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Searching for Structure in Complex Social, Cultural & Psychological Phenomena

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Foreword

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In science, the effective modeling of human and social systems is clearly the hardest challenge of all, because such subjects are far more difficult to study than anything one might find in the so-called "hard sciences". This is so because, in comparison to other fields, social, cultural, and psychological phenomena tend to involve a much larger number of variables to be considered, and show more complex, non-linear, relations between the variables involved. Furthermore, taking a historical perspective, their investigation by means of scientific methods increased substantially only in the more recent past.

In order to face the challenge of producing valid and useful scientific models of complex social, cultural, and psychological phenomena, it is not only necessary to create meaningful concepts and adequate research methods, but also logical and analytical tools capable of dealing with numerous variables with complex relationships between them. Achieving this was the goal of Louis Guttman (1916-1987), a brilliant psychologist, sociologist, and mathematician who produced fundamental advances in the fields of matrix algebra, scales of measurement, factor analysis, and multidimensional scaling. Having accumulated numerous awards and prizes throughout his illustrious career, he is considered one of the central thinkers that contributed by their seminal work in a sustainable manner to scientific progress in the social and human sciences during the 20th Century. Core elements of his work are Smallest Space Analysis (SSA) and Facet Theory, a set of techniques, methods, procedures, and paradigms capable of handling complex phenomena, identifying the relational structure within a multivariate dataset, and supporting the construction and/or empirical testing of theoretical models.

The Proceedings of the 14th International Facet Theory Conference "Searching for Structure in Complex Social, Cultural, and Psychological Phenomena" address various aspects of Facet Theory and its analytical tools that are still scarcely known in the scientific world when addressing complex social, cultural, and psychological phenomena and identifying their underlying relational structure. It is hoped to contribute and strengthen the field with contributions from researchers originating from different parts of the world,

including Belgium, Brazil, China, England, Germany, Israel, Italy, Norway, Portugal, and USA, and to advance its acceptance in the academic community.

In Part One, the possibilities and limitations of Facet Theory are considered. Borg and Bilsky focus on a duplex in MDS space as the simplest form of both a circumplex and a dimplex. Bilsky, Borg, Janik and Groenen illustrate how one can impose theory-based regional side constraints onto an MDS solution. Souza and Arruda explore the use of scalograms and Facet Theory, along with cluster analysis, as a basis for the construction of conceptual maps. Souza, Souza, Roazzi and Magalhães approach the fact that the lack of a formal treatment of uncertainty in Facet Theory and SSA leads to the use of ad hoc practices and can produce significant problems in the interpretation of scalograms.

Part Two shows several comparisons of the outcomes of SSA and Facet Theory with those of more traditional multivariate methods. Here, Rabenu, Elizur and Yaniv, along with Rocha, Roazzi, Silva, Candeias, Minervino, Roazzi and Pons, as well as Rocha, Candeias, Roazzi and Silva, plus Süß (Suess), contrast the findings of factor analysis and SSA/Facet Theory in various contexts. Findings suggest that the latter are more effective and robust in identifying the relational patterns in multivariate data. Roazzi, Diniz, and Candeias show that, at least in certain cases, SSA and Facet Theory can produce better results than structural equation modelling.

Part Three presents works using SSA and Facet Theory for investigating organizational phenomena. Solomon and Huse study the perceptual structure of the influence of the CEO in the boardroom. Rabenu, Elizur and Yaniv explore the structure of stress and coping strategies in Israeli organizations. Fisher analyzes the self-efficacy of school principals and its wave-like patterns as a function of experience.

In Part Four, different types of educational processes and aspects of psychological development are considered in the light of SSA and Facet Theory. Zhao Shouying, Yang Jian-yuan and Pan Yun study the structure of vocational interests of college students in China. Rebelo, Candeias and Roazzi evaluate the attitudinal and emotional profiles of Portuguese elementary school students as a function of sex and grade. Rosário, Candeias and Roazzi investigate the psychometric abilities of Portuguese children aged 7 to 15. Roazzi, Rocha, Candeias, Silva, Minervino and Roazzi analyze the relationship between social competence and the comprehension of emotions in children. Vione, Barbosa and Gusmão observe the value structures of adolescents, young adults, and

mature adults. Sousa, Soares, Gouveia and Lima test the structural hypothesis of the Functionalist Theory of Human Values among children.

In Part Five, the relational structure of values is explored. Gouveia, Fonseca, Nascimento and Souza Filho compare value structures cross-culturally. Araújo and Souza test the Functionalist Theory of Human Values in the context of a very large sample from the state of Paraiba, Brazil. Janik and Bilsky study value structures based on data from the European Social Survey, with special focus on deviations from Schwartz's values theory. Guerra analyzes the structure of moral codes based on facets identified in the Community, Autonomy, and Divinity Scale.

Part Six explores applications of SSA and Facet Theory to criminology and forensics. Scarpati, Guerra and Duarte test the structure of the Acceptance of Rape Myths Short Scale in Brazil. Souza, Roazzi, Souza and Silva evaluate the structure of the Honor Scale and its potential to explain the role of the "culture of honor" in the propensity towards homicide. Souza, Roazzi, Souza and Rocha analyze the structure of the Basic Values Questionnaire and attempt to build a holistic view of basic values, moral compasses, prejudice, and attitudes towards homicide in the Brazilian Northeast.

Part Seven deals with mental health issues. Attili, Di Pentima, Roazzi, Toni and Souza study patients with eating disorders in order to assess the structure of comorbidity and psychopathological symptoms. The same authors investigate the intergenerational transmission of attachment and its role in eating disorders. Escobar, Roazzi, Souza and Nascimento examine the mediating role of self-rumination in mental health in the context of the religious use of the ayahuasca.

Part Eight involves the use of SSA and Facet Theory to study views of society and of the environment. Kedar and Shye evaluate the congruence of views on distributive justice among party-voters in Israel. Barnetz examines the evidence from three studies with respect to the role of low legitimacy in inside/outside partition in systemic quality of life structures. Shenhav-Goldberg, Ginzburg and Barnetz research perceived racism, emotional response, behavioral response, and internalized racism among Ethiopian adolescent girls in Israel. Xue, Hine and Zhao use a multidimensional worldview model to explore environmental risk perception and pro-environmental behaviours. Finally, Costa Filho and Monteiro explore signscapes in urban environments in terms of their information and persuasion.

The 32 papers presented here provide a broad view of the status and of future trends in Facet Theory, and illustrate the many different applications within the human and social sciences. They also contain cutting edge findings in the study of quite different fields of application. It is our hope that these proceedings may contribute to a greater dissemination of MDS and Facet Theory among researchers involved in the study of social, cultural, and psychological phenomena. In fact, the real power of facet theory resides in its capacity of establishing a close connection between theory and research, dealing with multidimensionality, and geometrically displaying the organizational structure underlying a World of apparent disorder.

Finally, we hope that these proceedings will contribute to the dissemination of Facet Theory and, at the same time, will enable critical cooperation and exchange between the veterans and newcomers in the field, supporting the development of new processes and applications in research.

1 | Advances In Method And Theory

Interpreting a Duplex Using MDS and FA:
A Case from Work Value Research

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Abstract: A duplex in MDS space is the simplest form of a circumplex and also the simplest form of a dimplex. It is discussed here, using an example from value research, that thinking about extensions of the duplex to more than just a 2x2 regionalization helps interpreting the given duplex properly and building theory that promises to be generalizable beyond the duplex. In particular, it is found that you cannot "simplify" a circumplex by reducing it to basic "dimensions". Both exploratory and confirmatory MDS, as well as factor analysis are used as statistical tools.

1. Introduction

Circumplexes are structures that are frequently found in empirical social research. Probably the best-known example is the value circumplex, first proposed by Schwartz and Bilsky (1987) and replicated since then in numerous studies around the world. This Theory of Universals in Values (TUV) suggests that value items can be classified reliably into ten different "motivational domains" such as achievement, self-direction, security or enjoyment. Many other classifications are possible, of course, but what makes the Schwartz-Bilsky system particularly interesting is that it can be used to structure how respondents assess value items. That is, the intercorrelations of how respondents rate the importance of various values "as guiding principles in their life" can be modeled by distances of a 2-dimensional MDS space. The items are represented as points in this space, and the points are located such that the plane can be

partitioned so that points representing the same value fall into the same region. The various regions form a circle of sectors ("circumplex", see Figure 1). Some sectors are *opposite* to each other, forming composites of two regions that look like *hourglasses*, with an X-shaped set of partitioning lines. What is interesting about such regional structures in the TUV context is that they contain values that are *competing against each other*. For example, "to strive for success by using one's skills usually entails both causing some change in the social or physical environment and taking some risks for preserving the status quo and for remaining psychologically and physically secure that is inherent in placing high priority on security values (Schwarz & Bilsky, 1987, p. 554). Schwartz (1992) later proposed "that examination of the conflicts observed suggests a simpler way to view values structures. The relationship among the motivational types of values and among the single values can be summarized in terms of a two-dimensional structure. The total value structure can be viewed as composed of four higher order value types that form two basic, bipolar, conceptual dimensions" (p. 43). This leads to a duplex with two oppositions, "self-transcendence vs. self-enhancement" and "openness to change vs. conservation" (Figure 1, left panel). Similar systems were also proposed by Schwartz et al. (2012). They increased the number of values from 10 to 19 (Figure 1, right panel) and added two further "dimensions": "One dimension contrasts values concerned with self-protection and avoiding anxiety versus those that express anxiety-free growth… A second dimension contrasts values focused on personal versus social outcomes" (p. 15).
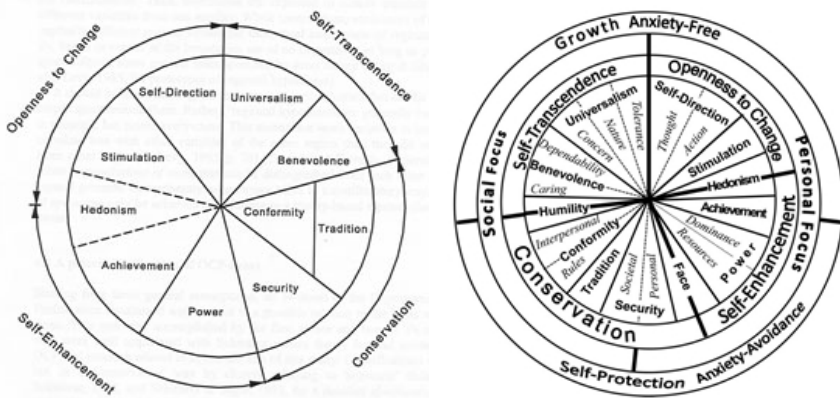
Fig. 1. TUV value circles with 10 and 19 values, respectively.

Not all value research uses facet-theoretical designs and MDS data analysis. One prominent example is the O(rganizational)C(ulture)P(rofile), a battery of 54 value items that asks employees to assess (both for themselves and for the company they work for) the importance of values such as "being demanding", "taking the initiative", "stability", and "informality". The OCP items were written, modified, and rewritten in traditional ways, i.e. by repeated factor analyses of pools of items that seemed to assess work values. The structure of the final set of items is based on exploratory factor analysis with simple structure rotation. For the 54 OCP items, one usually finds about eight factors such as "flexibility", "adaptability", "being aggressive", or "being demanding" (O'Reilly et al., 1991; Jehn et al., 1997). They yield a plausible post-hoc classification of the items, but since factor analysis had been used over and over again in the item construction process, the factor structure may be artificial to some extent, i.e. it may not hold for items that did not go through the scale-construction process with its purely formal side constraints (scree test, simple structure, high loadings, etc.). Given the TUV as a content-driven general theory of values, one can ask, therefore, to what extent the categories of the TUV can be used not only to conceptually classify the various OCP items but also to shed light onto the empirical structure of OCP items.

2. A TUV- Classification of the OCP Items and the Resulting Duplex

Bilsky and Jehn (2002) used the simplified TUV to encode the work value items of the OCP. They then checked via MDS to what extent this conceptual framework is mirrored in the structure of the data rather than using exploratory factor analysis which pays no attention to content codings of the items. The resulting MDS solution (Figure 2) exhibits a perfect correspondence of the facet-based codings of the items into four categories and a 2x2 partitioning of the space into four regions. However, the shape of the regions is "curvy" which does not promise to be replicable with new data. Nor does it easily relate to a law of formation such as two dimensions that represent the basic value opposition self-enhancement vs. self-transcendence and conservation vs. openness to change, respectively. Yet, using confirmatory MDS, Borg et al. (2011) showed that the simplified TUV theory and its duplex regionality can be

enforced perfectly onto an MDS solution (Figure 3) with a negligible additional loss of data information (i.e., almost the same Stress as the exploratory solution).
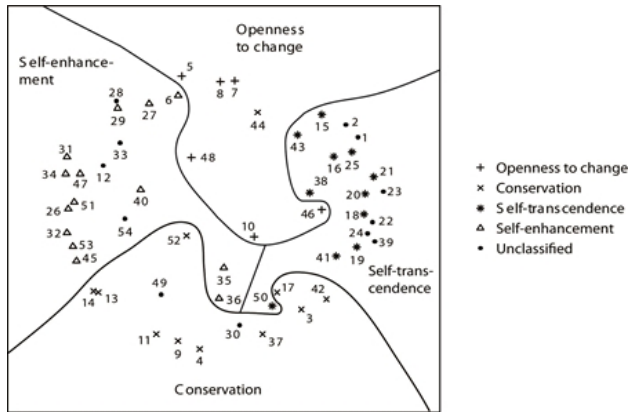
Fig. 2. An MDS representation of 54 OCP items of Table 1 (S=0.23), with best-possible TUV regions similar to Bilsky & Jehn (2002, p. 220).
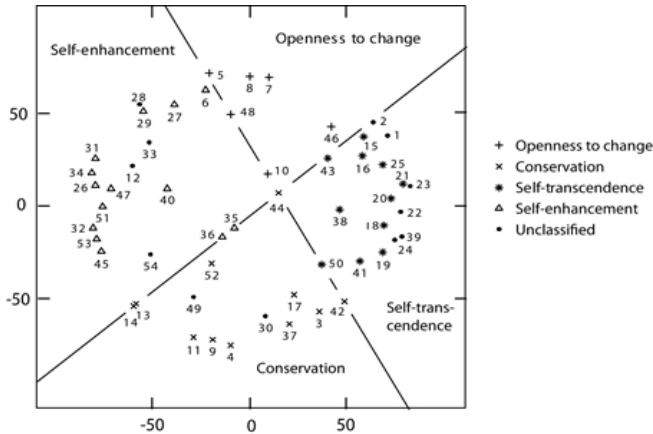
Fig. 3. MDS of the OCP items perfectly enforcing a TUV duplex (S=0.24).

The OCP data can also be analyzed by factor analysis. Indeed, the OCP items were developed by using traditional item construction methodology which is intimately connected to factor analysis. Typically, eight factors are needed to statistically explain the OCP items, and this is also true for the given

data. These factors can be embedded into the MDS space using regression methods. Figure 4 exhibits this embedding graphically: The factors are shown as vectors running through the origin of the MDS coordinate axes. The vectors are rotated about the origin of the MDS coordinate axes such that the resulting point projections are maximally correlated with the factor loadings of the items. Computationally, the optimal rotation is found by predicting the respective vector of factor loadings from the two coordinate vectors of the MDS solution: The raw weights of the regression equation are then taken as the coordinates of a point in the MDS plane through which the vector that represents the factor should run; the second point that defines the vector is the origin of the MDS configuration. The fit of the embedded factors is shown in Figure 4 by the correlation coefficients next to the vector heads. You will note that the fit of the factors in MDS space is high for five factors, reasonable for two factors, and relatively poor for one factor. You may also note that the factors form two bundles (F1, F2, F5, and F7; and F3, F4, F6, and F8). These bundles roughly correspond to the two dimensions of the simplified TUV. So, the FA scales can be taken as a springboard for further theory development, in particular for shedding additional light onto the TUV dimensions. F1, for example, has high positive loadings for the items "flexibility", "adaptability", "being easy going", "being calm", "low level of conflict", and high negative loadings for "being aggressive", "being demanding", and "working long hours". Hence, this factor can be seen as a component of the Self-transcendence vs. Self-enhancement TUV dimension which focusses on easy-going/calm vs. aggressive. A similar factor is F7, where "fairness", respect for the individual's rights", "tolerance", "being supportive" and "offers praise for good performance" load positively, and "being aggressive" and "being competitive" load negatively. So, F1, and F7 indicate two components of the Self-enhancement vs. Self-transcendence TUV dimension, one that is task-oriented and the other that is people-oriented.

Viewed more formally, the embedding analysis also shows that the high dimensionality of the FA solution may be artificial, stemming from the restrictive mathematical scaffolding that FA uses to represent the data. On the other hand, one can argue that the MDS solution is articifically low-dimensional, because it does not disentangle dimensions which are really multi-dimensional.

3. Where to go from a duplex: Dimplex or circumplex?

It seems obvious that having established a duplex, the next natural step in theory development is to extend the theory to a 3x3, 4x4 etc. system, i.e. enforcing an ever finer dimensional grid onto the items. This requires, first of all, a more fine-grained explication of the 2x2 TUV classification of the items. This extension is also a test for how to conceive of the given duplex: It helps deciding whether the duplex is either a simple circumplex or a pattern of dimension-like regions, a pattern that we call "dimplex". These structures are fundamentally different for theory construction.
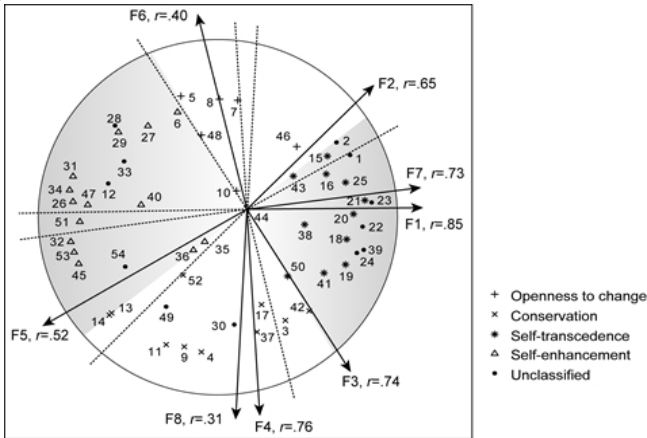
Fig. 4. The MDS solution of Figure 3 with optimally embedded factors from exploratory FA.

With the given OCP data, it turns out that extending the duplex in terms of a dimplex is conceptually (but not statistically) difficult. Conceptually, you would have to clarify, for example, what lies between extreme self-transcendence and extreme self-enhancement, and what between extreme conservation and extreme openness to change. If you look at item #10 in Figure 2 or 3, for example, then this item should be in between all extremes. Content-wise, item #10 is "autonomy". It was classified by Bilsky and Jehn as representing the value "openness". That is, a respondent who rates "automomy" as highly important should do so because he/she feels that "openness to change" is highly important to him or her. Hence, the Bilsky-Jehn classification is really a hypothesis about the respondents. But what comes to the respondents' minds

when they think about rating the importance of "autonomy"? Is it having a say in decisions affecting their own work? Is it working in non-teamwork tasks? Etc. And why should all this be related to "openness to change"?

Each stripe of a dimplex should represent a substantive gradient, where items are ordered in terms of "more" or "less". This is illustrated in Figure 5, where all items within the stripe with the coordinate value 3 on dimension Y should be *equivalent* in terms of Y, irrespective of where they lie on dimension X. Figure 6 demonstrates this more concretely for the TUV structure: Here, the stripe in the North-West corner collects items of different sectors of the circumplex, i.e. values that are classified in the original TUV as self-direction, stimulation, or hedonism. All the items in this stripe are equivalent in terms of openness to change, but they vary along the self-enhancement vs. self-transcendence dimension.
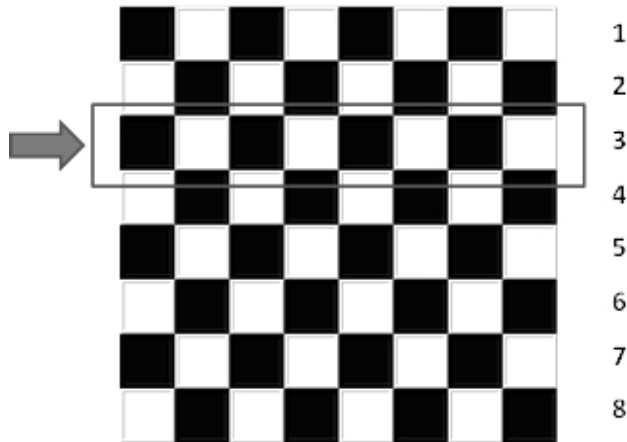
Fig. 5. All points in the same stripe share one coordinate value (here: Y=3).

What points fall into the same stripe depends on the rotation of the partitioning line grid. Given four regions or clusters with items that clearly belong to self-enhancement, self-transcendence, conservation and openness to change, respectively, you could use these regions to define the corners of a checkerboard (as in Figure 3), but also some middle category. In the latter case, you should be able to come up with labels for those regions that are now the corner regions. The items in these corner regions of the duplex checkerboard are extreme on two dimensions, and so they should be particularly useful for interpreting the dimensions. Consider a case. Assume we want to use

the rotation of the dimensions shown in Figure 3. Then we have to interpret the dimension "Self-enhancement/Openness to change vs. Conservation/Self-transcendence" and "Self-enhancement/Conservation" vs. "Open-ness to change/ Self-transcendence". This seems difficult with these global labels, so we have to take a closer look at the items once more. They suggest the dimensions active/ decisive/innovative vs. stable/predictable/rule-oriented, and the dimension being precise/predictable/performance-oriented/rule-oriented vs. informal/experi-mental/easy-going/flexible. Note that we included the OCP item #11="being rule-oriented" in both dimensions to show that any item in the duplex belongs to two dimensions, not just to one sector of the circumplex. (Item #11 was coded by Bilsky & Jehn, 2002, as "Conservation" only, with no other code assignment.)

 Any 2-dimensional dimplex is based on two substantive gradients. If we use the perspective of the simplified TUV, we get a different rotation of the dimensions, with (1) strong self-enhancement (E), self-enhancement (e), self-transcendence (t), strong self-transcendence (T); and (2) a similar bipolar gradient for the Openness to change vs. Conservation dimension (O-o-c-C). This may seem clear enough, but the real test comes when the given OCP items have to be classified into this system. Consider some cases. How, for example, would you code "being socially responsible"? As "T" or as "t" on the T-t-t/e-e-E scale? And as "O", "o", "o/c", "c", or "C" on O-o-t/c-c-C? (Our final coding was Tc.) Or the item "risk taking"? This is clearly an "O" item, but how should it be coded with respect to the second dimension?
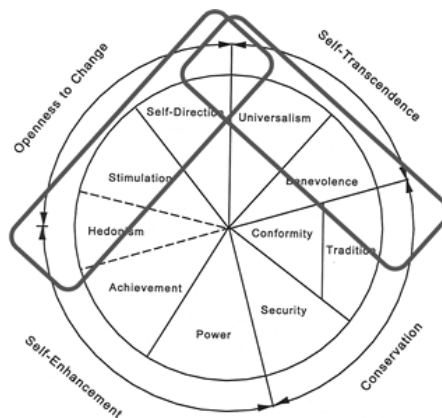
Fig. 6. Dimension-wise partitioning the exploratory MDS representation of the OCP items into dimensional stripes.

(Our final coding was sO.) In the end, we generated 5x5 code assignment for most items (although with quite a bit of uncertainty in many cases). Some items did not receive full 5x5 codes. Rather, these codes were left open as "?" or "undecided". Also, there was not a single item with extreme codes on both dimensions. This may indicate that "better" items are needed, i.e. those that are constructed with the TUV dimensions in mind. However, during this conceptual work it became clear that coding typically meant that an item had to be *contextualized*. That is, we had to theorize how *the respondents* would interpret the items in terms of their actual working life or in terms of concrete cases, typical incidents, etc. In other words: Any coding of work value items must be done with the respondent's particular work setting in mind. The setting that we chose was the setting that we felt described the individuals that generated the OCP data of by Bilsky and Jehn (2002).

In the end, the 5x5 code assignments were not fully convincing. They seemed unreliable, i.e. when thinking about the codes a few days later, they appeared arbitrary in many cases. So, we settled for a simpler partitioning, a 3x3 system. Moreover, the 3x3 coding was done using an exploratory MDS solution as an *empirical support* system. (This probably comes close to what is done in practice in most cases, even though few would admit doing it.) That is, we coded the items first and then checked their positions in the MDS plane to see to what extent these points would fall into the same stripes. If they violated this test, the items were recoded or the stripes were redrawn somewhat. This process of adjusting both codes and partition boundaries in a ping-pong fashion was repeated iteratively until both the coding and the striping seemed plausible.

With a 3x3 coding established in this fashion, an MDS solution with a perfect 3x3 checkerboard regionalization can be enforced, extending the solution of Figure 3 to a dimplex with nine cells. (Note that presently there does not exist a freely available MDS program that can handle this type of confirmatory MDS scaling. Proxscal in SPSS promises to do this, but generates an incorrect solution; see Borg et al., 2012; or Borg et al., 2013). We therefore used an experimental MDS program written in the MatLAB language by Prof. Patrick Groenen of the Erasmus Universiteit Rotterdam, NL.) However, enforcing this 3x3 grid MDS solution is, to some extent, a formal exercise: Its Stress is minimally higher than the Stress for the exploratory MDS solution which, of course, is partly due to the fact that the coding was done in partnership with the exploratory MDS solution. It was not based on *pure* content considerations, because they were not clear enough.

The difficulties encountered when coding the items cast doubt on the notion of two TUV dimensions. True dimensions should represent true substantive gradients. Items that project similarly onto a dimension (i.e., those within the same stripes) should be similar in the sense of this dimension, no matter where they are in terms of the other dimension. What was particularly difficult in the given case was coding the non-extreme items. For example, the items "12=being analytical", "21=tolerance", "23=being easy-going", and "26=being aggressive" are all in the middle of the Openness to change vs. Conservation dimension (see Figure 2). However, it is hard to see how to interpret them on this dimension at all. All that seems possible is to decide that they are neither indicators of Openness nor indicators of Conservation. So, they end up in the middle category because one cannot see what they really mean. They remain cases of "undecided" rather than exhibiting the "middle" of some attribute. These analyses lead us to conclude that the duplex in Figure 3 should be conceived as a simple circumplex, not as a simple dimplex.

4. Discussion

One conclusion of the analyses above is that *you cannot simplify a circumplex by introducing dimensions*. Using a "dimension" terminology means that you are implicitly introducing a different structural theory for the population of items and for facets with more than just two categories. Facets that correspond to dimensions articulate simple orders of content for its stripes. The order may be qualitative at first but if it replicates the researcher is well advised to think about the dimension's underlying gradient of content and its quantitative meaning with gradual substantive transitions. In any case, all items within a dimensional stripe should have something in common and vary systematically only on the other dimensions.

Strictly speaking, each axis in a circumplex is a "dimension", i.e. (1) a straight *line* that runs through the origin, and that (2), in case of values, has a bipolar meaning with opposite values at its endpoints. However, there are infinitely many such dimensions, each one with a different orientation.

Schwartz et al. (2012), in their "refined" TUV, offer not just two but four pairs of opposite value domains that they call "dimensions". Yet, these dimensions are neither dimensions in the sense that they coordinatize the MDS

plane, nor are they axes that have a compelling substantive interpretation. Rather, the dimensions of the "refined TUV" are actually what we described above as *hourglass regions*, i.e. composites of two opposite sectors of the circumplex. (Note that such regions are elements of a circumplex; they differ from the stripes of a dimplex.) These hourglasses can be seen in Figure 1 (right panel): Self-enhancement vs. Self-transcendence; Conservation vs. Openness to Change; Personal focus vs. Social Focus; and Growth anxiety free vs. Self-protection anxiety-avoidance. At the same time, they argue that their refined TUV "more accurately supports the central assumption of the original theory that research has largely ignored: Values form a circular motivational continuum" (p. 1). Hence, in this TUV version, the "dimensions" are not an attempt to simplify but to explain the circumplex and its order of regions. The overlapping and interlocking of the hourglasses allows one to derive order predictions for some of the 19 values. Calling such hourglasses "dimensions", therefore, is blurring the theory that, in fact, represents a commendable case of attempting to explain the circular order of the TUV circumplex. To understand the meaning of the circular dimension that "generates" the order of the value sectors had always been an element of the TUV: "… the partition lines … represent conceptually convenient decisions about where one type of motivation ends and another begins. Because the array of values represents a *continuum* [my emphasis] of motivation, the precise locations of the partition lines are arbitrary" (Schwartz, 1992, p. 45).

A fuller theory of values should also explain the points' positions relative to the origin. Thus, thus the circumplex should be turned into a radex. A case that illustrates this nicely is the color circle, where the circular position represents the "hue" of the stimulus and the distance from the origin the "saturation" of the stimulus. The notion of saturation may serve as a guiding model in thinking about radexes in general and, in particular, about a TUV radex. What one needs to explain, in particular, is the shrinkage of the sectors as one moves towards the origin of the circumplex. Empirically, this reflects growing similarities among the items until they all end up in the same point. In the color circle, this corresponds to a decrement of color saturation, from a saturated color to pure gray. But what does it mean in the context of values? The factors in Figure 3 show that it corresponds to the size of the items' loadings. Hence, in terms of content, this may indicate a value's breadth of focus, where sharp and narrow foci are at the outside and unsaturated (blurry, "gray") values are in the middle.

In any case, such systematic shrinkage of regions does not occur in a dimplex.

Mathematically, the dimplex and the circumplex are just regional versions of two alternative ways to coordinatize a geometric plane, i.e. the familiar *Cartesian* method with its *X* and *Y* coordinates, and the *polar* method with its direction angle and a distance-from-the-origin coordinate. Both render geometric problems accessible to algebra. Yet, the TUV circumplex in Figure 1 does *not* articulate its polar distance coordinate (as a radex would), and so "simplifying" the circumplex by introducing two dimensions means that the plane is actually *fully* coordinatized while the TUV circumplex specifies only *one of two* coordinates. Indeed, the dimensions that are supposed to "simplify" the circumplex are, in a sense, not simplifying the theory at all: Rather, they articulate *two linear* dimensions rather than just *one circular* one. Hence, the difficulties encountered above may also stem from the fact that the dimplex asks for substantive specifications that are missing in the TUV circumplex.

Researchers who encounter a duplex should carefully consider its interpretation as a dimplex or as a circumplex. This can be done, first of all, by considering extensions of the underlying 2x2 facet system. Using terminology that does carry beyond the 2x2 case may thwart theoretical progress.

Statistical methodology does not help much in deciding where to go from a duplex. Dimensional checkerboard-like regions may hold perfectly in confirmatory MDS with low Stress if you allow exploratory analyses to influence the items' codings, a common practice of traditional item analysts or scale constructors. Factor analysis does not help either but, if used carefully, it may be help clarifying the meaning of content facets.

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Children's value structures - Imposing Theory - based regional restrictions onto an ordinal MDS solution

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Abstract: Children's value structures have been under-researched in the past. With the development of the Picture-Based Value Survey for Children (PBVS-C; Döring et al., 2010) the situation changed, and data from 14 countries have been analysed since then. Recently Roazzi et al. (2011) used an adaptation of the PBVS-C to analyse value structures of Brazilian children. Their results show some marked deviations from hypothesized structures. We reanalyse these data imposing theory-based regional side constraints onto the MDS solution and compare the results with those from weak confirmatory MDS and from Principal Component Analysis.

1. Introduction

Until recently children's value structures have remained under-researched as compared to those of adults. Some few studies with older children show structures that are similar to those of adults and compatible with Schwartz's (1992) theory of human values (e.g., Bubeck & Bilsky, 2004; Liem et al., 2011). Studies with younger children were missing almost completely. Since literacy is a necessary requisite

for completing standard questionnaires, this lack of research can be partly ascribed to limited reading skills of children younger than 10.

With the development of the Picture Based Value-Survey for Children (PBVS-C; Döring et al., 2010) this situation ameliorated. The PBVS-C is grounded in Schwartz's (1992) value theory and has been constructed in close analogy to his Portrait Values Questionnaire (PVQ). In order to use the instrument in cross-cultural studies, children's understanding of the pictorial portrayals had to be tested. If necessary, items were adapted to the particular cultural context. Meanwhile the PBVS has been applied to samples from 14 countries worldwide. Findings confirm the validity of this instrument and its applicability in cross-cultural research, even with children younger than ten (Bilsky et al., 2013; Döring et al., 2010, 2011).

Roazzi et al. (2011) applied an adapted version of the PBVS to a sample of Brazilian children. Their results confirmed the basic values structure hypothesized by Schwartz (1992). However, some items showed marked deviations. These deviations may be attributable to cultural factors and/or to a suboptimal adaptation of the instrument. They suggest reanalysing the present data in order to identify possible weaknesses of the instrument that need amendment.

The present paper focuses on methodological aspects. In doing so, we refer to both Schwartz's (1992) early conceptualization of his theory, and to a recent reconsideration of his two ''basic value dimensions'' self-enhancement vs. self-transcendence and openness to change vs. conservation (Schwartz, 2006; see also Schwartz et al., 2012). In this reconsideration, Schwartz discusses dynamic principles which go beyond congruence and conflict (Schwartz, 2006, 947f). The first principle differentiates between social and personal interests, the second contrasts anxiety and growth related objectives: the prevention of loss and the promotion of gain. The following mapping sentence results when recasting these principles in terms of facet-theory.

p considers value X that has a {social/personal} focus and that {promotes gain/prevents loss} for p → {very important … not important} as a guiding principle for his/her life.

It should be noted that this mapping sentence deviates from former formalizations which contain only one motivational facet (Schwartz & Bilsky, 1987; Schwartz, 1992). Assuming two facets allows disentangling motivational content.

In the following we present first a replication of the analysis reported by Roazzi et al. (2011), using a weak confirmatory MDS approach. Second, we reanalyse the Brazilian data by using a strong confirmatory MDS that enforces regional restrictions onto the data. Finally, these analyses are complemented by a Principal Component Analysis (PCA), an often used statistical procedure in scale construction.

2. Method

2.1. Sample

The Brazilian sample analysed by Roazzi and collaborators (Roazzi et al., 2011) consisted of 185 children between 6 and 12 years, almost equally divided into girls (95) and boys (90). All of them attended one of two public schools in Recife, Pernambuco. Their schooling level ranged from 'alfabetização' (one year prior to the first grade) to the fourth grade. Prior to reanalysing these data, we excluded missings listwise. Hereby our final sample was slightly reduced to N=182 children.

2.2. Instrument

The Picture-Based Value Survey for Children (PBVS-C) was developed within the conceptual framework of Schwartz's (1992) Theory of Universals in Values (Döring et al., 2011; Bilsky et al., 2013). It comprises twenty items, each depicting one value-related situation which is complemented by a short caption. Captions were formulated by children in their own words. Every basic value is represented by two items (Table 1, second column).

The twenty items are printed on removable stickers. Children's task is to paste them on a standard response sheet in a Q-sort like ranking and rating procedure with five graded alternatives from "very important" to "not at all important" in my life. They are instructed to accomplish this task according to their subjective importance. Figure 1 shows sample items and the response sheet of the PBVS-C.

The PBVS-C was first validated with different samples of German children (Döring et al., 2011). In the following it was adapted for the use

in several other countries.[1] The adaptation for Brazil included several steps which related to the content of particular pictures (i.e., the children's field of experience), the figure captions (children's lexicon), and the empirical setting (presentation of material; individual assessment; cf. Roazzi et al., 2011, for more detailed information).

Table 1. Human Values (Schwartz, 1992), classified according to "Focus" (social vs. personal) and "Objective" (promotion: gain vs. prevention: loss); see Schwartz (2006).

Higher-Order Values (HOV)	Basic Values and PBVS-Items	Central Motivational Goal [a]	Facets and Elements [b]	
			Focus	Objective
Self-Transcendence	Universalism UN1, UN2	Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature	social	promotion: gain
	Benevolence BE1, BE2	Preserving and enhancing the welfare of those with whom one is in frequent personal contact (the 'in-group')	social	promotion: gain
Conservation	Tradition TR1, TR2	Respect, commitment, and acceptance of the customs and ideas that traditional culture or religion provide the self	social	prevention: loss
	Conformity CO1, CO2	Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms	social	prevention: loss
	Security SE1, SE2	Safety, harmony, and stability of society, of relationships, and of self	social	prevention: loss
Self-Enhancement	Power PO1, PO2	Social status and prestige, control or dominance over people and resources	personal	prevention: loss
	Achievement AC1, AC2	Personal success through demonstrating competence according to social standards	personal	prevention: loss
Openness to Change	Hedonism[c] HE1, HE2	Pleasure and sensuous gratification for oneself	personal	promotion: gain
	Stimulation ST1, ST2	Excitement, novelty, and challenge in life	personal	promotion: gain
	Self-Direction SD1, SD2	Independent thought and action; choosing, creating, exploring	personal	promotion: gain

a Central motivational goals (Schwartz, 2005; http://essedunet.nsd.uib.no/cms/topics/1/)
b Facets: Focus (f1 social, f2 personal); Objective (o1 promotion: gain, o2 prevention: loss)
c Hedonism shares elements of both self-enhancement and openness to change, but is closer to openness in most cases (Schwartz, 2005).

[1] see also http://wwwpsy.uni-muenster.de/Psychologie.inst4/AEBilsky/international/map_pbvs-c.html
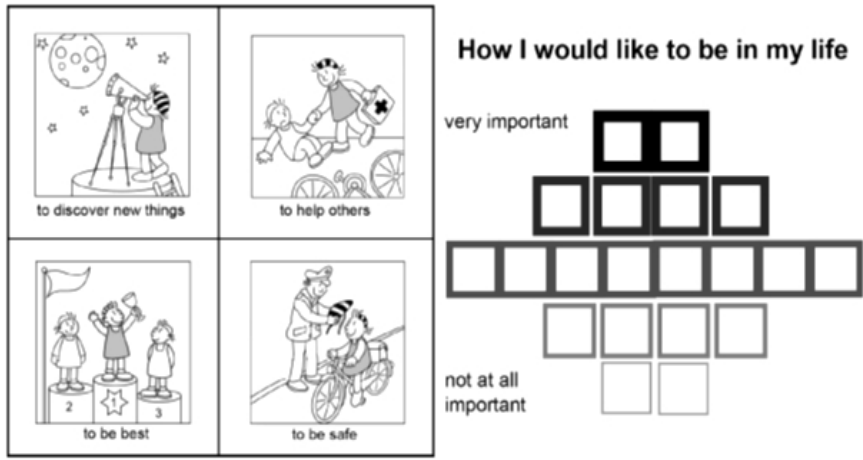
Fig. 1. PBVS-C Sample Items (self-direction, benevolence, achievement, and security) and Response Sheet with five graded alternatives (see Bilsky et al., 2013)

2.3. Ordinal Multidimensional Scaling

2.3.1. Weak Confirmatory MDS

The first analysis with the Brazilian data parallels the one reported by Roazzi et al. (2011), except for a slightly reduced N. Falling back on Schwartz's original model of values structure (Schwartz, 1992, p. 14), we specified a theory-based starting configuration (Borg et al., 2013) to be employed for ordinal multidimensional scaling of the correlation matrix of the 20 PBVS-items. Using such a starting configuration reduces the danger of ending up in local minima and facilitates the interpretation of results. The ten sectors of the Schwartz model served as templates for specifying the location of each *basic value* by corresponding coordinates. Values are ordered equidistant around the unit circle as shown in the following *design matrix* (Table 2).

Table 2. Design matrix based on Schwartz's (1992, p. 14) original model: location of basic values (Bilsky & Janik, 2010, p. 344)

Basic Value Type	Dim 1	Dim 2	Direction Angle
Tradition (TR)	1.00	.00	0
Benevolence (BE)	.81	.59	36
Universalism (UN)	.31	.95	72
Self-Direction (SD)	-.31	.95	108
Stimulation (ST)	-.81	.59	144
Hedonism (HE)	-1.00	.00	180
Achievement (AC)	-.81	-.59	216
Power (PO)	-.31	-.95	252
Security (SE)	.31	-.95	288
Conformity (CO)	.81	-.59	324

The *starting configuration* resulted from this matrix such that items measuring the same basic value are represented by identical coordinates (see Bilsky & Janik, 2010, for a more detailed description of this procedure, and for comparing alternative starting configurations based on Schwartz's theory). While using a theory-based starting configuration is preferable to a configuration that does not relate to the research question under study (e.g., *Simplex*, *Torgerson*, or *Random*), this approach is not strictly confirmatory because it does not enforce a hypothesized regional solution. Yet, it goes beyond a merely exploratory MDS because it specifies theory-based regional hypotheses prior to statistical analyses. Therefore, this procedure is sometimes also called a *weak confirmatory approach* (Borg et al., 2013).

2.3.2. Strong Confirmatory MDS

A strong confirmatory approach enforces theoretically grounded regional restrictions onto the MDS results. These restrictions can be derived from the above mapping sentence. First, the ten basic values (Table 1, second column) are classified independently according to each of the two facets "focus" and "objective" (columns 4 and 5). With two elements per facet, a 2 x

2 classification scheme results as depicted in Figure 2, allocating every value to one of the four quadrants 1/1, 1/2, 2/1, and 2/2.

Classification Scheme		Objective	
		promotion: gain	prevention: loss
Focus	social	1/1 *Self-Transcendence*: Universalism Benevolence	1/2 *Conservation*: Security Conformity Tradition
	perso- nal	2/1 *Openness to Change*: Hedonism Stimulation Self-Direction	2/2 *Self-Enhancement*: Achievement Power

Fig. 2. Classification of the ten basic human values (Schwartz, 1992) according to the two facets "Focus" and "Objective"

Next, the PBVS-items are characterized by *structuples*, that is, by the combination of facet elements taken one from each facet. There are four possible structuples: 11, 12, 21, and 22. Thus, 21, the structuple of item SD1 in the upper left corner of Figure 1, defines this situation as expressing *personal* interest and *promoting gain* (i.e., pursuing reward; see Schwartz, 2006).

Facets often play typical roles in partitioning multidimensional space (Borg & Shye, 1995). Schwartz's reconsideration of *self-enhancement vs. self-transcendence* and *openness to change vs. conservation* (above) suggests interpreting "Focus" and "Objective" as two axial facets with two elements each. This has implications for the expected split of value items in two-dimensional space: Instead of looking for a circular order of the ten basic values (a circumplex) a *duplex* is predicted to result, showing a quadrant structure.

There exists no standard software until today which would allow testing such a structure by confirmatory MDS. Therefore we used an experimental program written in MatLAB by Groenen and already used for similar purposes in an earlier study (Borg et al., 2011). In the present case, we specified regional restrictions for mapping the Brazilian value items in two-dimensional space

by referring to their respective structuples. To put it differently, our structural hypotheses corresponded to a split into four quadrants as suggested by the classification shown in Figure 2.

2.3.3. The Contribution of Individual Items to the "Badness of Fit"

Stress-1 is an often reported general index informing about the mismatch between the correlations and the corresponding distances of an MDS solution. However, for getting a better understanding of how much each single item contributes to this mismatch, other indicators are needed. Averaging the squared errors between one particular item and all other items yields such a measure. It indicates how badly this item is fitted by the respective solution. This indicator is called *Stress per Point* (SPP; Borg & Groenen, 2005).

Comparing the outcome of weak and strong Multidimensional Scaling is of particular interest in the present context. SPP is supposed to shed additional light on this comparison. Therefore, SPP is computed in addition to Stress-1 for both analyses and contrasted in a final table.

2.4. Principal Component Analysis

Principal Component Analysis (PCA) has been a frequently used tool in test construction. Therefore, and for comparison with the results of ordinal MDS, we subjected the correlation matrix of PBVS-items to PCA with orthogonal rotation to simple structure.

First, we screened the two-factors solution for parallels with Schwartz's (1992) "basic value dimensions". Second, we inspected the four-factors solution, looking for an overlap with the four higher-order values (HOVs) openness to change, conservation, self-transcendence, and self-enhancement. Finally, we checked for all solutions with eigenvalues > 1 whether blends of factors would form bundles that resemble the two dimensions of Schwartz's theory (see Borg et al., 2011; Borg & Bilsky, 2013, for a similar procedure when analysing the Organizational Culture Profile).

3. Results

3.1. Ordinal Multidimensional Scaling

3.1.1. Weak Confirmatory MDS

Our weak confirmatory MDS resulted in the two-dimensional split shown in Figure 3. The Stress-1 = 0.254 of this solution is relatively high. Yet, it is still lower than average Stress to be expected for random proximities among 20 objects in two dimensions, i.e., Stress-1 = 0.3 (Borg & Groenen, 2005). While most of the PBVS-items emerged in the hypothesized regions, three items showed marked deviations from expectation: AC2 was supposed to be located in self-enhancement, i.e., in the lower-left of this plot, and not in openness-to-change. CO1 should belong to the conservation-region, in the lower-middle sector. Finally, SD2 shows up in the conservation-region but should be located toward the top of this plot, among the openness-to-change items. TR1 is displaced to the right. However, this displacement can be compensated by drawing a bended line without violating the placement of other items.

3.1.2. Strong Confirmatory MDS

Figure 4 shows the results of our confirmatory MDS, enforcing an orthogonal split of the PBVS-items which is in line with the a priori classification of the ten basic values (Figure 2). In view of the marked displacements resulting in the weak confirmatory MDS, the increase of Stress-1 from 0.254 to 0.282 in the present analysis is small.

3.1.3. Stress per Point

The Decomposition of Normalized Raw Stress is summarized in Table 3 for both the weak and the strong MDS of the PBVS-items. In order to compare the resulting SPP to Stress-1, this latter indicator must be squared (σ_1^2).

Table 3. Stress per Point (SPP) for the weak and the strong MDS of PBVS-Items.

PBVS-Items	Ordinal MDS Stress per Point[a] and Stress-1	
	theory-based starting configuration	imposed regional restrictions
Universalism1 (UN1)	.0337	.0454
Universalism2 (UN2)	.0365	.0241
Benevolence1 (BE1)	.0627	.0760
Benevolence2 (BE2)	**.0949**	**.0916**
Tradition1 (TR1)	**.1205**	**.1036**
Tradition2 (TR2)	.0663	**.1057**
Conformity1 (CO1)	.0720	**.1014**
Conformity2 (CO2)	.0719	**.0909**
Security1 (SE1)	.0712	**.1037**
Secuirty2 (SE2)	.0469	.0393
Power1 (PO1)	.0335	.0416
Power2 (PO2)	.0538	.0563
Achievement1 (AC1)	.0359	.0452
Achievement2 (AC2)	**.1206**	**.1653**
Hedonism1 (HE1)	.0322	.0509
Hedonism2 (HE2)	.0742	.0876
Stimulation1 (ST1)	.0652	.0653
Stimulation2 (ST2)	.0550	.0444
Self-Direction1 (SD1)	**.0933**	**.1120**
Self-Direction2 (SD2)	.0461	**.1437**
Mean[b]	.0643	.0797
Stress-1	*.2536*	*.2823*

[a] SPP > .09 is printed in bold letters
[b] Squaring Stress-1 results in the average SPP (Mean) across all PBVS-Items
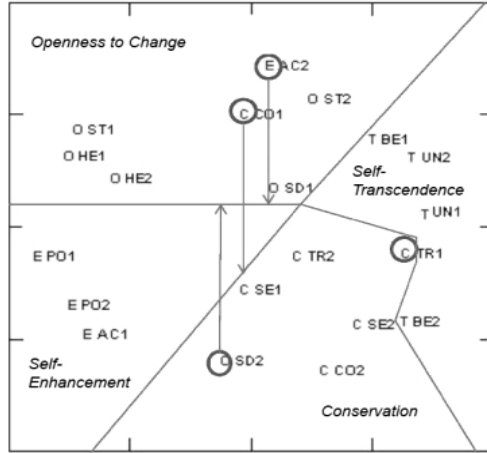
Fig. 3 Value data of Brazilian children (Roazzi et al., 2011): Weak confirmatory MDS, using a theory-based starting configuration (Bilsky & Janik, 2010); N = 182, Stress-1 = 0.254.
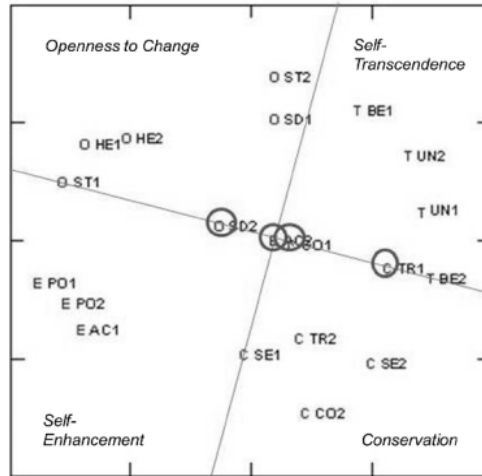
Fig. 4 Value data of Brazilian children: Strong confirmatory MDS, enforcing regional restrictions (Borg et al., 2011); N = 182, Stress-1 = 0.282.

3.2. Principal Component Analysis

According to the eigenvalue criterion, a maximum of eight factors could be extracted, explaining about 59% of the total variance. The four and the two factors solutions explain 35.5 and 20.8 per cent of the total variance, respectively; neither of them matches Schwartz's basic dimensions or HOVs, respectively. Screening the different solutions for bundles of factors that make up Schwartz's basic dimensions was also only partly successful.

Table 4 summarizes the eight factors solution. Considering only those items with high loadings, factor 1 relates to "self-enhancement", factor 2 to "openness" vs. "conservation", and factor 4 to "self-transcendence". The eight factors can be fitted quite well into the MDS plane (see Borg & Bilsky, 2013): Figure 5 shows this for the weak confirmatory MDS solution of Figure 3. Note that only one factor (i.e., F7) has a poor fit (r=.29). Fitting the factors into the confirmatory MDS solution is less successful: The factors that run in the vertical direction are not as well explained due to three major point movements (as shown in Figure 3) that negatively affect the fit of F5 and F8.

Table 4. Principal Component Analysis of PBVS-Items, 8 Factors, Varimax rotation

Item	Component							
	1	2	3	4	5	6	7	8
PO2	**-.732**	.097	.039	-.008	-.094	.168	-.059	-.032
AC1	**-.637**	-.098	-.212	.028	**.327**	-.170	.020	-.039
PO1	**-.484**	-.165	-.275	**-.313**	-.184	-.260	-.061	-.274
HE2	.050	**-.686**	.137	-.261	-.042	.129	.050	-.093
BE1	-.001	**.625**	.152	-.046	-.115	.231	.024	.001
TR2 *	.104	**.576**	.184	**-.397**	-.025	-.236	.058	-.056
HE1	-.041	**-.414**	-.263	**-.360**	**-.327**	-.030	.012	.195
ST1	.063	-.037	**-.732**	.008	-.197	.122	-.056	-.232
UN1	.197	.113	**.662**	.092	-.088	.138	-.066	-.161
BE2 *	.007	.016	.066	**.772**	-.037	-.182	-.001	.000
UN2	**.393**	.174	.038	**.403**	.056	**.361**	**.319**	.108
SD2 *	-.114	-.039	.093	.113	**.748**	.021	.115	-.017
SE1 *	**.341**	-.024	-.025	-.230	**.555**	-.110	-.136	.067
ST2	.140	-.029	.155	-.100	-.051	**.669**	-.065	-.048
SE2	.291	-.017	**.323**	.051	.005	**-.621**	-.035	-.056
TR1 *	.209	-.034	.084	.132	-.018	-.131	**.708**	-.259
CO2 *	.166	-.117	.250	.284	-.151	-.170	**-.631**	-.147
SD1 *	**.325**	**.334**	-.286	-.130	.151	.152	**-.392**	-.111
CO1 *	.062	.040	.020	-.024	.050	-.005	-.130	**.827**
AC2 *	.139	-.121	.055	.097	**-.357**	.000	**.351**	**.470**

* SPP > .9 in the two-dimensional ordinal MDS of PBVS-Items

4. Discussion

The *ordinal MDS* of the PBVS-items resulted in two-dimensional splits which largely reflect Schwartz's distinction of four Higher-Order Values (Figures 3 and 4). However *Stress-1* values are high in both the weak and the strong confirmatory MDS. The results of our additional analyses should shed some light on possible reasons for this poor fit.

Screening *Stress per Point* (Table 3) reveals that some items contribute more to the overall stress than others. It should be noted, however, that depending on which MDS is considered items show remarkable differences of SPP. Thus, TR1 and AC2 have above average SPP in both analyses. SD2, on the other hand, shows a below average SPP in the weak confirmatory analysis but an above average SPP in the strong confirmatory MDS. Since the *regional restrictions* imposed by this latter analysis are *theoretically grounded*, the respective SPP scores are diagnostically more important because they relate directly to item and construct validity.
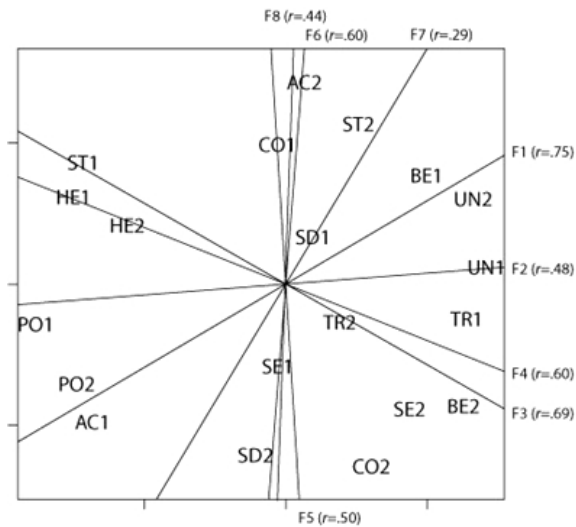
Fig. 5. Eight factors of PCA/Varimax analysis fitted into exploratory MDS representation; r=correlation of factor Fi with MDS dimensions (=fit of factor in MDS plane).

A closer look at SPP in our *MDS with regional restrictions* shows that high scores are not evenly spread across items. Rather, we can identify two

blocks of value items with SPP above average: (1) Self-Direction, and (2) Tradition and Conformity, together with SE1. Thus, seven out of nine items with high SPP scores are measures of *Openness to Change* vs. *Conservation* (Schwartz, 1992).

While neither Schwartz's two basic dimensions nor the four higher order values could be identified in our *Principal Component Analyses*, the loading patterns of PBVS-items across all PCA solutions are nevertheless instructive: The majority of items with above average SPP load on those factors which cannot be interpreted in terms of Schwartz's Theory of Universals in Values. Instead, they may share features relating to form and/or content that allow alternative interpretations and distract from their intended meaning. This possibility should be considered in future studies.

The MDS analyses together with the fittings of the factors into the two MDS solutions show that the group of values and the value oppositions that are described more or less by a horizontal axis are robust over all solutions. Axes that run vertically in the MDS plots, on the other hand, show substantial point scatter but they do not robustly reflect the value oppositions proposed by Schwartz's TUV. That is, while it seems clear that children differentiate self-enhancement values from self-transcendence values as expected, they do not structure the openness and the conservation value categories as predicted.

Aside from methodological reasons (reliability and validity of items, non-representativeness of samples), the above average SPP found for Schwartz's *Openness* vs. *Conservation* dimension could be rooted in both developmental and cultural differences between children. A first step for narrowing these interpretations would be to reanalyse PBVS-data from past studies for Stress per Point in order to see whether the "badness of fit" pattern found in the present study can be found in those studies, too. If so, a next step would be to test whether differences with respect to age and cultural background between (sub-) samples co-vary with differences in SPP.

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Validation, Application, Expansion, and Integration of Consulting Theories by Means of Facet Theory: Using Scalograms to Build Conceptual Maps

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Abstract: The main goal of the present paper is to use SSA and Facet Theory to investigate the relational structure of different aspects of the processes involved in organizational learning in an actual consulting project so as to test the constructs proposed by Argyris and Schön (1974, 1978), Cooperrider and Whitney (2006), and Senge (2006), identify new constructs and relational structures not foreseen in such structures, and express the findings in the form of concept maps (Novak, 1998; Novak & Cañas, 2006; Moon, Hoffman, Novak & Cañas, 2011). Thus, a total of 207 members of a not-for-profit organization in Northeastern Brazil were submitted to a form containing 117 questions, derived directly from the theoretical frameworks in question, regarding the status of several organizational processes. The results obtained were that: (a) some of the constructs proposed were confirmed, and others were not, (b) with the aid of joining tree cluster analysis, some new constructs could be created and used to define mapping sentences for the definition of facets in the case of the models where the SSA analysis showed that the original constructs could not be used to define clear facets, (c) the simultaneous analysis of all of the valid constructs obtained in the study created an integrated and holistic overview of the consulting process, showing that it can understood as having four basic latent dimensions (Evolution, Stability, Analysis, and Synthesis), and (d) scalograms can be used for the construction of intuitive and stylish conceptual maps that accurately reflect the logical relationships being represented.

1. Introduction

Very much like living organisms, human organizations are dynamic entities that exist in continuous interactions with their environments. In order to survive and thrive, they must adapt to differences in their internal and/or external workings that emerge through time, which is to say that they must evolve. This process of change can be extremely complex, involving many types of psychological, social, and cultural phenomena which can be extremely difficult to predict, let alone control (Zimmermann, 2004). Therefore, it is very frequent that external agents may be required to supplement in-house knowledge, competencies and efforts in order to achieve such a goal, this being the essential role of organizational consulting (Block, 1991; Oliveira, 1999). Indeed, it may be said that the *raison d'être* for organizational consulting is change (Kubr, 1986).

In the search for a scientific understanding of the phenomenon of business consulting, particularly regarding its impacts and the elements that are critical for its success, some models have been developed which have gained significant acclaim in the international literature on the subject in the last few decades, particularly: (a) Argyris and Schön (1974, 1978), who emphasize the importance of making explicit the automatic and/or unconscious guidelines of actual organizational practice and submitting them to critical reflection as a way of learning new forms of action, (b) Senge (1990, 2009), who points out that people are the most important means of leverage for the process of organizational change, proposing five disciplines that are to be developed both individually and collectively in order to promote growth through learning, and (c) Cooperrider and Whitney (2006), who favor the fostering of an attitude of investigative inquiry based on a focus on goal and ideals to be achieved rather than on problems and obstacles to be solved. Such theories have in common the importance they stress on human knowledge and learning as the way to achieve positive organizational change, as well as the identification of a series of actions, activities, and attitudes that would lead to that. They also share the fact that they see such things as occurring or having to occur in a specifically ordered form, with the structure envisioned being based more on *a priori* beliefs rather than *ex post facto* observations. One can also add that the theories in question are comprised of different concepts and approaches that have all

a very high level of face validity, a significant amount of anecdotal evidence, and are not inherently contradictory, yet, they have never been integrated into a coherent unified model.

By studying the organizational learning processes in an organization submitted to a broad consulting project by means of a smallest space analysis (SSA) and facet theory, it is possible to not only test the predictions regarding the structure of the processes measured, but also to use the resulting scalograms and facets as a basis for the elaboration of concept maps that illustrate the relationship between the constructs investigated for each theory. By repeating the process using all of the constructs previously identified or confirmed, it is possible to produce a visualization capable of inspiring a concept map that will represent the integration of the different theories under consideration.

2. Constructs of Organizational Learning

Of the theories of consulting focused on organizational learning, those of Argyris and Schön (1974, 1978), Senge (1990, 2009), and Cooperrider and Whitney (2006) stand out as some of the most influential.

Argyris and Schön (1974, 1978) argue that individuals have mental maps of how they should behave in a given situation which produce their patterns of planning, implementing, and reviewing the actions they take. According to them, such maps, which tend to be unconscious, determine what people do much more than their explicitly declared theories. According to them, in order to promote transformative learning, an organization must promote a set of basic attitudes that promote awareness and reflection.

Senge (1990, 2009) highlights that an organization is in a learning state when the collective aspirations are freed, new patterns of thinking are nurtured and expanded, individuals continuously relearn to see the whole, and people continuously expand their capacity of generating results. In other words, such a condition makes an organization capable of acting in an active and productive way. To achieve that, they must practice, at a collective level, a series of interdependent and convergent "disciplines" that enable mental changes (metanoia) that can shape reality and the future.

Cooperrider and Whitney (2006) produced a perspective according to which an excessive focus on dysfunctions can be counterproductive for

organizations, a more effective method being the attention to the points of value and the potential for growth. This view lead to the creation of a method of consulting called "appreciative inquiry", where the objective is to create an understanding of the assets and personal motivations that are of fundamental value to the particular organization by means of a cycle of problem "discovery" (identification of organizational processes that work well), "dream"(envisioning of processes that would work well in the future), "design" (planning and prioritizing processes that would work well), and "deliver" (implementation or execution of the proposed design).

Table 1 shows an overview of the three models referred to in the present paper regarding the main constructs that are considered to emerge from the numerous specific processes and phenomena addressed by such models.

Table 1. Theories of organizational learning and their constructs (Argyris & Schön, 1974, 1978; Senge, 1990, 2009; Cooperrider & Whitney, 2006).

Argyris and Schön	Exposing Errors and Omissions ("Left Collumn"), Ability to Reflect, Ability to Inquire and Defend, Proclaimed vs. Practiced Theories, Reflection in Action, Defensiveness, Errors as a Source of Learning, and Levels of Enrollment.
Senge*	Personal Domain, Mental Models, Shared Vision, Group Learning, and Systemic Thinking.
Cooperrider	Appreciative Inquiry

* There are also constructs related to Deficiencies in Learning and Laws of Systemic Thinking.

One can see that, in the description of processes that promote organizational learning, Argyris and Schön (1974, 1978) propose eight distinct

constructs, and Senge (1990, 2009) only five, whereas Cooperrider and Whitney (2006) just one. Senge (1990, 2009) also differentiates between actions that favor learning (laws of systemic thinking) and those that hinder it (deficiencies in learning). None of them clearly describe the relationship between the constructs or a form of classifying them.

Several pages of text and numerous diagrams have been produced in order to expound and describe the theories above so as to favor their assimilation and understanding, but these are still complex and convoluted concepts that require considerable intelligence, effort, and experience to be fully understood (Argyris & Schön, 1974, 1978; Senge, 1990, 2009; Cooperrider & Whitney, 2006).

3. Concept Maps

Concept maps are hierarchic diagrams made to visually express a complex set of concepts and their relationships to one another, being originally developed by Joseph D. Novak and his team at Cornell University in the 1970s in order to represent individual and group knowledge in various context, including science, education, government and business (Novak, 1998; Novak & Cañas, 2006). They have subsequently been used as a tool to increase meaningful learning in the sciences and other subjects as well as to represent the expert knowledge of individuals and teams in education, government, and business, with strong empirical findings pointing towards their practical efficacy as instructional and educational tools in many different settings, including business organizations and corporations (Moon, Hoffman, Novak & Cañas, 2011).

Traditionally, concept maps are represented as boxes or circles that are connected with labeled arrows in a downward-branching hierarchical structure, though there are many alternative graphical forms that can be used, including variations of Venn diagrams. They are also usually constructed by means of an interactive process of trial and error through which subjective abstract knowledge is translated into objective visual representations, an activity which has actually been included in many consulting projects to promote reflection and learning, but they can also arise from the results of multivariate data analysis (Novak & Cañas, 2006; Moon, Hoffman, Novak & Cañas, 2011).

4. Multivariate Analysis

4.1. Cluster Analysis

Hierarchical cluster analysis is a form of data analysis where variables are grouped according to their similarity, which is given by measures of association expressed as distances. The resulting diagram is called a dendrogram or tree diagram where the multiple clusters and sub-clusters are graphically represented in the form of branching lines. Such a presentation allows one to visually discern the existence of natural groupings of variables based on affinity. (Kaufman & Rousseeuw, 2005; Tan, Steinbach & Kumar, 2005).

4.2. Multidimensional Scaling and Facet Theory

Multidimensional scaling (MDS) is a way of representing all the associations between multiple variables in graphical form by means of a special diagram (scalogram) that incorporates information as to the similarities, dissimilarities, or correlations between them in the form of spatial distances, with the Guttman-Lingoes smallest space analysis (SSA) algorithm being the preferred method. Facet theory, created by Louis Guttman, is a method of interconnecting data analysis and theorization based on the geometrical partitioning of a scalogram by means of a mapping sentence in order to define clusters of variables, latent variables, or conceptual constructs. As such, it can identify complex structures in datasets so as to be useful for both exploratory interpretation and the testing of theoretical models (Guttman & Greenbaum, 1998; Levy, 2005).

5. Study Goals

The main goal of the present paper is to use multivariate analysis, particularly SSA and Facet Theory, to investigate the relational structure of different aspects of the processes involved in organizational learning in an actual consulting project according to the theories of Argyris and Schön (1974, 1978), Senge (1990, 2009), and Cooperrider and Whitney (2006).

The constructs from the theories of Argyris and Schön (1974, 1978) and Senge (1990, 2009) will be tested by means of verifying whether one can identify or not, in the scalograms of the processes they refer to, facets that correspond to such constructs. If so, the scalograms and their facets will be used as a basis for the drawing of stylized concept maps. If not, hierarchical cluster analysis will be used to identify variable groupings that can be understood as "natural" constructs that will be semantically interpreted and then expressed in the scalograms as facets that, in turn, will be used as a basis for the drawing of stylized concept maps. The latter will also be done in the case of the theory from Cooperrider and Whitney (2006), where no explicit constructs are proposed.

Finally, numerical indexes for all the constructs arising from all of the aforementioned theories and analysis will be used in an exploratory SSA where resulting scalogram will be interpreted as to possible facets that may express latent variables arising from the sum of all the models under consideration. Such findings will also be expressed in the form of a stylized concept map.

6. Method

6.1. Participants

A total of 207 employees from a private, not-for-profit, organization in Northeastern Brazil that was the object of a consulting project in organizational learning in the year 2010 were interviewed. There were 36.7% men and 63.7% women, with a mean age of 42.5 years (SD=10.91), ranging from 21 to 68. Roughly 12.1% were in managerial positions, the remaining 87.9% being collaborators.

6.2. Instruments

A single form containing questions regarding sociodemographic data and the respondent's position in the company, plus a total of 117 items relating to the functioning of the various processes, concepts, and constructs directly referred to in the theories of Argyris and Schön (1974, 1978), Senge (1990, 2009), and Cooperrider and Whitney (2006), each item measured on a 1-5 Likert scale, was used.

6.3. Procedures

The board of the organization was approached by the researchers and asked to authorize the study in their premises and with their personnel. Having such permission being given, the forms were applied to the participants in conference rooms within the company's facilities.

7. Results

7.1. Framework from Agyris and Schön

Figure 1 shows the scalogram for the SSA of the 30 items in the form that referred to processes, concepts, and constructs referred to by Argyris and Schön (1974, 1978). In it, one can observe the existence of eight clearly defined facets that correspond to the constructs defined by those authors.
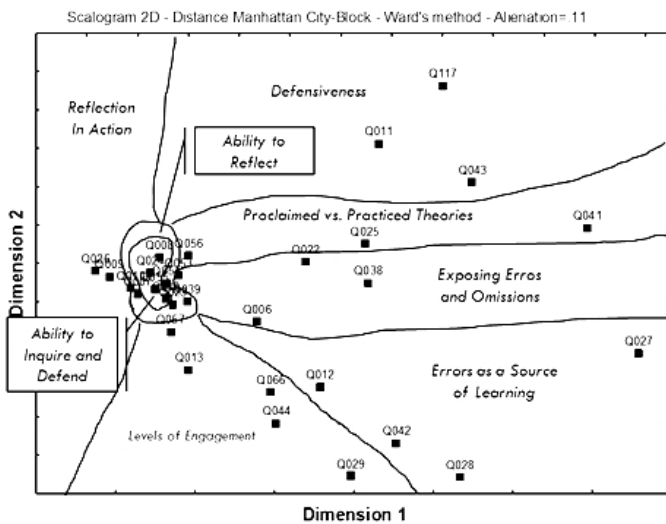
Fig. 1. Scalogram for the items relating to Agyris and Schön (1974, 1978).

From the facets identified in Figure 1, and their radex pattern, an equivalent concept map was drawn, as shown in Figure 2.

Looking at the concept map in Figure 2, one can clearly see not only the eight constructs proposed by Agyris and Schön (1974, 1978) for organizational learning, but also a hierarchical structure for them where the Ability to Inquire and Defend is a fundamental component (literally, a "central" one), from which emanates the Ability to Reflect, with the remaining six constructs being spread out around them at a the same level. One can also perceive a series of oppositions.

7.2. Framework from Senge

A scalogram was done for the SSA of the 55 items in the form that referred to processes, concepts, and constructs referred to by Senge (1990, 2009). However, no facet structure was found that could possibly organize such elements into the five constructs proposed by that author, so an exploratory joining-tree cluster analysis was done, producing the dendrogram in Figure 3.
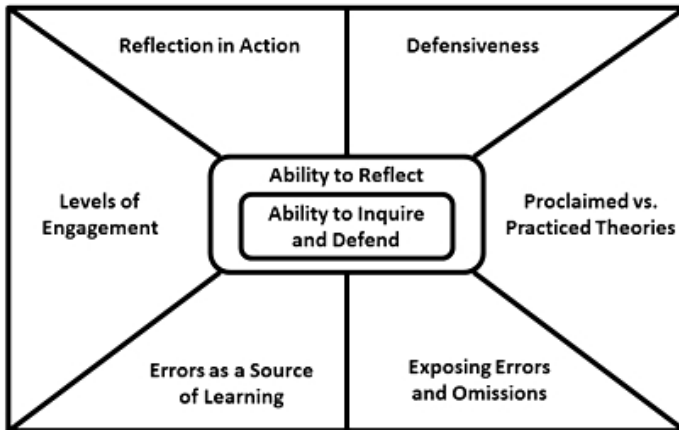
Fig. 2. Concept map for the constructs from Agyris and Schön (1974, 1978)
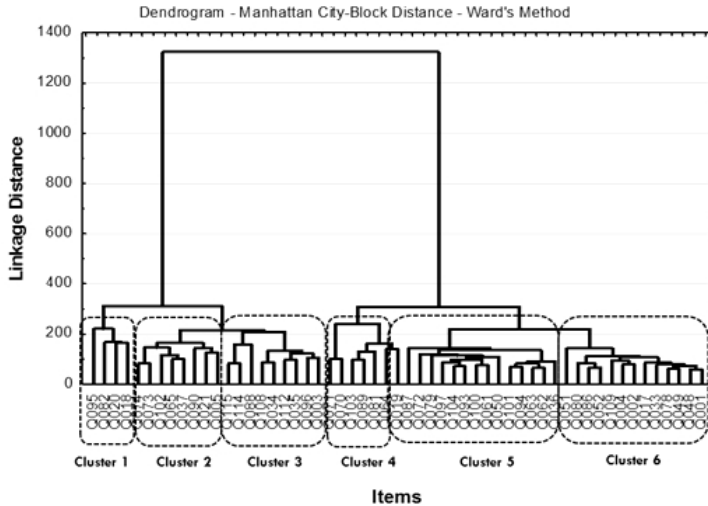
Fig. 3. Dendrogram for the items relating to Senge (1990, 2009) and the six clusters identified.

Figure 4 shows the SSA for the 55 items from Senge (1990, 2009) with facets drawn based on the clusters identified in Figure 3, as well as labels that suggest their semantic interpretation. The pattern is clearly modular..
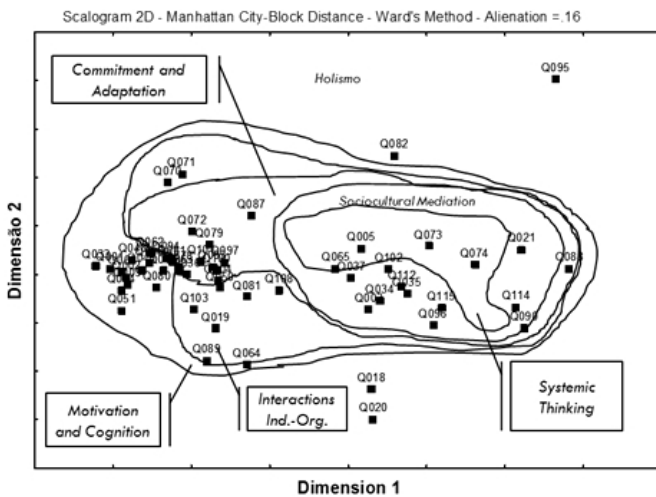
Fig. 4. Scalogram for the items relating to Senge (1990, 2009).

A concept map based on the facets present in Figure 4 was drawn and is shown in Figure 5.
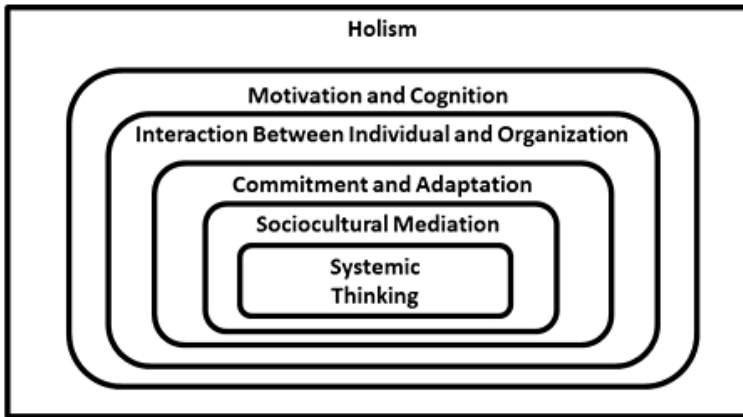
Fig. 5. Concept map for the constructs from Senge (1990, 2009).

Figure 5 clearly indicates a fully hierarchical structure where the most basic construct is Systemic Thinking, followed, in order, by Sociocultural Mediation, Commitment and Adaptation, Interaction Between Individual and Organization, Motivation and Cognition, and Holism.

Two other constructs proposed by Senge (1990, 2009) - Deficiencies in Learning (processes that hinder learning) and Laws of Systemic Thinking (processes that favor learning) – were tested by means of a hierarchical cluster analysis. The findings of the cluster analysis clearly confirms the distinction between the two constructs with regards to 16 items.

7.3. Framework from Cooperrider

Cooperrider and Whitney (2006) did not propose specific constructs in which to group the items processes he considered to be involved in what he called "Appreciative Inquiry". Thus, an exploratory joining-tree cluster analysis was done, producing the dendrogram in figure 6, where four clusters were identified.

Figure 7 shows the SSA for the 13 items from Cooperrider and Whitney (2006) with facets drawn based on the clusters identified in Figure 6, as well as labels that suggest their semantic interpretation. The pattern is clearly axial.

From Figure 7 and the four facets identified, an equivalent concept map was drawn and shown in Figure 8.

Figure 8 exhibits a spectrum-like series of four constructs ranging from "Freedom and Hope" on one end to "Valueing" on the other, passing through "Openness and Support" and then "Incentive". Such a series is indicative of a bipolar ordering of processes.
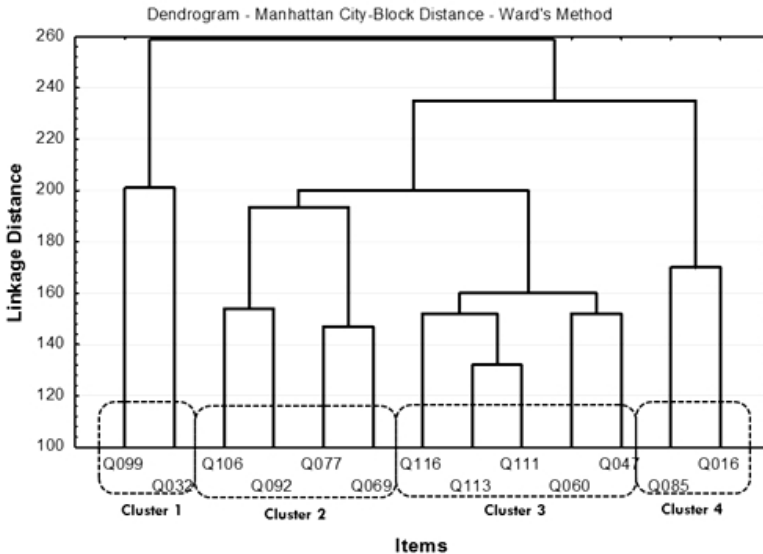
Fig. 6. Dendrogram for the items relating to Cooperrider and Whitney (2006) and the four clusters identified.

7.4. Structure Emerging from all the Constructs

If one calculates the arithmetic mean of the scores given to all the items in the research form for a given construct, one has an index for that construct. In that fashion, a total of 20 indexes were calculated and then submitted to an SSA, with the resulting scalogram being presented in Figure 9.
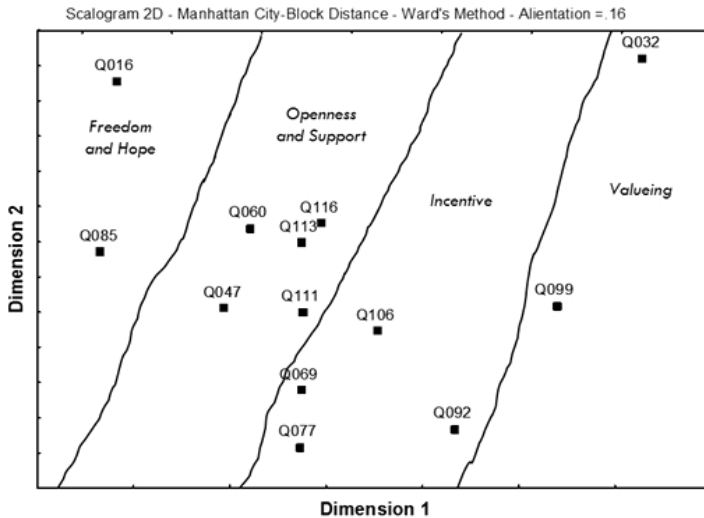
Fig. 7. Scalogram for the items relating to Cooperrider and Whitney (2006).
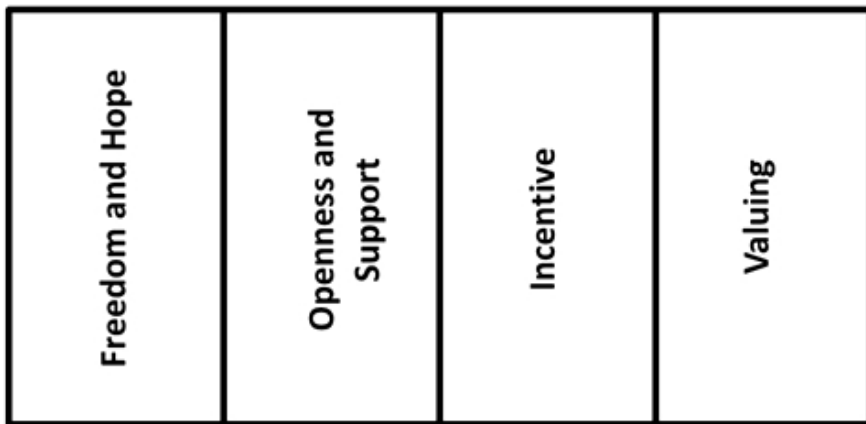
Fig. 8. Concept map for the constructs from Cooperrider and Whitney (2006).

Reflecting upon the meanings underlying the constructs in Figure 9, as well as their spatial distribution in the scalogram, one can perceive four major facets that seem to emerge from them in a polar structure: Evolution, Stability, Analysis, and Synthesis. Based on them, the concept map in figure 10 was drawn.
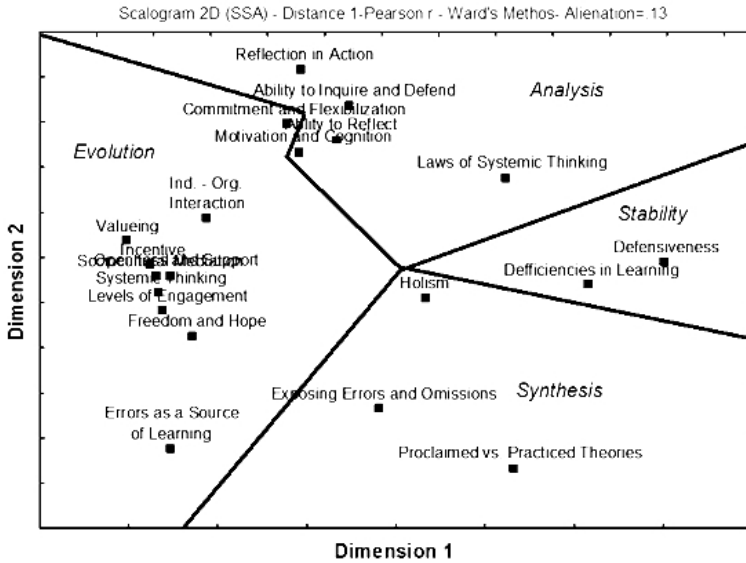
Fig. 9. Scalogram for all the 20 constructs identified from the present study.
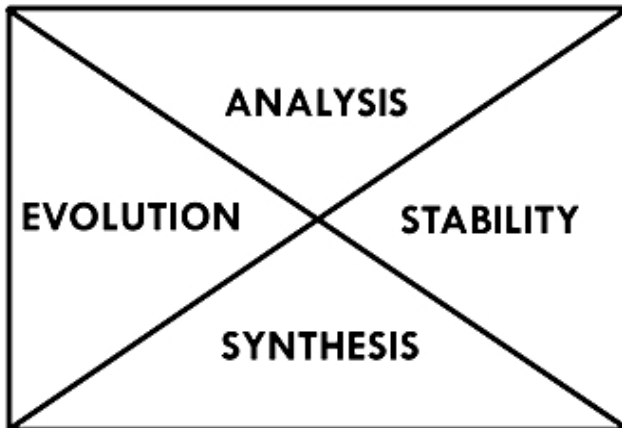
Fig. 10. Concept map emerging from the SSA of all the 20 constructs.

The pattern perceived in figure 11 is that of four fundamental constructs with two pairs of opposition.

8. Discussion

8.1. Constructs and Structure from Chris Agyris and Donald Schön

The concept map obtained for the framework of Agyris and Schön (1974, 1978) suggests that a key element of organization learning is the Ability to Inquire and Defend (the capacity to ask questions and support ideas). From it, and as a supplement, arises the Ability to Reflect (the capacity to ponder and evaluate ideas). Out of this combined capacity to propose and analyze arguments, emerge six other capacities that influence organizational learning: Reflection in Action (thinking while doing), Defensiveness (maintain and justify one's own position), Proclaimed vs. Practiced Theories (identifying the contrasts between ideas held and action done), Exposing Errors and Omissions (making explicit things that are wrong or absent), Errors as a Source of Learning (using past experiences with wrong decisions or actions as a means to learn), and Levels of Engagement (involvement in the organization beyond a mere fulfillment of tasks). The concept map also establishes a series of semantic similarities and oppositions between the eight constructs. Defensiveness, for instance, is in contradiction with Errors as a Source of Learning and with Exposing Errors and Omissions, whereas the latter two are placed side-by-side. Several other similar relationships can be identified. All of these associations between meanings are pretty much consistent with expectations arising from the original formulations, but confirmed by empirical results and presented in an intuitive and accurate visual format.

8.2. Constructs and Structure from Peter Senge

The concept map derived from the empirical data regarding the processes considered by Senge (1990, 2009) is inconsistent with the theoretical formulation coming from that author, indicating that the constructs that he originally formulated are too intertwined to be differentiated into separate elements. Therefore, one is better off making use of the six concepts that have shown themselves to be fairly consistent and differentiated, that is: (a) Systemic Thinking (reasoning in terms of structure and dynamics), (b)

Sociocultural Mediation (using interpersonal collaboration and special tools to produce knowledge), (c) Commitment and Adaptation (attitudes that promote resilience), (d) Interaction Between Individual and Organization (dynamic exchanges between personnel and the organization as a whole), (e) Motivation and Cognition (volitional and mental processes), and (f) Holism (thinking on the whole rather than the parts).

The structure of the concept map indicates that Systemic Thinking is the cornerstone of organizational learning as viewed by Senge (1990, 2009). From it, emerges Sociocultural Mediatio, which allows for Commitment and Adaptation, that, in turn, lead to specific patterns of Interaction Between Individuals and Organization, the latter finally promoting Holism.

8.3. Constructs and Structure from David Cooperrider and Diana Whitney

The concept map derived from the ideas of Cooperrider and Whitney (2006) indicates the existence of four constructs: (a) Freedom and Hope (the promotion of liberty to act and positive aspirations), (b) Openness and Support (a supportive environment that is favorable to innovation), (c) Incentive (the existence of stimulus towards improvement), and (d) Valuing (to acknowledge the individual and collective value of the workforce).

The structure of the map indicates that Freedom and Hope is in some level of opposition to Valuing, but the former is closely related to Openness and Support, while the latter is more associated to Incentive. Openness and Support, however, is associated to Incentive.

8.4. Emergent Global Constructs

The concept map produced from the SSA of all 20 constructs originated form the present study of the frameworks from Argyris and Schön (1974, 1978), Senge (1990, 2009), and Cooperrider and Whitney (2006) suggests that, from a broader perspective, organizational learning can be understood as occurring along two major bipolar axis: (a) Evolution-Stability and (b) Analysis-Synthesis. This is an indication that there are competing elements that, being of equal importance, must all be balanced in order to obtain the best results for an organization.

9. Conclusions

In the present study, SSA and facet theory, with the aid of hierarchical cluster analysis, were used to identify the relational structure of a series of items related to organizational learning answered by 207 members of a Brazilian not-for-profit organization that participated in a consulting project involving the theories of Argyris and Schön (1974, 1978), Senge (1990, 2009), and Cooperrider and Whitney (2006). The results obtained were also used to guide the drawing of concept maps that expressed the constructs that were identified, as well as their semantic interrelations. Finally, all the constructs that arose from the previous analysis were submitted to a further multidimensional scaling so as to detect any second-order latent dimensions arising from the simultaneous consideration of all the theoretical frameworks investigated.

The findings obtained indicated that:

- The eight constructs proposed by Argyris and Schön (1974, 1978) for the understanding of organizational learning have been empirically confirmed;
- The five disciplines proposed by Senge (1990, 2009) do not conform empirical results, but a different set of six coherent constructs could be built from observations of the processes he referred to;
- Cooperrider and Whitney (2006) did not propose a set of specific constructs into which group the organizational learning processes he alluded to, but a set of six coherent constructs could be constructed from empirical analysis;
- By analyzing all the constructs obtained from Argyris and Schön (1974, 1978), Senge (1990, 2009), and Cooperrider and Whitney (2006) regarding organizational learning, two major axis and four latent dimensions emerged;
- Concept maps based on SSA scalograms and facet theory are relatively easy to draw and simple to interpret, conveying a great deal of information regarding the structure of the constructs being represented and their semantic relationships.

One can conclude from the present research that SSA and facet theory, along with other multivariate techniques such as cluster analysis, can be

used for the drawing of empirically-based concept maps that can be of use in visually portraying the semantic structure of complex phenomena based on actual observations. This offers significant possibilities for the scientific testing of theoretical concepts, the creation of new constructs, and the representation of knowledge.

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The Lack of a Treatment of Uncertainty in Facet Theory: A Relevant Problem?

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Abstract: In the present paper, it is argued that Facet Theory is an essentially deterministic approach. This is so because, even though the distance matrix may contain information obtained by statistical estimation, there is no direct way of dealing with the uncertainty inherent to such estimations. One implication of this fact is that, due to issues of sample size or inherent variance, the relative position of the variables in a scalogram may vary substantially from one dataset to another even if one is collecting that data from the same population in both cases, i.e., even if the probabilistic mechanism is the same. To illustrate this point, an analysis was done of data collected from the application of the Ten-Item Personality Inventory (TIPI), from Gosling, Rentfrow and Swann Jr. (2003), to a total of 1,679 employees of the Brazilian oil company Petrobrás. When analyzing the whole dataset, an elegant pattern was found on the SSA scalogram that is clearly consistent with a radex where the five basic personality dimensions are clearly identifiable in the polar partitions, and the positive and negative items on the modular ones, in accordance to theoretical expectations. However, successive random subsets of this data with n=100 were generated and analyzed in a similar way, eventually producing scalograms that changed to the point of completely altering their potential interpretations. It is concluded that the lack of an adequate treatment and representation of uncertainty in Facet Theory is a substantial deficiency, therefore, the field is desperately requiring further development in that regard.

1. Introduction

Facet Theory is a systematic approach for coordinating theory and research. It comprises the universe of observations, the population of respondents, and the range of observations, this being done by stratifying these universes through facets identified by means of a Smallest Space Analysis (SSA) and then integrating the design using a mapping sentence, which guides the construction of items and the formulation of hypotheses (Guttman & Greenbaum, 1994; Levy, 2005). A fundamental aspect of the method is the determination of a distance matrix that reflects the similarities/dissimilarities/ associations of the variables being analyzed, which involves the choice of a metric. Once this is done, and one also chooses an amalgamation schedule and a number of dimensions, the rest is simply a matter of pure mathematics to arrive at a scalogram, which constitutes a visual spatial representation of the associations and relational structures that were identified.

In a deterministic world, as long as one has a sample which can exhibit the possible range of variations for the variables themselves and for the interactions between them in terms of the chosen distance metric, the application of SSA to a dataset will yield perfect information as to the relational structure of the variables being analyzed, i.e., the distance matrix will be a flawless and precise representation of the relationship between them. This would allow for the adequate testing of theoretically predicted facets, or the exploratory process of attempting to create a theoretical structure capable of accounting for the findings, without concern as to errors or random variations. In actual scientific practice, however, the world proves to be riddled with various levels of uncertainty regarding every type of observation or record regarding any type of phenomenon, which produces additional challenges to the empirical verification or exploration of mapping sentences. The distances between the variables, their similarities or dissimilarities, are subject to errors in estimation, observational biases, imprecisions, and chance, making the distance matrix something that is, at best, an approximation that is dependent on things like sample size and variance.

There is no formal and explicit form of dealing with uncertainty in SSA or Facet Theory. Indeed, one is hard pressed to find that word in papers or textbooks on the subject, the same going for terms like "probability" and "randomness". Some

authors actually express the expectation that, somehow, the structural patterns required for the determination of facets will emerge even when one has only a modest sample, however, no clear mathematical proof of this has been shown. Others practice a subdued form of dealing with uncertainty by allowing for a certain amount of spatial deviation from the perfectly elliptical or straight lines that one would theoretically use to draw facets, or that an occasional isolated variable be let to geometrically "stray" from the others in the same category, up to a certain point, and still be considered as belonging to the same facet. Such allowances, however, are entirely subjective and arbitrary, varying from researcher to researcher,making it difficult to determine when they are adequate, excessive, or insufficient.

There is reason to believe that SSA scalograms can be subject to a significant level of misrepresentation of the associations they are meant to display simply due to chance variations originating from sample size, inherent randomness, measurement errors, and/or other sources of uncertainty. The main modes of dealing with such a possibility, however, seem to be, at best, informal and implicit, and, at worst, inexistent. The consequence of such a state of affairs is that facet structures can be misidentified, undue confidence may be assigned to scalogram results, or both.

2. Facet Theory And Uncertainty

2.1. The Lack of a Formal Way to Address Uncertainty

When one combs through the literature in Facet Theory, it is possible to go through many influential works in the field without a single reference to probability, randomness, and/or uncertainty at all, or at least with regards to the importance of such things in the results of an SSA or in the process of identifying or determining a mapping sentence (Canter, 1985, 1996; Shye, Elizur & Hoffman, 1994; Borg & Shye, 1995; Greenbaum, 1998; Shye, 1998; Guttman and Greenbaum, 1998; Foster, Barkus, and Yavorsky , 2005; Levy, 2005; Dancer, 2008).

A reason for this lack of a direct form addressing uncertainty may be the absence of a focus on traditional approaches and goals of statistical analysis. Greenbaum (1998) points out that the traditional notion of statistical inference, viewed as being the use of the concept of statistical significance

to make a probability estimate of the similarity between a sample and the population, has serious theoretical flaws, something that is not used in Facet Theory and being the reason for its lack of a wider level of acceptance in human and social sciences. Likewise, Shye (1998) explains that Facet Theory is more concerned with constructs than with particular variables, and that the prediction paradigm in it is one oriented towards associations (e.g., correlations) instead of to the values of variables.

Another cause might be an implicit expectation that the issue of uncertainty will tend to sort itself out by means of some form of unspecified strong stochastic convergence, as illustrated by the statement from Levy (2005) that:

> *Although generally "there is no probability distribution for a facet design of content," in each case a small sample of items that will nevertheless suffice to yield the essential information about the facets can be systematically constructed. (Levy, 2005, p.180).*

None of these reasons, however, can justify the absence of a direct and explicit form of dealing with uncertainty. An emphasis on identifying associations and resulting structures rather than on the estimation of the values of variables does not eliminate the fact that associations themselves are always estimated and subject to chance (Hair, Black, Babib & Anderson, 2009). Also, even if one assumes that there is some sort of strong convergence that tends to null the effects of random variations, as it is likely the case, such a convergence:

- Must be suitably explicated, including explicit statements as to its assumptions and requirements;
- Still must have certain thresholds in sample size in order to achieve adequate reliability;
- Will necessarily have estimation errors whose relationship to sample size and intrinsic variance must be known.

Therefore, in spite of the absence of such a thing in the specialized literature, it is of importance to establish a clear way to deal with uncertainty in SSA and Facet Theory.

2.2. Squiggly Lines and Allowance for Variable Sliding

When one peruses the works published in the application of Facet Theory to human and social sciences, which are particularly susceptible to the effects of chance, there are many instances when one finds that uncertainty is informally dealt with by means of implicit and subjective allowances in the partitioning of scalograms.

An example can be found in a study from Hackett (1993) regarding environmental concern values in consumers, where facet structures are drawn with significant "stretching" and "bending" of lines and shapes are done in order to find a hypothesized structure (Figure 1).
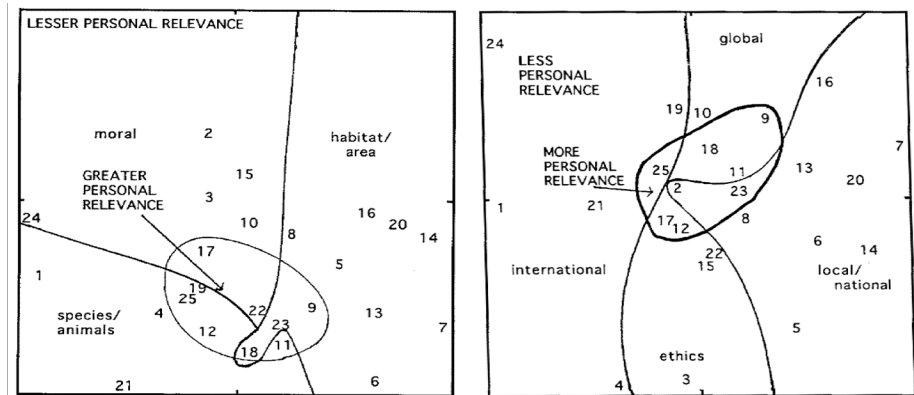
Fig.1. Scalograms from Hackett (1993) showing marked distortions in the lines used to delineate the facet structure.

Another, similar, example comes from Gray and Wilson (2007), investigating the psychometric properties of the Sensation Seeking Scale in the UK (Figure 2).
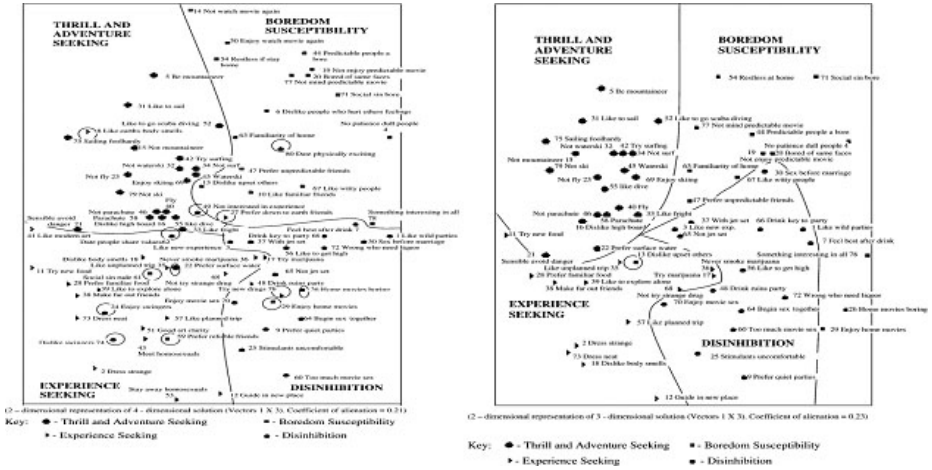
Fig. 2. Scalograms from Gray and Wilson (2007) showing marked distortions in the lines used to delineate the facet structure.

Both Hackett (1993) and Gray and Wilson (2007) deviated markedly from the straight and elliptical lines usually indicated as the basis for partitioning a scalogram into facets (Canter, 1985, 1996; Shye, Elizur & Hoffman, 1994; Borg & Shye, 1995; Greenbaum, 1998; Shye, 1998; Guttman and Greenbaum, 1998; Foster, Barkus, and Yavorsky , 2005; Levy, 2005; Dancer, 2008). Though those authors do not state it explicitly, it seems that such deviations are basically straightforward allowances for errors and random variations that are assumed (but not proven) to be of no theoretical or empirical significance.

One must note that this sort of informal allowance for uncertainty, in spite of being quite common, is by no means a general rule, though it is difficult to ascertain whether this is due to a greater rigor in the application of Facet Theory, publication bias, and/or simply to the tendency to use large samples (therefore obtaining more precise estimations).

In any case, this informal and subjective form of dealing with uncertainty leaves much to be desired in terms of establishing the conditions and limits for their use, and opening the possibility of Byzantine discussions regarding the admissibility of distortions in the drawing of facets that have no clear way to be resolved.

3. Study Goals

The present paper aims to empirically explore the possibility that the findings obtained by SSA and Facet Theory can be substantially affected by randomness and sample size, producing relevant implications regarding the theoretical interpretation of such findings, making the absence of a formal treatment of uncertainty a significant theoretical gap in the field, one with significant implications.

4. Method

4.1. Overview

In order to investigate the impact of uncertainty sample size in the results of a SSA and the application of Facet Theory, a study of the structure of a psychometric personality test will be made first with a large sample of subjects and, then, the same will be done with successive random subsets of a substantially smaller size, so as to observe what discrepancies might emerge in the structure found as a consequence of sampling error in a practical setting. Naturally, each subset of the larger database will have 10 observations per variable in the analysis, as recommended by most authors for multivariate analysis (Ford, MacCallum, and Tait, 1986; Costello and Osborne, 2005). Also, all the structures found will be compared to the theoretical expectations from the authors of the test.

4.2. Sample

A total of 1679 adults of both sexes and various ages, working at the official oil and gas extraction company of Brazil (Petrobrás) in the second half of 2011.

4.3. Instruments

A Portuguese version of the Ten-Item Personality Inventory (TIPI) from Gosling, Rentfrow, and Swann Jr. (2003), which measures the Big-Five

personality traits (Openness, Conscientiousness, Extraversion, Agreeableness, and Stability) with two items for each trait, one positive and another negative.

4.4. Procedures

An interactive Adobe PDF version of the TIPI was sent to the employees of Petrobrás by company e-mail, asking them to fill it out in their computers and return it to the sender. Data from all of the returned forms was then compiled into the database.

The SSAs were all done using Statsoft Statistica 10, with four subsets of n=100 being produced by random subsampling.

5. Results

5.1. SSA of the Total Sample (n=1679)

Figure 3 shows the SSA scalogram of the 10 items of the TIPI (with negative items reversed), displaying the facet structure for the Big Five traits, for the total sample of 1679 subjects.
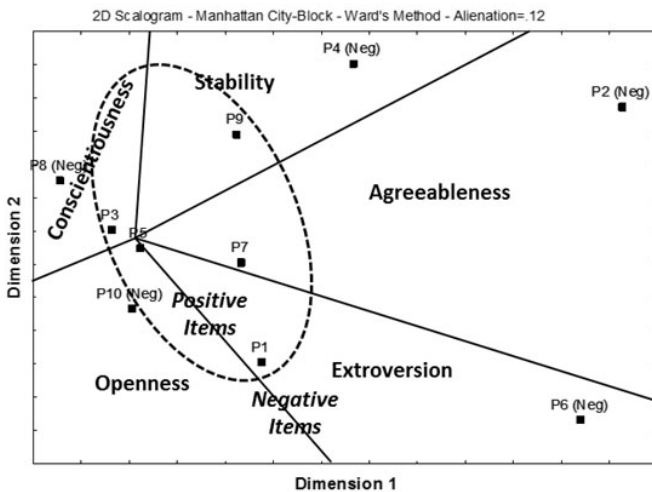
Fig. 3. Scalogram of the items of the TIPI for the whole sample (n=1679).

The analysis shows a clear radex structure. The items are distributed in a polar pattern with five components clockwise distributed as the five personality traits of Stability, Agreeableness, Extraversion, Openness, and Concientiousness, each one comprising its expected two items. There is also a modular structure with the positive items in the center and the negative items in the outer region.

5.2. SSA of Four Random Subsets (n=100)

Figure 4 shows the SSA scalogram of the 10 items of the TIPI (with negative items reversed), displaying the facet structure for the Big Five traits in four random subsets (A, B, C, and D) with a total of 100 subjects each.
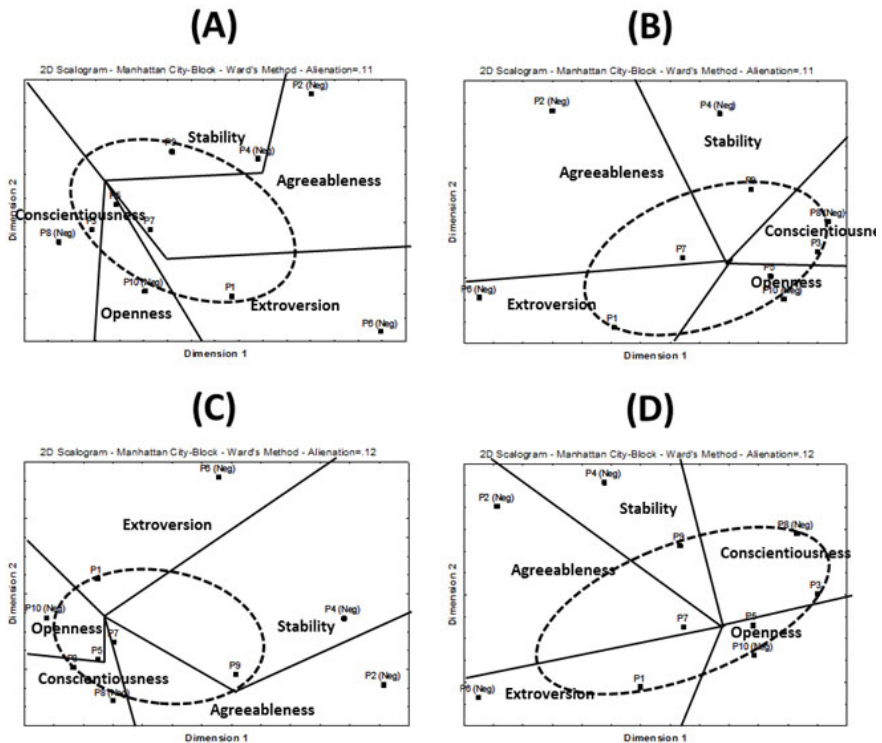
Fig. 4. Scalogram of the items of the TIPI for the four subsets with n=100 each.

In Figure 4, all four scalograms seem to show a radex pattern like the one in Figure 3, i.e., the combination of a modular patter with the positive items on the inside and the negative ones outside, plus a polar one with the five personality traits. There are, however, some relevant differences between the results for the subsets and the findings for the whole sample, as well as between the subsets themselves.

In scalograms B and D, a radex pattern consistent with five personality traits with positive and negative items can be obtained by simply drawing straight lines and ellipses, whereas scalograms A and D require significantly distorted lines to achieve the same structure.

Furthermore, the specific clockwise order of the items in the polar structure has also varied substantially in the different subsets. Indeed, the orders obtained for each scalogram were:

- Scalogram A: Stability - Agreeableness - Extroversion - Openness Conscientiousness;
- Scalogram B: Stability - Conscientiousness - Openness - Extroversion – Agreeableness;
- Scalogram C: Stability - Conscientiousness - Openness - Extroversion – Agreeableness;
- Scalogram D: Stability - Agreeableness - Conscientiousness - Openness – Extroversion.

Only Scalogram A has exactly the same order of items as the analysis in Figure 3 (the one found for the whole sample).

6. Discussion

The SSA findings and Facet Theory interpretations of the radex structure of the TIPI items for the entire sample of 1679 subjects are completely consistent with the theoretical expectations from Gosling, Rentfrow, and Swann Jr. (2003). This includes the relationship between the five personality traits (Agreeableness being close to Stability and Extroversion, but not so much to Openness and Conscientiousness, etc.).

In the four subsets of data analyzed, radex structures were easily discernible in two of them, but, in the rest, significant allowance had to be given to the definition of the polar facets in order to conform to the predicted structure. The degree of distortion is such that, if an exploratory analysis was done, as opposed to a confirmatory one (i.e., if one was looking for clues to an unknown structure rather than evidence for a known one), it is not difficult at all to imagine the possibility of arriving at different structures for the two pairs of scalograms. Indeed, even in the confirmatory case, in half of the scalograms obtained, one could raise the argument that, rigorously speaking, the structure being sought was not actually found.

Even if one assumes that the polar structure for the personality traits which was identified in the complete sample has effectively been confirmed in all four data subsets, there are still issues with the identification of the relationship between such traits. Only one of the scalograms from the subsamples displayed a clockwise order of personality traits that corresponds exactly to the findings from the whole sample and to the theoretical expectations from the authors of the test. Two of the other three subsets were identical to each other as to the clockwise order of the traits, but they were both different from what was found for the whole sample, and the remaining subset had its own unique distribution of traits. This means that different relationships between personality traits that were found in the present according to the sample/subsample analyzed.

Given all the evidence from the present study, it seems that the results of the application of SSA and Facet Theory to the investigation of the structure of the items of a psychometric test can vary substantially depending on sample size, with relevant implications for the scientific interpretation of the phenomenon underlying the findings.

7. Conclusions

The present paper made the argument that Facet Theory lacks a specific treatment of uncertainty which, from a mathematical, statistical, and scientific point of view, is a serious gap that can lead to erroneous results in research efforts. An investigation was then done to test this notion in the context of the empirical evaluation of the structure of a personality test in a large sample of Brazilian adults and in much smaller subsamples.

The findings obtained showed that, as a consequence of sample size and/or random variations between different subsets of data, relevant differences in the structure of the variables studied were found. Such differences were large enough to alter the relationships identified between the personality traits measured by the test or even the interpretation of what are the traits that the test measures.

It is concluded that the evidence obtained in the present investigation confirms the notion that the absence of an adequate way to deal with uncertainty in SSA and Facet Theory can lead to significant errors when such approaches are used in actual research. Thus, future developments in the field must aim to provide new methods and tools capable of quantifying the reliability and precision of their findings. Without addressing this important point, it will be difficult to view its results without some level of suspicion.

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2 | Contrasts Between Facet Theory And Other Methods

Test of Emotion Comprehension: Exploring the underlying structure through Confirmatory Factor Analysis and Similarity Structure Analysis

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Abstract: Some decades of research on emotional development have underlined the contribution of several domains to emotion understanding in childhood. Based on this research, Pons and colleagues (Pons & Harris, 2002; Pons, Harris & Rosnay, 2004) have proposed the *Test of Emotion Comprehension* (TEC) which assesses nine domains of emotion understanding, namely the recognition of emotions, based on facial expressions; the comprehension of external emotional causes; impact of desire on emotions; emotions based on beliefs; memory influence on emotions; possibility of emotion regulation; possibility of hiding an emotional state; having mixed emotions; contribution of morality to emotion experiences. This instrument was administered individually to 182 Portuguese children aged between 8 and 11 years, of 3rd and 4th grades, in public schools. Additionally, we used the *Socially in Action-Peers* (SAp) (Rocha, Candeias & Lopes da Silva, 2012) to assess TEC's criterion-related validity. Mean differences results in TEC by gender and by socio-economic status (SES) were analyzed. The results of the TEC's psychometric analysis were performed in terms of items' sensitivity and reliability (stability, test-retest). Finally, in order to explore the theoretical structure underlying TEC a Confirmatory Factor Analysis and a Similarity Structure Analysis were computed. Implications of these findings for emotion understanding assessment and intervention in childhood are discussed.

1. Introduction

For Harris (1989; 2008), children's understanding of emotion enables them to alter their experience of emotion, which, in turn is considered a good predictor of emotion competence. Saarni's (1999) model of emotional competence considers that this competence is an inextricable form of social competence. Emotion understanding is one relevant domain of emotion competence, and is conceptualized as a children's general sociocognitive understanding of perspective taking, desire beliefs, intentions understanding related to emotions in their selves and others (Harris, 1989).

In order to have an understanding of emotions there are two essential aspects: awareness (manifested in different forms: reporting, anticipating, hiding or change the emotional state) and the identification and understanding of others' emotions. Harris (1989, 2008) proposes a number of types of consciousness: (a) about 1 year of age, children begin to recognize the emotional states that are directed, (b) by 3 years they begin to realize that people choose what they do according to their beliefs / desires, as well as begin to make sense of emotion (in self and others), (c) 4-6 years: understanding that emotional expression may not be a direct reflection of the emotional state (e.g., are able to perceive the concealing of expressions), (d) from 6/7 years: the moral standards begin to be important in understanding that children have about emotion, (and) finally, later arises the understanding that it is possible to modify the emotion, first by hiding the expression and then by modifying the state itself.

The existence of a large panoply of definitions of emotion competence, in general, and understanding, in particular, has led to a lack of consensus and, consequently, to methodological limitations in research plans, and also to assessment and intervention in emotional competence. Several decades of research on emotional development has underlined the contribution of several domains to emotion understanding in childhood. Based on this research, Pons and colleagues (Pons & Harris, 2002; Pons, Harris & Rosnay, 2004) have proposed the Test of Emotion Comprehension (TEC) which assesses nine domains of emotion understanding, namely the recognition of emotions, based on facial expressions; the comprehension of external emotional causes; impact of desire on emotions; emotions based on beliefs; memory influence on emotions; possibility of emotion regulation; possibility of hiding an emotional

state; having mixed emotions; contribution of morality to emotion experiences.. These nine components have a developmental orientation, following 3 stages: one external phase (3-6 years old), one mental phase (5-9 years old) and one reflexive phase (8-11 years old).

TEC was initially validated with a sample of 100 English children aged 3, 5, 9 and 11 years old, equally divided by sex in each age group. According to data collected, Pons and colleagues (Pons & Harris, 2002; Pons, Harris & Rosnay, 2004; Pons & Harris, 2005) have detected an evolution of a meta-emotional competence, organized in three developmental areas: 1) emotional categorization in relation to its nature; 2) comprehension of the emotion causes; 3) the control of emotions.

This instrument is being used worldwide, has been translated to 21 languages[1], and is now being tested in the Portuguese-speaking countries (Brazil and Portugal, so far), under the coordination of Roazzi doing the process of translation, adaptation and validation of this test.

In this study, we used a Portuguese sample of 182 children attending 3rd and 4th grades in public schools. The aim of this paper is to present some of the first results of its psychometric properties, analysis of its theoretical structure, through Confirmatory Factor Analysis (which has never been performed, as far as we know) and Similarity Structure Analysis, as well as its external validation in relation to age, gender and social competence.

There have been two previous studies in Portugal with TEC, which focused on 1st to 4th graders and on kindergartners (Santos, 2012; Silva, 2013; respectively).

2. Method

2.1. Sample

Data was collected in three public elementary schools in a Portuguese city (Évora - 50.000 habitants). Students from 10 classes from 3rd and 4th grade (5 classes each grade) were invited to participate in this study. 88,5% obtained parental consent to participate. Students with severe education needs were excluded from sample.

[1] Arabic, Catalan, Cantonese, Danish, Dutch, English, Fongbé, French, German, Greek, Icelandic, Italian, Macedonian, Mandarin, Norwegian, Polish, Portuguese, Quechua, Roumanian, Spanish & Turkish.

The final sample is constituted of 182 children aged between 8 and 11 years (M = 8,81; SD = 0,77); 52,7% (n=96) are boys and 47,3% (n=86) are girls; 51,6% (n=94) are from 3rd grade and 48,4% (n=88) from 4th grade. 7 children (3,85%) are from other nationality other than Portuguese (e.g., from eastern Europe countries, German, Dutch, Brazilian), but all are fluent in Portuguese. Finally, regarding the schooling (number of years) of the children's mothers (which is considered a good index of socioeconomic status), 1,1% (n=2) are analphabets; 16,48% (n=30) have elementary school; 10,99% (n=20) have middle school; 32,97% (n=60) have secondary school; 36,81% (n=67) have higher education (8,96%, n= 6, of which have masters; and 2,99%, n=2, have PhD), and 2,2% (n=4) have not responded.

Considering that only 5 children have 11 years, they have been inserted on the group of 10 years.

2.2. Instruments

2.2.1. Test of Emotion Comprehension

The Test of Emotion Comprehension (TEC, Pons & Harris, 2000; Pons, Harris & Doudin, 2002; Pons, Harris & de Rosnay, 2004) is divided into a set of stories in an established order. The test evaluates the following components (corresponding to the theoretical dimensions of understanding of emotions): understanding of the (1) recognition of emotions based on facial expressions, (2) external causes of emotions (e.g., being sad when a pet dies), (3) assigning a desire as cause an emotion; (4) the role of beliefs in determining emotions, (5) the influence of memory in circumstances of assessment of emotional states, (6) the ability to regulate emotions, (7) the ability to hide or conceal an emotion; (8) that a person can have mixed emotions (e.g., happiness and fear at the same time) in relation to a given situation, and (9) the role of morality in emotions.

There is a version for boys and girls, and it consists of a booklet of illustrations with a story that is read for each situation and in every sheet are presented four possible outcomes represented by emotional facial expressions (there five options: happy, sad, angry, afraid, OK). The children are asked to assign an emotion represented by a facial expression to the situation. The

instrument is also available in computerized format, where questions and stories are narrated by a female voice. The scoring is made automatically by the computer application. In this study we used the computerized format, only the male version, since this is the only available up to now for the European Portuguese.

Children's responses are nonverbal, considering that cross-cultural studies establish that facial expressions related to situations are similar across cultures. This test has been used in many countries around the world, being translated into 21 languages, is now being adapted into Portuguese (Portugal and Brazil).

This test can be used with children aged 3 to 11 years. Each child can get a score between 0 and 9.

2.2.2. Socially in Action-Peers

The instrument consists of six critical hypothetical social situations (one of them is an example for training) that require a variety of behavioral, emotional and cognitive skills. This version *Socially in Action-Peers* (SAp) (Candeias & Almeida, 2005; Candeias, Rebocho, Pires, Franco, Barahona, Franco, Santo, Oliveira & Pereira, 2008; Candeias & Rocha, 2012) was prepared taking into account issues of social development in terms of social interaction with peers relevant for this stage of development (Denham, 2007; Dodge, McClasky & Feldman, 1985; Waters & Sroufe, 1983). In general terms, the SAp assesses social competence in children in critical social situations with peers in the school context, in intimate situations and informal: E. Spokesman situation (example); 1. Group work situation; 2. Integrating a new classmate situation; 3. Leading a group situation; 4. Visiting a sick classmate situation, and 5. Conflict situation.

Each child was evaluated in each situation by the three sources in order to obtain a panoramic assessment. Firstly, the child makes a self-assessment of her perceived competence in each of the situations, using a Likert-type scale (bad -1, medium - 2 and good - 3). In other versions of the SAp children were also asked about the perceived difficulty of each situation, which has been eliminated in this version to facilitate the questions comprehensibility, since children tended to confuse performance to difficulty. Then, each child is asked

to nominate three colleagues (boys or girls, without needing to rank them) in her class perceived as the most competent to resolve each situation. Finally, the teacher evaluates the performance of each child using the same scale as the one used in self-evaluation version. In the format of peer assessment, we used the method of positive nominations instead of the evaluation of all classmates, because we felt that in developmental terms it would be difficult for these children to do it in a discriminant way to all colleagues.

For the instrument's scoring, example situation is not considered in the calculation of scores, as long as it has been used in order to help children to get familiarized with the test and the answer format. Several scores may be obtained for each child: (1) scores per rater, which consists on the sum of the five situations made by each rater (self, peers and teachers); (2) scores by situation, which consists on the mean of three sources scores in each situation; (3) composite score of social competence: which consists on the global mean of the three sources in all situations. In the case of peer assessment we counted the number of nominations that each child had in each situation. Since the classes in which children were placed had different number of students, t scores were calculated for each situation raw result. Cumulatively, considering that this procedure was going to generate different magnitudes in inter-rater metrics, we also calculated t scores for the self and teacher's ratings.

Finally, and to increase the predictive ability of the instrument, since each rater has systematic biases in their assessment, as result of the perceived (ir)relevance of certain behavioral data and the same selective attention, and considering the recommendations of previous studies (Ford, 1982; Waters & Sroufe, 1982); we calculated the composite score of social competence. Thus, it is possible to have a composite vision and also a specific one according to the perspective of different social actors.

2.3. Procedure

Prior to data collection, authorization for this study was obtained from the Ethical Panel of the Portuguese Ministry of Education, the National Commission for Data Protection, the three schools' principals, and finally, permission from parents of each child.

Data collection took place between March and June 2012. The administration of these tools is part of a larger study that sought to examine the relationship between the understanding of emotions, social competence and emotion regulation in children.

Regarding the administration of TEC, it was done individually with each child in a quiet place, using a laptop computer. The instructions were explained to the child and were clarified their doubts. The stories of the instruments and their questions were in European Portuguese by a female voice. After each question, the child chose the correct answer, and automatically passed to the next story. The computer application automatically recorded and quoted the child's response, which were then exported to SPSS. The administration of TEC took about 15 to 20 minutes with each child. Scoring procedure on component IV (*belief*) was changed in order to make the results more similar to the original ones, the same way the Italian adaptation did (both answers *happy* or OK were considered correct). This decision has been made because about 30% of all children answered OK, which seems also a plausible answer to us do to the fact that is also possible in terms of content (it's possible for the rabbit to feel ok) and to the fact that the Portuguese word for OK ("bem") may induce an use as synonymous of *happy*.

The SAp was administered in group in the classroom in the presence of the class teacher. We explained the study purpose to the children, assuring data confidentiality and voluntary participation. The instructions and situations were read aloud by the researcher and the children accompanied the reading. Firstly, the children made their self-assessment, and then they did the nominations of peers for each situation, situation to situation sequentially. Finally, a form was distributed to the teacher with the same situations. The administration of this instrument took approximately 30 to 45 minutes per class. Scoring was done according to the procedure described above.

Finally, children's results were reported back to their parents who have expressed will to know about it.Data analysis was performed on SPSS 20.0 and on MPlus 6.

3. Results and discussion

3.1. Descriptive statistics and reliability analysis

The items (here named as components) of each TEC were submitted to a descriptive analysis, as follows in Table 1. Generally, all the items have an adequate distribution along the likert scale used and adequate Skewness and Kurtosis values (bellow 3 and 7, cf. Kline, 1998), which indicate that the results follow a normal distribution. This does not stand for components I (recognition) and II (external causes), which have unacceptable values, that are due to the high success rates. These results are according to the developmental and hierarchical nature of TEC: first components of emotion understanding emerge earlier. Even though these values are unacceptable in psychometric terms, it's defensible that they are used among older children, in order to have them familiarized with the test purpose and contents. The discriminative power of the items on different versions also has acceptable results (corrected item-total correlations - CITC), although they were lower in this two components.

Table 1. Descriptive statistics of Test of Emotion Comprehension components.

Component	M	SD	Range	Skewness	Kurtosis	CITC
Recognition	,99	,105	0-1	-9,46	88,46	,180
External causes	,97	,179	0-1	-5,28	26,11	,259
Desire	,76	,429	0-1	-1,22	-,526	,334
Belief (recoded)	,82	,386	0-1	-1,67	,791	,385
Reminder	,80	,399	0-1	-1,53	,344	,270
Regulation	,76	,429	0-1	-1,22	-,526	,367
Hiding	,69	,465	0-1	-,812	-1,36	,459
Mixed	,69	,465	0-1	-,812	-1,36	,509
Morality	,42	,495	0-1	,337	-1,91	,493

In terms of reliability analysis, we've studied stability of results doing a test-retest 3 months later with 30 children. The correlation between first and

second application is of rs=,750 (p<,000), showing us that test results are stable over time. Analyzing the correlations of each component, the most stable over time were component 2 (external causes; V=,695; p<,000) and 6 (regulation; V=,636; p<,000); and the least stable was component III (desire; V=,088; p<,645). Our general correlation is similar to that found by Pons and colleagues: with a 3-month r (18) = ,83 (Pons, Harris & Doudin, 2002), and a 13-month delay, r (40) = , 68 and r (38) = ,54, when the effects of age and gender were controlled (Pons & Harris 2005).

As shown in Table 2, considering the relationships among the several components, they were only significant between components I (recognition) and II (external causes) (V=,276; p<,000); component I and 4 (belief recoded) (V=,244; p<,000); component 2 and 4 (v=1,53; p<,039); component 7 (hiding) and 8 (mixed) (V=,183; p<,014), and component 8 and 9 (morality) (V=,163; p<,027). This results show us that the different components are distinguishable dimensions of emotion understanding. Comparing with previous studies our correlations are weaker that the Italian ones (Albanese & Molina, 2008).

Table 2. V Cramer correlation matrix of Test of Emotion Comprehension results

Component	1	2	3	4	5	6	7	8
1.Recognition	1							
2.Causes	,276**	1						
3.Desire	,064	,039	1					
4.Belief (recoded)	,224**	,153*	-,033	1				
5.Reminder	,080	,063	-,023	,017	1			
6.Regulation	,064	,111	,101	,101	-,087	1		
7.Hiding	-,071	,074	-,022	,020	,081	-,022	1	
8.Mixed	,042	,074	,034	,143	-,097	,034	,183*	1
9.Morality	,089	,094	-,016	,051	,029	,062	-,005	,163*

$* = P<.05; ** = P<.01$

The success rates of our sample are similar to those of English and Italian previous studies (English – Pons, Harris & Rosnay, 2004; Italian - Albanese & Molina, 2008 – see Table 3 for UK and Portugal results comparisons), lower than the Brazilian ones in private schools, but higher than the Brazilian ones

in public schools (Roazzi, Dias, Minervino, Roazzi & Pons, 2009) and then Peruvian quechua ones (Tenenbaum, Visscher, Pons & Harris, 2004).

Table 3. % of correct answers for each component according to age for the UK sample (N=60) and our sample (n=140) per age groups.

Type of Sample /	Components									
Age (years)	N	I	II	III	IV	V	VI	VII	VIII	IX
British					Pons et al. (2004)					
7	20	90	100	75	85	80	35	65	20	30
9	20	100	100	80	95	100	60	80	65	50
11	20	100	100	100	100	100	80	95	90	90
Mean		97	100	85	93	93	58	80	58	57
Portuguese					This study					
8	70	99	96	80	54(81)	81	79	67	66	29
9	82	99	96	72	49(82)	77	76	74	72	44
10	30	100	100	77	53(83)	87	70	57	57	67
Mean		99	97	76	52(82)	80	76	69	69	42

Note: The data in parentheses about Component IV from our sample represent the re-codified data in order to obtain compatible results with the English data. Both the answer "happy" and the answer "normal" were considered correct. In this table there are only the results of similar age range from the UK sample.

The organization of TEC's components follows a hierarchical structure. In Table 4 is shown the general rate of success in all components, which is somewhat different from the original UK results, as shown in table 4. This difference may be concerned to methodological issues: different size samples, different age groups (7-9-11 years for the UK sample, and 8-9-10 years for the Portuguese one).

Table 4. Hierarchical organization of TEC's components

Portuguese sample (8-9-10y)	% success N = 182	UK sample (7-9-11 y)	% success N = 60
I - Recognition	99	II - External causes	100
II - External causes	97	I - Recognition	97
IV – Belief (recoded)	82 (52*)	IV – Belief	93
V - Reminder	80	V - Reminder	93
III - Desire	76	III - Desire	85
VI -Regulation	76	VII - Hiding	80
VII - Hiding	69	VI -Regulation	58
VIII - Mixed	69	VIII - Mixed	58
IX - Morality	42	IX – Morality	57
Mean	76,67	Mean	80,11

*non recoded

3.2. Confirmatory Factor Analysis

A Confirmatory Factor Analysis (CFA) was performed in order to test the adjustment of the theoretical model underlying TEC. No previous study has yet done this type of analysis. According to TEC's theoretical and empirical model (tested with Multidimensional Analysis), it assesses emotion understanding through 9 components, that can be grouped into three factors: external (recognition, external causes and belief), mentalist (desire, reminder and hiding) and reflexive (regulation, mixed and morality).

Considering that TEC's items are nominal and dichotomical, CFA was performed based on tetrachoric correlations. The analysis has been performed with MPlus v.6. The data was previously standardized into z scores. We used the procedure of Weighted Least Squares (WLMSV) as an estimation method, which is better suited in terms of the statistical processing for relatively small samples (200 to 500 subjects) than with other statistical estimation procedures. Fit indices chosen were chi-square analysis, GFI (Goodness-of-Fit Index), CFI (Comparative Fit Index), TLI (Tucker Lewis Index) and RMSEA (Root Mean Squared Error of Approximation), taking the indices suggested in the literature (Marôco, 2010). We've considered the following values indicative of good fit: CF, GFI e TLI above to ,90; $\chi2/gl<2$ and RMSEA inferior to ,60.

CFA hierarchical structure of TEC organized according to the original model (three related factors: external, mentalist and reflexive) had a good

adjustment to this sample ($\chi2$/gl = ,997; GFI = ,973; CFI = 1,000; TLI = 1,006; RMSEA = ,000). Finally, no adjustment to the initial model was needed. No modification indices above the minimum value.

Figure 1 shows factorial loadings and individual reliability of items (components) of each factor. All three factors are positively correlated: external and reflexive (r=,37); external and mentalist (r=,28) and mentalist and reflexive (r=,23). Not all trajectories between the factors and the items are statistically significant (e.g., reminder to external; hiding to mentalist; regulation to reflexive). There is a paradoxical mismatch between the general fit index of the model and the existence of some low loadings, which may be due the size and homogeneity of this sample.

This paradoxical results request for another kind of data analysis that may help to understand the distribution of emotion understanding components. This may be achieved using SSA, which may be more suited for dichotomous variables that not fulfill normality requisites.
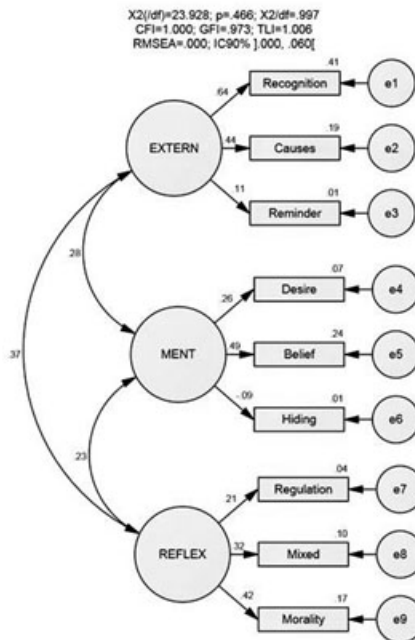
Fig. 1. Confirmatory Factorial Model of Test of Emotion Comprehension ($\chi2$/gl = ,997; GFI = ,973; CFI = 1,000; TLI = 1,006; RMSEA = ,000).

3.3. Similarity Structure Analysis

In this section we present results concerning the facets of Test of Emotion Comprehension. For this analysis we relied on a multidimensional scaling approach using the SSA (Smallest Space Analysis - Guttman, 1965; or Similarity Structure Analysis - Borg & Lingoes, 1987). Considering that TEC has dichotomous items, we used Jaccard's coefficient (Table 5). Figure 2 shows the SSA projection of the first two vectors of the three-dimensional space. The coefficient of alienation, which is the stress measure applied in SSA for assessing the goodness of fit was 0,066, indicating a good fit between the SSA solutions and the input correlation matrices. In this figure each point represents an aspect of the TEC items.

Table 5. Correlation matrix (Jaccard Coefficient) of the nine TEC components

TEC (Components)	1. Recog.	2. Ext. Cause	3. Desire	3. Belief (r)	5. Remin.	6. Regul.	7. Hiding	8. Mixed
1. Recognition	100							
2. External Cause	97	100						
3. Desire	76	75	100					
4. Belief (recoded)	83	81	64	100				
5. Reminder	80	79	65	72	100			
6. Regulation	76	76	67	66	63	100		
7. Hiding	68	69	59	67	64	59	100	
8. Mixed	69	69	61	60	58	61	65	100
9. Morality	43	44	45	48	46	48	47	54

Note: Decimals were omitted

A polar structure can be observed dividing the space in three regions according to the structural organization pointed out by Pons, Harris and Rosnay (2004). In the right side of the plot are located the first group of components, which may be labeled as "**external**", being the easiest. It focuses on external aspects of emotions, including the recognition of facial expressions (Recognition), understanding of the impact of situational causes on emotions (Cause), and understanding of the impact of associated external events or reminders on emotions (Reminder).

In the bottom region of the plot, closer to the center, are located two components characterized by the understanding of the various mental aspects

of emotion which may be labeled as "**mental**": the understanding of the role of beliefs (Belief) and the distinction between outwardly expressed and privately felt emotions (Hiding). The third mental component – understanding the role of desires (Desire) on emotions that should be located in this region together with desire and belief, is situated in the upper right part of the plot.

The last group of components which may be labeled as "**reflective**" is located in the left region. It focuses on children's understanding of the way by which an individual can think about a particular emotionally charged event from more than one perspective, including the appreciation of concurrent mixed feelings (Mixed), cognitive control strategies (Regulation), and the effect of rumination about an unacknowledged misdemeanour (Morality).

The components of "external" facet of emotion understanding are more densely clustered, showing us that they are highly correlated (1x2=,97; 1x5=,80 and 2x5=,79), besides the fact that our sample had success rates higher in these components.. According to the theoretical model proposed by Pons and colleagues (2004), Desire should be located in the "Mental" facet, even though it appeared closer to Recognition (r=,76) and Cause (r=,75).
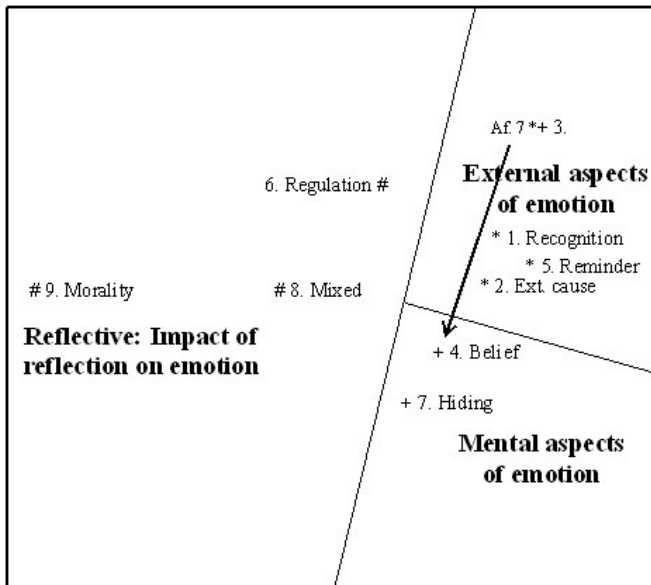
Fig.2 Two Dimensional SSA projection of the nine TEC components (coefficient of alienation .066).

In sum, according to this results, this structure suggest the existence of an hierarchical organization of TEC's results: understanding of external components of emotion (recognition, causes and reminder) is a prerequisite for understanding the psychological/ mental aspects of emotions (belief, desire and hiding); in turn, understanding theses internal aspects is a prerequisite for understanding the impact of reflection on emotions (regulation, mixed and morality). This way, emotion understanding in children is organized in an hierarchical fashion, with the earlier components of understanding being a necessary condition for the emergence of the later ones.

3.4. Validity evidence based on relations to other variables

3.4.1. Age and gender

In general, previous studies with TEC have found an effect of **age** on emotion understanding (Albanese & Molina, 2008; Pons & Harris, 2005; Morra, Parrella & Camba, 2010; Pons, Harris & Rosnay, 2004; Pons, Lawson, Harris & Rosnay, 2003; Ornaghi & Grazzani, 2012; Roazzi and colleagues, 2008, 2009; Santos, 2012; Silva, 2013; Tenenbaum, Visscher, Pons & Harris, 2008). In our study, in general there were no significant differences between age groups (8, 9 and 10 years) (F=,532; p<,588), with the 10 years group having higher results (M=7,07; DP=1,44). Indeed, our sample is small and relatively homogeneous in ages. There were significant differences in only one component: *morality* (F=6,78; p<,001), the 10 years group having higher results (M=,67; DP=,479). This difference may be due to effect of moral reasoning development, which can be easily seen analyzing both questions of this component. The first question of this component had a small percentage of success (32,9% in the 8 years group; 46,3% in the 9 years and 70% in the 10 years), but higher on the second question (90% in the 8 years group; 95,1% in the 9 years and 90% in the 10 years). The second question seems to be more related to compliance to authority figures (mother), and the first one to the acknowledgment of the inner value of acting correctly

Similar to a vast amount of results in this domain, our results about **gender** differences were not consistent. We performed Analysis of Variance (ANOVA) and t tests for independent samples in order to compare means by

gender in the TEC global score and in its components. We have found a small number of significant differences in all comparisons. In general, there were no significant differences between boys and girls (F=2,574; p<,099), with boys having slightly higher results (M=7,04; DP=1,28 vs. M=6,71; DP=1,42). Considering results in the 9 components, we have only found significant differences in *hiding/concealing* emotions (F=3,08; p<,053), boys having higher results (M=,75; DP=4,35 vs. M=,62; DP=,489). This difference may be due to different socialization practices related to gender in respect to emotion expression: boys are thought to hide or conceal emotion expression more.

3.4.2. Criterion-related validity: Social competence

Considering criterion-related validity, we've focused on social competence variable. Several theoretical and empirical evidences have underlined the connection between social competence and emotional competence in children (Alves, 2006; Denham, Blair, DeMulder, Levita, Sawyer, Auerbach-Major & Queenan, 2003; Halberstadt, Denham, & Dunsmore, 2001; Hubbard & Coie, 1994; Izard, Fine, Schultz, Mostow, Ackerman & Youngstrom, 2001; Machado, Veríssimo, Torres, Peceguina, Santos & Rolão, 2008; Mostow, Izard, Fine & Trentacosta, 2002; Santos, 2012; Saarni, 1999).

Our results confirm that TEC is significant and positively correlated to social competence, assessed by *Socially in Action-Peers* (r = ,281; p<,001). Considering the several evaluators used in this instrument, peers' assessment seems to be the one which has an higher level of correspondence with emotion understanding level (r = ,309; p <,001), followed by self-evaluation (r = ,168; p<,023) and teachers (r = ,165; p<,026) . All situations of SAp, except situation 5 (conflict resolution situation) have a significant positive correlation with TEC's overall result. Finally, considering TEC's components, only components IV (*belief*; r=,246; p<,001), VII (*hiding/concealing emotion*; r = ,190; p < ,010) and VIII (*mixed emotions*; r = ,199; p < ,007) are significant and positively correlated to social competence composite score.

Belief component of TEC is related to the understanding of the role of believes in determining and that requires the comprehension of false belief, which is considered a good indicator of perspective taking, useful in social competence. *Hiding/concealing* component of TEC is related to the understanding of the

possibility that internal experience and external expression of emotion may not coincide; so this component may be positively related do social competence as far as for being socially accepted, sometimes, we should not be too much emotionally expressive. The 8th component (*mixed emotions*) is about the understanding that a person can present multiple or even contradictory emotional answers in relation to a determined situation. This component may be relevant in social behavior as long as it may allow children to have a more flexible recognition of other's emotions and behaviors, and therefore better able to adjust her behavior in social interaction.

In our study, we've obtained similar results to those find by previous Portuguese studies, such as those of Alves (2006), Machado, Veríssimo, Torres, Peceguina, Santos and Rolão (2008), Santos (2012) and Silva (2013) who (the last two ones) also used TEC for assessing emotion understanding.

4. Conclusion

TEC use among the Portuguese children has proven to be a relevant instrument for the assessment of emotion understanding, in its several facets. Our results have shown its reasonable psychometric properties within the Portuguese middle childhood population. Results also fit its theoretical structure goes, which give inputs for a developmentally informed assessment and intervention in the domain of emotion competence. Results also showed us that the more complex components of emotion understanding (*hiding, mixed and morality*) are those that are more useful for differentiating children, as long as they are obviously associated with gender, social competence and age, respectively.

The use of **MDS and SSA**, in particular, enabled us to do a more comprehensive analysis of data. Unlike factor analysis, the dimensions work as a means to enable the verification of different projections of the total configuration, having theoretical considerations in mind in order to decide about the usefulness and appropriateness of a multidimensional solution. Besides, SSA compared with CFA, is less restrictive about the variables: it is not necessary that data have metric characteristics, or that association coefficients to be linear, allowing monotonic coefficients to be used also. In sum, in this type of analysis, looking for facets distribution facilitate the laborious work of theory construction and modification.

Within the **practical relevance** of this instrument, it allow us to identify children at risk of emotional maladjustment, and based on the strengths and weaknesses will be possible, at a later stage, outline intervention plans according to the specific emotional understanding skills to consider. For example, the evaluation made by a researcher or a psychologist can the results collected with TEC the outline an intervention plan. Likewise, in the prevention context, TEC can be used as a control measure to use in pre-and post-intervention. Intervention may be tailored according to children's level of emotion understanding development.

TEC is an instrument of easy and fast administration, children are amused to participate in its tasks.

This study has **limitations**, the most notable one is the sample size and homogeneity, which is small and unrepresentative. Another limitation is that we have not used another measure of emotional understanding or emotional competence for external validation of the TEC. This way, in **future studies**, it should be used a larger sample and with a wider range of ages. Finally, the factorial structure of CFA has paradoxal results, which may be related to sample's size and homogeneity.

There are some limitations in the instrument that should be considered in a revision of TEC. For instance, the older and the more developed children (in terms of cognitive development) find the tasks a bit childish; components I and II items are considered too easy for the majority of children above 8 years, which may decrease motivation to answer, even though we consider it important, as we've mentioned earlier; the wording for "OK" emotion should be adapted to a more neutral one, as long as some children consider it as synonym of "*happy*", leading to wrong answers (which was quite obvious on component 4); the answers to the several situations are not univocal: the same situation may trigger different emotions in different people, depending on the appraisal made; all components should have the same number of items, which has led to psychometric deficits; answers options should be 5 emotions, not 4, in order to have all the possible emotions; on component VI (hiding) it should be used a more relevant toy for girls, as long as that they to use, as much as boys, to play with marbles; on component VI (*regulation*) the type of answer is different from the rest of the TEC; finally, and in general and qualitatively, we've noticed that the linguistic and cognitive level of children seem to influence TEC's results.

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Socially in Action-Peers (SAp): Validation by Means of Confirmatory Factor Analysis (CFA) and Similarity Structure Analysis (SSA)

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Abstract: This study aimed to demonstrate the value and psychometric qualities of an instrument that assesses social competence for children in critical social situations within the relationships with peers in the school context - *Socially in Action-Peers* (SAp) using CFA and SSA. This instrument was administered to 182 Portuguese children aged between 8 and 11 years, of 3rd and 4th grades. These children were assessed by three sources: themselves, their peers and their teacher. Additionally, we used the *Test of Emotion Comprehension* (Pons & Harris, 2002; Pons, Harris & Rosnay, 2004) to assess SAp's criterion-related validity. Mean differences results in SAp by gender were analyzed. Concerning to gender, we only have found gender significant differences in a few items and in the general assessment made by teachers, in which girls being considered superior. The results of the SAp's psychometric analysis are satisfactory, both in terms of items' sensitivity and reliability (internal consistency) in three versions (self-assessment, peer and teacher). Finally, we performed a confirmatory factor analysis that confirmed that the model underlying the instrument's rational: a hierarchical model with a 1st order factor (composite social competence) that has three factors of 2nd order (consisting of the three sources of evaluation: self, peers and teacher). Besides the CFA data were analyzed through Louis Guttman's SSA - a non-metric multidimensional scaling (MDS) procedure. CFA and SSA confirmed the psychometric qualities of SAp and identified the subscales and dynamic relationships between them. Implications of these findings for social competence assessment and intervention in childhood are discussed, as well as, the advantages and disadvantages of CFA compared to SSA for empirical validation of psychological constructs are examined.

1. Introduction

There is a large panoply of definitions of social competence, some of them are quite broad, others quite specific. A lack of consensus has, naturally, led to methodological limitations in research plans and also in theo assessment and intervention in social competence. The **effectiveness in social interaction** and the ability to guide behavior in order to achieve personal goals in social situations have been considered central aspects in most of definitions of social competence. The several models of social competence have focused in specific skills, sociometric status, functional relationships and outcomes (Rose-Krasnor, 1997).

In this article we adopt the model of social competence of Ford (1982; Tisak & Ford, 1983). For Ford (1982), social competence is defined by "*the attainment of relevant social goals in specified social contexts, using appropriate means and resulting in positive developmental outcomes*" (p. 323). In this assessment instrument, the goal is related to being able to act effectively in social challenging situations with other people, in this case with peers.

Thus, according to Ford's Systems Model (1982; Ford & Tisak, 1983) a **socially competent child**: (1) is oriented to goals, acting deliberately and with effort, (2) have greater motivation for social goals (e.g., maintain relationships with adults and peers, making and maintaining friendships, helping others with their problems) than for non-social, (3) has skills that allow her to achieve those goals, for instance interpersonal problem solving and means-ends thinking (cf. Spivack, Platt & Shure, 1976), and (4) has intention to improve goals and knows how to do it, (5) is able to monitor transactions with the social contexts and personal skills, (6) is able to evaluate feedback information; (7) and shows empathy (sensitivity to behaviors, goals and feelings of others, cf. Feshbach , 1975) and consequential thinking (can assess the personal and social consequences of her behavior, cf. Spivack, Platt & Shure, 1976).

Our focus in this paper is on children's adjustment with peers within the school context. Through relationships with peers, children have the opportunity to develop social skills relevant to their harmonious development.

The importance of peer acceptance and friendships increases with age during elementary school (Sullivan, 1953, cit. by Rose-Krasnor, 1997). At this stage, the child needs to understand and behave according to the social

challenges of this context. The maintenance of positive social relationships and peer acceptance are good indicators of social development in childhood (Crick & Ladd, 1990). Some of these behaviors, such as prosocial behavior, facilitate the acceptance and popularity of these children (Hymel, Vaillancourt, McDougall, & Renshaw, 2002, cit. per Kwon, Kim & Sheridan, 2012; Mostow, Izard, Fine & Trentacosta, 2002). Likewise, the level of social competence influences some school indicators, such as: children with a level of social competence have a lower level of academic performance (Ahmed, 2006; Izard, Fine, Schultz, Mostow, Ackerman & Youngstrom, 2001; Kwon et al. May 2011; Stipek & Miles, 2008; Mostow et al. 2002; Wentzel, 1991); children with a higher quality of friendships, support from friends and less aggressive behavior toward peers are more committed to school (Kwon et al. 2011; Perdue, Manzeske & Estell, 2009). Social skills and academic competence mediates the relationship between emotional knowledge and peer acceptance (Alves, 2006; Mostow et al., 2002). The existence of difficulties in relationships with peers appears associated to the manifestation of externalizing behavior problems (eg, aggressiveness) and internalizing (e.g., depression, social anxiety) (Anderson & Messick, 1974). In the same line, rejected children with poor social skills (aggression and shyness/withdrawal) are more likely to have adjustment problems in the long term, such as school dropout, youth and adulthood criminality, as well as psychopathology in adulthood, which makes these children an at-risk group (Parker & Asher, 1987). These limitations in social competence are reinforced by the emphasis on peer acceptance: Ford (1982) noted that socially competent adolescents give higher priority to social goals than to nonsocial.

The quality of peer relationships is both a cause and a consequence of social competence. Rejected children are pledged opportunities to develop their social skills, as long as they have fewer opportunities to have positive interactions with peers, to learn and develop socially adaptive behaviors. Cumulatively, social competence in school can negatively affect school performance, which affects the first recursively. So, given the critical role played by social competence in childhood, its same assessment is of crucial importance in terms of research, intervention and prevention.

1.1. Developmental contributes

As mentioned above, the effectiveness in interaction must be considered from the point of view of developmental goals/ tasks, and according Waters e Sroufe (1983), "*competence assumes the status of an organizational construct. Competence is not one of the personal resources (…). Competence is identified with the ability to coordinate these resources in pursuit of adaptive goals.*" (p. 3). Thus, the characterization of the social developmental profile is extremely important to inform the construction of instruments for assessing social competence.

The nature of social functioning changes in middle childhood (Denham, 2007). The child starts to have a tendency to maintain a "*cool emotional front*". Dodge, McClaskey, and Feldman (1985) created a taxonomy of social situations in within relationships with peers in **elementary school children** (1st to 5th grade) that can lead to social difficulties. From the situations encountered, they created 8 categories: (a) meeting the standards of the peer group (e.g., group work at class, which requires cooperation and sharing), (b) being identified as different by peers (e.g., a funny or peculiar way of walking), (c) attempting to join a peer group for playing, (d) respond to a peer's ambiguous provocations, (e) being excluded or rejected by the peer group, (f) being identified as superior in some domain by peer group, (g) responding to a failure (e.g., losing a game), and (h) responding to negative statements made by peers (e.g., being called mean names). Based on this taxonomy, the authors developed the Taxonomy of Problematic Social Situations for Children, with 48 items, based on which teachers assess students' social behavior. In addition, the authors also used 15 of the 48 items to assess children's attempt solve of conflicts in these situations.

1.2. Social competence assessment

As an outcome the theoretical dispersion and the general interest in the topic, instruments for the assessment of social competence have proliferated (for a review see up Candeias, 2001; Crowe, Beauchamp, Catroppa & Anderson, 2011; Denham, 2005; Denham, Ji & Hamre, 2010). Assessment instruments of social competence have had different formats, such as behavioral rating scales, sociometry, observation, performance tasks. The **traditional instruments**

for assessing social competence help us to obtain relevant information about children's social behavior, but tend to emphasize intra-individual variables, giving little importance to contextual factors that naturally influence their social behavior (Warnes, Sheridan, Warnes & Geske, p. 174). Many of these instruments assess it from a broadband perspective, such as rating scales do, they end up losing specificity, reliability, and discriminant validity, unlike the more situational evidence. However, the latter tend to lose stability over time (Waters & Sroufe, 1983). These approaches lack the ability to assess the functional nature of social behavior that is necessarily transactional (Ford, 1982; Krasnor-Rose, 1997). The use of a multi-method, multi-source and multi-setting instruments may help to overcome this limitation, but it can be time consuming and expensive.

The conceptualization of social competence as *effectiveness in interaction* is associated with the characteristics of being transactional (i.e., is the joint product of the interaction of the individual with the social environment), dependent on the context (which has made its assessment to focus more in tasks or situations) and is an organizer construct (and not presentation a set of pre-defined behaviors) and related to specific goals. These characteristics should be taken into account in the preparation of instruments for assessing social competence.

Since the naturalistic studies (i.e., that use real behaviors) are difficult to implement and operationalize the construct, instruments' validity can be enhanced using different performance tests (or from different scores) to form a composite index or to analyze the profiles (Waters & Sroufe, 1983). Finally, to ensure greater ecological validity, these authors suggest the use of critical situations or transactions, instead of global ratings of typical performance (e.g., items such as "is cooperating", "does not get involved in fights"). These situations are critical in the sense that they tax the child's ability to deal with the core issues of the development phase it is in, as well as to the cognitive processing characteristics of each age.

In the same vein, Erdley and Asher (1999), reinforced the importance of using critical social tasks, since children face, in their reality, socially challenging situations (e.g., ambiguous provocation, conflict, social failure) and, moreover, it is in such situations that children with behavior problems tend to exhibit difficulties, since they tend to follow maladaptive social goals (e.g., retaliation goals) and tend to make different interpretations of

their failure (e.g., some adopt a helpless response pattern, making them to withdrawal from social interaction; while others show a mastery oriented pattern, increasing their effort in social terms; Erdley, Cain, Loomis, Dumas-Hines, Dweck, 1997). Several authors have already used challenging situations for the assessment of social competence (e.g., Ford, 1982; Lopes-da-Silva, 1988; Spivack et al., 1976; Candeias and colleagues, 2001, 2003, 2005, 2008, 2012).

In respect for the **evaluators** of social competence, peers and teachers have the opportunity of being primordial observers of social behavior of children in schools, since they share the same context. Children's behavior varies naturally according to the context and situations in which are; similarly, the expectations of different observers related to children's behavior also vary. Peers and teachers tend to show a moderate consensus (Achenbach, 1987; Alves, 2006; Renk & Phares, 2004) in the assessments that are in this area, however each of them manifest different perspectives as long as they interact differently with the child: the teachers have more opportunities for observation in instructional contexts, whereas peers have them in different contexts.

In **short**, given the definition of social competence adopted here, as well as to the empirical contributions discussed above, the assessment tool being analyzed here relies on social critical situations, developmentally relevant to middle childhood and in the relationship with peers in the school context, using multiple evaluators (trying to use rates of each source, but also a composite score).

1.3. Socially in Action-Peers: Social competence assessment in children with social critical situations with peers

The development of this Portuguese instrument here in review, *Socially in Action-Peers* (SAp - Candeias & Rock, 2012), had as reference the *Social Competence Nomination Form* (SCNF - Ford, 1982), considered one of the most reliable and valid assessment tool for social competence (Candeias & Almeida, 2005). It is an instrument for assessing the social competence of situational nature, whose critical situations involve interaction with peers in

the school context. SAp is targeted for children aged between 7 to 11 years old. There are other previous versions of this instrument for children (more general in the type of situations), for adolescents (general) and for adolescents in the domain of career development (Candeias et al., 2008; Candeias, 2001, 2004, 2005; Araújo, Taveira & Candeias, 2009, and Pinto, Taveiras, Candeias, Araújo & Mota, 2012).

In this instrument, social competence is conceptualized according to Ford's definition (1982; Ford & Tisak, 1983). Recalling: the achievement of personal goals in social contexts, using the appropriate means and achieving positive results according to the level of development. In SAp, the objective in question is about being able to act effectively in challenging social situations with peers in the school context.

2. Method

2.1. Sample

Data was collected in three public elementary schools in a Portuguese city (Évora - 50.000 habitants). Students from 10 classes from 3rd and 4th grade (5 classes each grade) were invited to participate in this study. 88,5% obtained parental consent to participate. Students with severe education needs were excluded from sample.

The final sample is constituted of 182 children aged between 8 and 11 years (M = 8,81; SD = 0,77); 52,7% (n=96) are boys and 47,3% (n=86) are girls; 51,6% (n=94) are from 3rd grade and 48,4% (n=88) from 4th grade. 7 children (3,85%) are from other nationality other than Portuguese (e.g., from eastern Europe countries, German, Dutch, Brazilian), but all are fluent in Portuguese. Finally, regarding the schooling (number of years) of the children's mothers (which is considered a good index of socioeconomic status), 1,1% (n=2) are analphabets; 16,48% (n=30) have elementary school; 10,99% (n=20) have middle school; 32,97% (n=60) have secondary school; 36,81% (n=67) have higher education (8,96%, n= 6, of which have masters; and 2,99%, n=2, have PhD), and 2,2% (n=4) have not responded.

2.2. Instruments

2.2.1. Socially in Action-Peers

The instrument consists of six critical hypothetical social situations that require a variety of behavioral, emotional and cognitive skills. This new version (SAp) was prepared taking into account issues of social development in terms of social interaction with peers relevant for this stage of development (Denham, 2007; Dodge et al.; 1985; Waters & Sroufe, 1983). In general terms, the SAp assesses social competence in children in critical social situations with peers in the school context: E. Spokesman situation (example); 1. Group work situation; 2. Integrating a new classmate situation; 3. Leading a group situation; 4. Visiting a sick classmate situation, and 5. Conflict situation; all available on Appendix).

In the adaptation of this instrument for the scope of relationships with peers, the writing of the situations was revised to facilitate understanding by children; some situations were eliminated (those involving teachers and parents), and new situations involving only peers were added. These situations were presented to two senior researchers in the field of Psychology, 1 elementary school teacher, 1 educational psychologist, and 10 children from 3rd and 4th grades, with the aim of analyzing the adequacy and appropriateness of the situational content for children this age. We also analyzed the comprehensibility of situations, their ambiguity, credibility, objectivity and clarity of the wording and their questions for the purpose of the study (Almeida & Freire, 2007).

Each child was evaluated in each situation by the three sources in order to obtain a panoramic assessment. Firstly, the child makes a self-assessment of her perceived competence in each of the situations, using a Likert-type scale (bad -1, medium - 2 and good - 3). Then, each child is asked to nominate three classmates (boys or girls, without needing to rank them) in her class perceived as the most competent to resolve each situation. Finally, the teacher evaluates the performance of each child using the same scale as the one used in self-evaluation version. In the format of peer assessment, we used the method of positive nominations instead of the evaluation of all classmates, because we felt that in developmental terms it would be difficult for these children to do it in a discriminant way to all colleagues.

For the instrument's scoring, example situation is not considered in the calculation of scores, as long as it has been used in order to help children to get familiarized with the test and the answer format. Several scores may be obtained for each child: (1) scores per rater, which consists on the mean of the five situations made by each rater (self, peers and teachers); (2) scores per situation, which consists on the mean of three sources scores in each situation; (3) composite score of social competence: which consists on the global mean of the three sources in all situations. In the case of peer assessment we counted the number of nominations that each child had in each situation. Since the classes in which children were placed had different number of students, t scores were calculated for each situation raw result. Cumulatively, considering that this procedure was going to generate different magnitudes in inter-rater metrics, we also calculated t scores for the self and teacher's ratings.

Finally, and to increase the predictive ability of the instrument, since each rater has systematic biases in their assessment, as result of the perceived (ir)relevance of certain behavioral data and the same selective attention, and considering the recommendations of previous studies (Ford, 1982; Waters & Sroufe, 1982); we calculated a composite score of social competence. Thus, it is possible to have a composite vision and also 3 specific ones according to the perspective of different social actors.

2.2.2. Test of Emotion Comprehension

The Test of Emotion Comprehension (TEC, Pons & Harris, 2000; Pons, Harris & Doudin, 2002; Pons, Lawson, Harris & de Rosnay, 2003) is divided into a sets of stories in an established order. The test evaluates the following components (corresponding to the theoretical dimensions of understanding of emotions): understanding of the (1) recognition of emotions based on facial expressions, (2) external causes of emotions (e.g., being sad when a pet dies), (3) assigning a desire as a cause of an emotion; (4) the role of beliefs in determining emotions, (5) the influence of memory in circumstances of assessment of emotional states, (6) the ability to regulate emotions, (7) the ability to hide or conceal an emotion; (8) that a person can have mixed emotions (e.g., happiness and fear at the same time) in relation to a given situation, and (9) the role of morality in emotions.

There is a version for boys and girls, and it consists of a booklet of illustrations with a story that is read for each situation and in every sheet are presented four possible outcomes represented by emotional facial expressions (there five options: happy, sad, angry, afraid, OK). The children are asked to assign an emotion represented by a facial expression to the situation. The instrument is also available in computerized format, where questions and stories are narrated by a female voice. The scoring is made automatically by the computer application. In this study we used the computerized format, only the male version, since this is the only available up to now for the European Portuguese.

Children's responses are nonverbal, considering that cross-cultural studies establish that facial expressions related to situations are similar across cultures. This test has been used in many countries around the world, being translated into 15 languages, is now being adapted into Portuguese (Portugal and Brazil).

This test can be used with children aged 3 to 11 years. Each child can get a score between 0 and 9.

2.3. Procedure

Prior to data collection, authorization for this study was obtained from the Ethical Panel of the Portuguese Ministry of Education, the National Commission for Data Protection, the three schools' principals, and finally, permission from parents of each child.

Data collection took place between March and June 2012. The administration of these tools is part of a larger study that sought to examine the relationship between the understanding of emotions, social competence and emotion regulation in children.

The SAp was administered in group in the classroom in the presence of the class teacher. We explained the study purpose to the children, assuring data confidentiality and voluntary participation. The instructions and situations were read aloud by the researcher and the children accompanied the reading. Firstly, the children made their self-assessment, and then they did the nominations of peers for each situation, situation to situation sequentially. Finally, a form was distributed to the teacher with the same situations. The administration of this

instrument took approximately 30 to 45 minutes per class. Scoring was done according to the procedure described above.

Regarding the administration of TEC, it was done individually with each child in a quiet place, using a laptop computer. The instructions were explained to the child and were clarified their doubts. The computer application automatically recorded and quoted the child's response. The administration of TEC took about 15 to20 minutes with each child.

Finally, children's results were reported back to their parents who have expressed will to know about it.

3. Results and Discussion

3.1. Descriptive statistics and reliability analysis

The items of each SAp raters-version were submitted to a descriptive and internal consistency analysis, as follows in Table 1. Generally, all the items have an adequate distribution along the likert scale used and adequate Skewness and Kurtosis values (bellow 3 and 7, cf. Kline, 1998), which indicate that the results follow a normal distribution. The discriminative power of the items on different versions also has acceptable results (corrected item-total correlations - CITC), although they were lower in the self-evaluation version.

The same way, the reliability coefficients assessed with Cronbach's Alpha (α) (Nunnally, 1978) for this version and its items were low (α =,561 for the total self-evaluation scale); but the internal consistency index for the peers and teacher's versions have adequate results (α = ,876 for peers version, and ,842 for teacher's version). This difference in the results between raters may be due to the fact that, as Ford (1982), mentioned and find before "s*elf-judgments are more situation specific than judgments by others, which tend to be more traitlike*" (Ford, 1982, p.330).These last values (peers' and teachers') are above the studies of Ford (1982) in which the author used a sample of 600 American Adolescents (α = .76) and Candeias (2008) with a sample of 441 Portuguese children (α = ,82). Globally, this reliability results are good considering the fact that the each version has only 5 items.

Table 1. Descriptive statistics and reliability analysis for the Socially in Action-Peers (based on raw data).

N = 182 for all items.	Situa-tion	M	SD	SEM	Range	Skewness	Kurtosis	CITC	α if deleted
	1	1,550	,644	,048	0-2	-1,128	,136	,371	,477
	2	1,736	,478	,035	0-2	-1,533	1,358	,221	,555
Self-evaluation version (α=,561)	3	1,522	,645	,048	0-2	-1,017	-,074	,414	,451
	4	1,604	,654	,049	0-2	-1,410	,712	,441	,434
	5	1,127	,823	,061	0-2	-,240	-1,486	,207	,597
	1	2,791	3,593	,266	0-16	1,665	2,188	,667	,872
	2	2,725	2,597	,193	0-15	1,637	4,023	,713	,849
Peers version (α=,876)	3	2,665	2,862	,212	0-14	1,636	3,254	,801	,826
	4	2,714	2,602	,193	0-12	1,447	2,312	,738	,843
	5	2,692	2,304	,171	0-10	,936	,481	,679	,859
	1	1,214	,746	,055	0-2	-,370	-1,121	,731	,786
	2	1,517	,628	,047	0-2	-,941	-,155	,719	,794
Teacher's version (α=,842)	3	1,082	,757	,056	0-2	-,138	-1,238	,676	,802
	4	1,610	,591	,044	0-2	-1,245	,546	,645	,814
	5	1,225	,750	,056	0-2	-,396	-1,127	,504	,851

We found significant positive correlations between results from all versions, as follows: self-evaluation – peers (r = ,293; p < 0.01), self-evaluation-teacher (r = ,225; p < 0.01) and peers-teacher (r = ,596; p < 0.01). This results are similar to those found by Rank and Phare's (2004) meta-analysis about concordance between raters, in which the highest correlation found was between

peers and teacher (r = , 48) and the lowest was between self and teachers (r = ,25). These results are also similar to Ford's (1982): peers-teacher (r = between ,57 and ,71), self-peers (r = between ,30 and ,48) and self-teacher (r = between ,22 and 0,43).

Considering now the results by situation, we calculated the average of all raters (self, peers and teacher) per situation. The composite results correlated significant and positively in all situation, ranging from r =,387 to r =,749.

3.2. Confirmatory Factor Analysis

A Confirmatory Factor Analysis (CFA) was performed in order to test the adjustment of the composite model underlying SAp, in which it is possible to have a composite score that encompasses the three sources of social competence assessment: self-evaluation, peers and teacher. The analysis has been performed with AMOS 20.0. The data was previously standardized into z scores. We used the procedure of Maximum Likelihood (ML) as an estimation method, which is better suited in terms of the statistical processing for relatively small samples (200 to 500 subjects). Fit indices chosen were chi-square analysis, GFI (Goodness-of-Fit Index), PGFI (Parsimony Goodness-of-Fit Index), CFI (Comparative Fit Index), PCFI (Parsimony Comparative Fit Index) RMSEA (Root Mean Squared Error of Approximation) and AIC (Akaike Information Criterion), taking the indices suggested in the literature (Marôco, 2010). We've considered the following values indicative of good fit: CFI and GFI superior to ,90; PCFI and PGFI superiors to ,60; $\chi^2/gl < 2$ and RMSEA inferior to ,60. Finally, model's adjustment was made using modification indices by Langrage multipliers (LM), considering that trajectories and/or correlations with LM>11 (p<,001) were indicative of a significant variation of model's quality.

CFA hierarchical structure of SAp with the original model had a modest adjustment to this sample (χ^2/gl = 2,306; GFI = ,867; PGFI = ,628; CFI = ,884; PCFI = ,732; RMSEA = ,085). According to modification indices (LM>11, p<0.001) correlations between errors were performed. The new model (correlating errors 7 and 9, 12 and 14, 5 and 11) has shown a good level of adjustment (χ^2/gl = 1,562; GFI = ,908; PGFI = ,635; CFI = ,952; PCFI = ,761; RMSEA = ,056). The difference of adjustment's quality of these two models is show by a decrease in AIC from the first to the second model (266,602 to 203,172, respectively).

Figure 1 shows factorial loadings and individual reliability of items (situations) of each factor, as well as the correlations between errors that have been performed to improve model's level of adjustment. All trajectories between the second order factors (self, peers and teacher evaluations)   and the first order factor (composite score of social competence) are statistically significant; the same has happened to second order factors and items. The greater influence of composite social competence is over teacher's evaluation (,89), followed by peers' evaluation (,79) and self-evaluation (,50).

Previous versions of this instrument have only performed Exploratory Factor Analysis, in which has emerged a somewhat different structure then ours, which is plausible, considering that versions for adolescents (PACS and PACS-CC) and for children (SA) have situations that involve peers and adults (teachers and parents), as long as ours only has situations with peers. The adolescent version (PACS) has a structure of 6 factors (Candeias, 2001; 2005) and the children version (SA) has 2 factors (Candeias, 2008). Considering the last one in more detail, the factors are related to general social competence (factor 1) and to situational aspects of social competence (factor 2) related to interpersonal communication and leadership in academic contexts.

As said before, considering the adjustments made to the initial model to improve adjustment indices, correlations between errors have been performed, according to LM>11 (p<,001). Correlation between errors 12 and 14, was the biggest one (r = ,480; p<,000), followed by the correlation between errors 5 and 11 (r = -,450; p<,001), and 7 and 9 (r = ,290; p<,002). These errors are associated to situations/items as follows: error 12 – situation 2, teacher; error 14 – situation 4, teacher; error 5 - situation 1, self-evaluation; error 11 – situation 1, teacher; error 7 – situation 2, peers; and error 9 - situation 4, peers.

These correlations may be interpreted analyzing situations/items contents. The correlations between errors of situations 2 (integrating a new classmate situation) and 4 (visiting a sick classmate situation) of teacher's version may be explained by the fact that both situations involve skills related to pro-social behavior, making and maintaining friendship. The same happens with the correlation of errors of situations 2 and 4 in peers' version. This finding may also enhance that the skills associated to this two situations are seen aggregated by these two sources. Finally, the negative correlation of errors of situations 1 (group work situation) of self and

teacher's evaluation; this situation is related to pro-social behavior in the context academic tasks, showing us that this two sources consider different relevant aspects for the successful accomplishment of this situation. It may be possible that children find more relevant to use friendship skills and teacher academic skills for being able to help other classmates with difficulties in academic tasks.
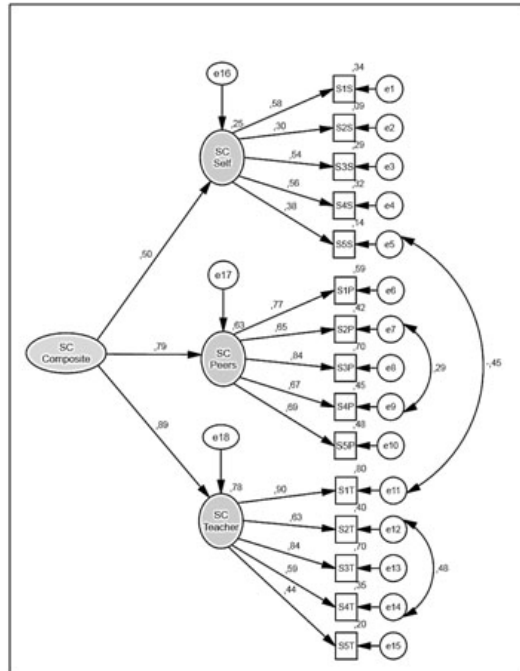
Fig. 1. Confirmatory Factorial Model between composite social competence; self-evaluation, peers' evaluation and teacher's evaluation of social competence, and situations ($\chi 2/gl = 1,562$; GFI = ,908; PGFI = ,635; CFI = ,952; PCFI = ,761; RMSEA = ,056).

3.3. Similarity Structure Analysis

In this section we present results concerning the facets of Socially in Action-Peers items (5: self-evaluation; 5: peers' evaluation; and 5: teacher's evaluation of social competence). For this analysis we relied on a multidimensional scaling approach using the SSA (Smallest Space Analysis

- Guttman, 1965; or Similarity Structure Analysis - Borg & Lingoes, 1987). Figure 2 shows the SSA projection of the first two vectors of the three-dimensional space. The coefficient of alienation, which is the stress measure applied in SSA for assessing the goodness of fit was 0,073, indicating a good fit between the SSA solutions and the input correlation matrices. In this figure each point represents an aspect of the SAp items.

A polar structure can be observed dividing the space according to the three of sources of evaluation – self, peers and teacher. While in the left side of the plot are located the self-evaluation items, on the right side of the plot we observe the peers' evaluation items (upper region) and teacher's evaluation items (bottom part).
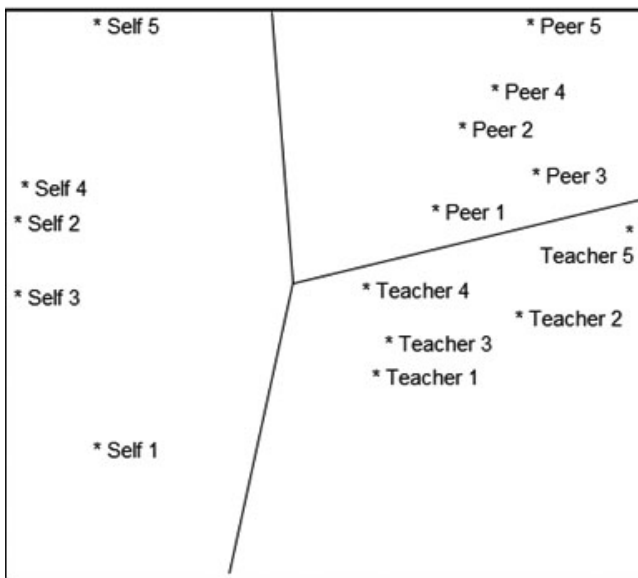
Fig. 2. SSA projection of the Socially in Action-Peers items (5: self-evaluation; 5: peers' evaluation; and 5: teacher's evaluation of social competence).

Concordantly with CFA, SSA shows us that peers and teacher's evaluations are more clusterized than self's evaluation. Self-evaluation's situations have more disperse results, which may be due to the fact that children's have a more situation specific judgment than others, which tend to be more general (Ford, 192; Candeias, 2008; such as mentioned earlier). Peers

and teachers tend to have a closer evaluation, than compared to self, as long as self vs. peers and teachers situations are more distant, plotted on opposite sides of the structure.

Analyzing each facet/evaluator, in self-version is possible to see that situations 1 (group work) and 5 (conflict resolution), and 1 and 2 (integrating a new classmate) are more distant, showing us that they may encompass different nuances of social competence. The closest ones, in self-version, are situations 2 and 4 (visiting a sick classmate). Regarding to peers situations, situation 1 and 5 are the most distant from each other, and 2 and 4 are the closest. Finally, for teacher's situations: again, situation 1 and 5 are the most distant, and 1 and 3 (team leader) are the closest.

It is interesting to note that situation 5 (conflict resolution) which, when compared to the other type of situations, is always located more distant from the center of the polar structure, in all sources of raters, showing us that this situation may encompass somewhat different nuances of social competence. Besides, situations 1 and 5 are always more distant from each other, for all raters. These facts were not yet possible to acknowledge using the descriptive statistics neither CFA.

3.4. Validity evidence based on relations to other variables

3.4.1. Gender

Similar to a vast amount of results in this domain, our results about gender differences were not consistent. We performed Analysis of Variance (ANOVA) and t tests for independent samples in order to compare means by gender in the composite score of social competence (mean of t scores in the 3 three versions), social competence score by version (self, peers and teacher), and between situations (composite scores per situation and each versions' scores). We have found a small number of significant differences in all comparisons.

There were no significant differences between girls and boys in **the composite score for social competence** ($F = 3,628$; $p = ,058$), which means that girls and boys have a similar level of social competence in our results. Analyzing results by each evaluator, in the **self-version**, there were no significant differences in the girls and boys self-assessment of global social competence ($F = 2,142$; $p =$

,145); the only situation within this version that presented significant differences was the situation 5 (conflict resolution situation) (t = -2,169; p = ,031), in which girls considered themselves better able to handle with this situation. In the **peers version**, there were also no significant differences by gender (F = ,087; p = ,769) in the peers' score of social competence, which means that peers rated boys and girls as equally socially competent . There were also no differences in all the 5 situations in this version. Finally, the **teacher's version** was the only version in which significant differences between composite social competence in genders emerged (F = 6,796; p = ,010): teacher's considered that girls have a superior global level of social competence. As concerned to the teacher's situations, there were significant differences on situation 2 (integrating a new classmate situation) (t = -4,278; p < ,000), situation 4 (visiting a sick classmate) (t = -3,745; p < ,000) and situation 5 (conflict resolution situation) (t = -2,067; p = ,040), in all of them girls with superior results in all these three situations.

These results are similar to those of Ford (1982), in which teachers rated girls globally more social competent than boys. The same way as Mostow et al. (2002) found that teachers tend to classify girls as having a level of prosocial behavior higher than boys. These differences may be due to a different social functioning between genders, but also to the fact that these ratings were made in the school context and, specifically, by teachers, who may overemphasize social behaviors more related to school achievement. In this line, Ford (1982) found a common factor between social and cognitive competence.

3.4.2. Criterion-related validity: emotion comprehension

Considering criterion-related validity, we've focused on emotion understanding variable. Several theoretical and empirical evidences have underlined the connection between social competence and emotional competence in children (Alves, 2006; Denham, Blair, DeMulder, Levita, Sawyer, Auerbach-Major & Queenan, 2003; Halberstadt, Denham, & Dunsmore, 2001; Hubbard & Coie, 1994; Izard et al. 2001; Machado, Veríssimo, Torres, Peceguina, Santos & Rolão, 2008; Mostow et al., 2002; Santos, 2012; Saarni, 1999). Saarni's model of emotional competence considers that this competence is inextricable form social competence. Emotion understanding is one relevant domain of emotion competence, and is conceptualized as a children's general sociocognitive

understanding of perspective taking, desire beliefs, intentions understanding related to emotions in their selves and others (Harris, 1989).

Our results confirm that SAp is significant and positively correlated to emotion understanding, assessed by *Test of Emotion Comprehension* (r = ,281; p<,001). Considering the several evaluators used in this instrument, peers' assessment seems to be the one which has an higher level of correspondence with emotion understanding level (r = ,309; p <,001), followed by self-evaluation (r = ,168; p<,023) and teachers (r = ,165; p<,026) . All situations of SAp, except situation 5 (conflict resolution situation) have a significant positive correlation with TEC's overall result. Finally, considering TEC's components, only components IV (belief; r=,246; p<,001), VII (*hiding/concealing emotion*; r = ,190; p < ,010) and VIII (*mixed emotions*; r = ,199; p < ,007) are significant and positively correlated to social competence composite score.

Belief component of TEC is related to the understanding of the role of believes in determining emotion and that requires the comprehension of false belief, which is considered a good indicator of perspective taking, useful in social competence. *Hiding/concealing* component of TEC is related to the understanding of the possibility that internal experience and external expression of emotion may not coincide; so this component may be positively related do social competence as far as for being socially accepted, sometimes, we should not be too much emotionally expressive. The component VIII (mixed emotions) is about the understanding that a person can present multiple or even contradictory emotional answers in relation to a determined situation. This component may be relevant in social behavior as long as it may allow children to have a more flexible recognition of other's emotions and behaviors, and therefore better able to adjust her behavior in social interaction.

In our study, we've obtained similar results to those find by previous Portuguese studies, such as those of Machado et al.'s (2008 – with significant positive correlations between emotional knowledge and peer acceptance; r = ,18 and ,49); Alves (2006; Alves et al, 2008 – with significant positive correlations between emotion knowledge and social competence (r = ,34; p<,001), and Santos (2012), who also used TEC for assessing emotion understanding (with positive no significant correlation between emotion understanding and peers acceptance; r = ,11; with only one component of TEC having significant positive correlations: causes of emotion, r = ,21; p<,05).

4. Conclusion

The design of this assessment instrument of social competence based on the definition of the construct as effectiveness in interaction, managed to keep the theoretical and empirical recommendations, ensuring its transactional nature (insofar as social competence is revealed in the person's interaction with its social environment), their contextual appropriateness (reporting to a specific context: social interaction with peers in the school context, and being related to specific situations), its orientation towards goals (successful interaction with peers), its consideration of relevant developmental social tasks in this phase of childhood, the use of critical social situations that overwhelm the capacities of the child, as well as the use of multiple raters (which ensure the collection of relevant complementary perspectives), are contributions that enhance its predictive and ecological validity.

Data analysis of psychometric characteristic of SAp are satisfactory in terms of sensitivity of items (situations) and in terms of reliability (internal consistency of each of the three raters' versions), or its hierarchical factorial structure, with the demonstration of the existence of the rationale behind the construction of SAp: a hierarchical model with one 1st order factor (composite social competence) that has three factors of 2nd order (consisting of the three sources of evaluation - self, peer and teacher). Demonstration of criterion-related validity was also demonstrated, with the existence of positive and significant correlation with the understanding of emotions. Finally, there were some gender differences in some situations or according to the contribution of the evaluators, which has the merit of providing clues to a differential intervention by gender.

The use of **MDS and SSA**, in particular, enabled us to do a more comprehensive analysis of data. Unlike factor analysis, the dimensions work as a means to enable the verification of different projections of the total configuration, having theoretical considerations in mind in order to decide about the usefulness and appropriateness of a multidimensional solution. Besides, SSA compared with CFA, is less restrictive about the variables: it is not necessary that data have metric characteristics, or that association coefficients to be linear, allowing monotonic coefficients to be used also. In sum, in this type of analysis, looking for facets distribution facilitate the laborious work of theory construction and modification.

Within the **practical relevance** of this instrument, beyond what is just mentioned, it is interesting to re-emphasize the contribution of using multiple informants in the assessment of social competence, not only because each informant has a complementary vision of different contexts in which children circulate, but also because the assessments made by researchers or psychologists can hardly reach children in multiple contexts and in a variety of situations that those raters can.

The collection of composite indices, per rater and/or situation, allow us to identify children at risk of social maladjustment, and based on the strengths and weaknesses will be possible, at a later stage, outline intervention plans according to the specific social skills to consider. For example, the evaluation made by a researcher or a psychologist can use the same situations of SAp to conduct an interview with the children at risk in order to assess the type of strategies and social skills used by them and, from there, the outline an intervention plan. Likewise, in the prevention context, SAp can be used as a control measure to use in pre-and post-intervention.

SAp is an instrument of easy and fast administration, to which children show satisfaction and adhere to respond. However, its scoring is laborious, especially in regard to the counting of peers nominations and to the composite scores calculation. During SAp's administration we could see that the situation 4 (visiting a sick classmate) is considered relatively easy by teachers, and that the situation 5 (conflict solving) is considered difficult for children. So, these situations may need to be revised.

This study has **limitations**, the most notable one is the sample size, which is small and unrepresentative. Another limitation is that we have not used another measure of social competence for external validation of the SAp. This way, in **future studies**, it should be used a larger sample and with a wider range of ages; to use another measure of social competence. In parallel, we could also use the sociometric status to define groups of popular and rejected children to correlate with the level of social competence, and to assess the type of strategies and behaviors they thought they would use by each group.

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Similarity Structure Analysis and Structural Equation Modeling in Studying Latent Structures: An Application to the Attitudes towards Portuguese Language Questionnaire

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Abstract: Several international studies such as PISA and PILRS (Progress in International Reading Literacy Study), have stressed the importance of positive attitudes and behaviours as facilitators of individuals reading literacy during the school years and throughout their lives.

Considering that there are not available instruments for assessing attitudes Towards Portuguese Language, it was proposed the development of the Attitudes towards Portuguese Language Questionnaire – ATPLQ (*Questionário de Atitudes Face à Língua Portuguesa*: QAFLP, Neto et al., 2011; Rebelo, 2012). The questionnaire has 22 Likert-type items, with four levels of response (Strongly Disagree, Disagree, Agree, Strongly Agree), spread, through exploratory factor analysis (EFA), over three attitudinal dimensions: Behavioural, Affective, and Motivational.In this study we aimed to analyse the ATPLQ's latent structure with a pooled sample data of 1441 participants, applying similarity structure analysis (SSA) and confirmatory factor analysis of ordinal data (CFA). The SSA was carried out with Hudap in order to identify the structural properties of the questionnaire and to assess its adequacy in a Portuguese population. The CFA was carried out with LISREL in order to assure structural validity, i.e., accounting for factorial validity, but also for factors' convergent and discriminant validity, and composite reliability. These psychometric features allowed the comparison of both the EFA derived model and the SSA derived model.

We justify the selection of the SSA's model, and we discuss the similarities between the results generated by SSA and LISREL procedures, highlighting their use in modeling constructs with ordinal indicators.

1. Introduction

Several international studies such as PISA and PILRS (Progress in International Reading Literacy Study), have stressed the importance of positive attitudes and behaviours as facilitators of individuals reading literacy during the school years and throughout their lives. These studies are intended to point out a number of factors inherent to the student and the educational system that could explain the differences found between the various participating countries.

In Portugal, as in other countries, the use of PISA results in educational policies favouring the induction of which is essential in the education system and what values to promote, allowing an understanding of the results, the skills, the quality of what is taught and what is learns (Afonso & Costa, 2009). But learning does not depend only on how teachers teach, or cognitive abilities of each student. Learning is influenced by a number of factors as psychological, social and content of the task. And, the affective characteristics of it may be an important explanatory element of quality-education and investment of individual actors in the different dimensions that make up the school (Santiago, 1994).

Attitudes are used by the subject to place the object in a class attitudinal favourable or unfavourable, helping to provide simple strategies to solve problems, organize memory of events and maintain self-esteem. Applying this information to the school field, we believe that knowledge of students' attitudes allow access to their evaluations about the school and the main school subjects, which will allow the development of curricular and extracurricular activities that take into account their attitudes, their interests and aspirations. The attitudes are still intrinsically linked to perception and interest of the student to learn, their competence (perceived and as a result of previous academic results) and motivation.

Regarding the Portuguese language (PL), little is known about the effect of students' attitudes on their performance and motivation to continue studying. But the results are not very encouraging reports of PISA for this discipline, according to which 22% of Portuguese students' performances are below level 1 (level featuring poor readers) in PISA 2003 compared with the reference value EU, which stood at 19.8 %, (Portal of the Ministry of Education, 06/01/2006), which compromises the academic success of both, students from regular and academic curriculum and students from professional curriculum. These data

support the need to assess what other factors beyond the school curriculum may be interfering with the performance of students.

Considering that there are not available instruments for assessing attitudes towards PL, it was proposed the development of the Attitudes towards Portuguese Language Questionnaire – ATPLQ (*Questionário de Atitudes Face à Língua Portuguesa*: QAFLP, Neto et al., 2011; Rebelo, 2012). As a result of this study, the ATPLQ's model has 22 Likert-type items (4-points response format) spread over three attitudinal dimensions: behavioural, affective, and motivational.

However, this ATPLQ model was derived from exploratory factor analysis (EFA) through principal components' method based on a Pearson correlation matrix. Bollen (1989) has demonstrated that the use of Person correlations with simulated ordinal variables derived upon the discretization of continuous variables generally produced lower estimates than the ones produced by the continuous variables. Consequently, in EFA with ordinal variables, this attenuation effect can bias factor loadings and communalities' magnitudes, misleading the variables' aggregation to the factors.

The Babakus, Ferguson, and Jöreskog's (1987) simulation study pointed out to the preference for the use of polychoric correlations instead of other measures of association (Pearson and Spearman correlation coefficients, or Kendall tau rank correlation coefficient). This was the type of correlations used in the current study to compare, through confirmatory factor analysis (CFA), with the ATPLQ's EFA derived model.

Finally, within this model comparison process, we intent to highlight the use of SSA based on monotonicity correlation and of CFA based on polychoric correlations in modeling constructs with ordinal indicators, and also to account for ATPLQ's structural validity, assessing its adequacy to the Portuguese youngsters population.

2. Method

2.1. Participants

Our work was developed with a convenience sample of 1441 Portuguese youngsters (28,8% in the first level, *Mdn*(age) = 9 years; 34,3% in the second

level, *Mdn*(age) = 11 years; and, 6,9% in the third level, *Mdn*(age) = 14 years), of both gender (52,3% girls), from the main regions of Portugal (23,8% from North; 19,7% from Centre; 18,0% from Lisbon and Vale do Tejo; 17,4% from Alentejo; 13,6 from Algarve; and, 7,3% from Azores Islands).

2.2. Instrument

The ATPLQ (Neto et al., 2011; Rebelo, 2012) has 22 items, with a Likert-type response format (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree), spread over three attitudinal dimensions: behavioural, affective, and motivational (cf. Appendix).

2.3. Data collection

The ATPLQ's administration took place during the school year 2011/2012 in a single ninety-minute session during lesson's time. Responses to the questionnaire were voluntarily provided after the active informed consent of students' parents.

2.4. Data analyses

The IBM SPSS Statistics for Windows (version 19) was used for re-codification of Affective items, which are negatively connoted (cf. Appendix), and also for descriptive data analysis.
SSA. The 22 ATPLQ's items were analyzed with the help of a statistical analysis package, the HUDAP (Hebrew University Data Analysis Package), based on Louis Guttman's Facet Theory (Guttman, 1968; Guttman, 1982). One of the HUDAP program was used, the Smallest Space Analysis (SSA), that allows to presents the data graphically, portraying the structure of the data. First, a correlation matrix is calculated using the non-linear, regression-free Monotonicity Coefficient. SSA is a technique for structural analysis of similarity data providing a metric representation of non-metric information based on the relative distances within a set of points. Each variable is characterized by a point in a Euclidian space of one or more dimensions. The points are plotted in the space of smallest possible dimensionality which preserves the rank order of the

relations. The distances among the points are inversely related to the observed relationship among the variables as defined by the correlations coefficients. When the correlation between two variables is high, the distance between them should be relatively small. On the other hand, when the correlation between two variables is low the distance between their geometric points should be somewhat large. In other words, in SSA distances between items are based on the inverse of a relational coefficient in such a way that the larger the coefficient the smaller the distance between the items. According to Guttman (1982), notwithstanding SSA and EFA share a common aim that is to reduce the number of variables by making parsimonious groupings, there are important differences that are critical in data analysis and building a theory. Besides the fact of SSA consents a greater flexibility of the allowable functions, it allows also representing domains in fewer dimensions, making the results more coherent, it is also less dependent on sample size as EFA that is highly dependent on large sample size. Furthermore, SSA is an extremely flexible technique, one that can model non-linear relationships and is not restricted by the various suppositions related with general linear models or even with factor analysis.

CFA. The ATPLQ's model derived from EFA (Neto et al., 2011; Rebelo; 2012) and the ATPLQ's model derived from SSA where compared, as oblique models, using confirmatory factor analysis (CFA) in LISREL 9.10 (Jöreskog & Sörbom, 2013).

The data collected for model testing are ordinal, requiring, in LISREL, a specific type of parameterization (Jöreskog, 2005). First, on PRELIS 2 (Jöreskog & Sörbom, 1996), the items' underlying latent continuous response, cut by m - 1 threshold parameters (m = number of response options), were used to produce the polychoric correlation (PC) matrix of those latent response variables, along with their asymptotic covariance matrix to aid estimation. These matrices were used as input in LISREL, knowing that polychoric correlations are robust estimates of bivariate associations among ordinal data (Flora & Curran, 2004).

In a second step, we tested a latent trait model, denoting the word "trait" an underlying latent variable and not an individual characteristic. Model estimation was done using the SIMPLIS command language (Jöreskog & Sörbom, 1993) with the Satorra-Bentler scaled correction of maximum likelihood (ML_{SB}; Satorra & Bentler, 1994), which adjusts standard errors and model fit statistics to non-normality. This robust technique has a good performance over a number of different sample sizes and degrees of non-normality with continuous (Curran,

West, & Finch, 1996) and discrete (DiStefano, 2002) variables. To assign the units of measurement of each ATPLQ's factor, the path for one of its items was fixed to one.

The assessment of model fit is usually founded in goodness of fit (GOF) statistics, in addition to the χ^2 test. However, in large samples like our (N = 1441), the χ^2 test statistic would be very high and statistically significant because of its excessive sensitivity to sample size (Bentler & Bonett, 1980), wrongly leading to model rejection (Type I error). Thereby, although we present the ML_{SB}-χ^2 estimates and respective degrees of freedom, we only used to exam model fit to empirical data the following alternative practical (or heuristic) GOF indices, and respective cutoff values: The comparative fit index (CFI), needing values close or above .95 to denote a good fit; the root mean square error of approximation (RMSEA), needing values close or below .06 to denote a good fit; and, the standardized root mean square residual (SRMR), needing values close or below .06 to denote a good fit (Hu & Bentler, 1998). We also used the expected cross-validation index (ECVI) to compare the two alternative or competing models in appreciation (EFA and SSA models): The model presenting the lower ECVI value should be selected (Browne & Cudeck, 1993).

To assure model´s structural validity it is important that, besides factorial validity (i.e., model fit), the factors show acceptable convergent validity (CV), discriminant validity (DV), and reliability (Anderson & Gerbing, 1988). The obtained CFA's standardized estimates (MLSB-PC method) allowed the examination of factors' CV, DV, and composite reliability (CR) (Fornell & Larcker, 1981). The CV was assessed through the examination of items' average variance extracted, which should be at least .50, accordingly to the expression

$$AVE = \Sigma\beta i^2/(\Sigma\beta i^2 + \Sigma\varepsilon i),$$

were β = standardized factor loading, and ε = standardized residual or error measurement variance. The DV was assessed by comparing the shared variance ($\varphi2$ = squared de-attenuated correlation) between any two factors and the AVE of each one: DV's values should be lower than the AVE's values. Factor's reliability was calculated through the expression

$$CR = (\Sigma\beta i)2/[(\Sigma\beta i)2 + \Sigma\varepsilon i].$$

Factor's reliability is deemed acceptable for group comparisons when it reaches .80 (Nunnally & Bernstein, 1994). When these criteria were not achieved, the model was modified and tested again. Nevertheless, data-driven modifications of an initial model should be substantively justified to avoid capitalization based on chance (MacCallum, Roznowski, & Necowitz, 1992).

3. Results

3.1 Similarity Structure Analysis (SSA)

In order to better understand the structure of the intercorrelations among the 22 items of the ATPLQ the Similarity Structure Analysis or Smallest Space analysis was computed (Guttman, 1965). Table 1 presents the Monotonicity correlation coefficient matrix for twenty-two items of the *Attitudes towards Portuguese Language Questionnaire* (ATPLQ). We can observe that no negative correlations were found (with two exceptions which are very low). According to Guttman's first law of attitude, a positive or close to zero correlation between two items points out that these items are from the same conceptual universe of attitudes, from the moment it is established that the sample has not been artificially chosen (Guttman & Levy, 1982).

The results of the SSA that was based on the monotonicity correlations matrix revealed that it is possible to represent the matrix of the intercorrelations fairly well in two dimensions (coefficient of alienation?), but rather better in a three-dimensional space (1x2, coefficient of alienation .09; Figure 1). The same three factors found in the EFA can be easily observed in the SSA projection revealing an axial partitioning with the Behavioural items in the middle, thus sharing a similarity with the other two groups of items Affective (on the left) and Motivational (on the right).

It is also evident in the SSA map three deviating points in the Behavioural partition. Two of them are better located in the Motivational partition in the upper part of the map: item 10 "I can easily get good grades in PL", and item 8 "I can easily be a good student in PL". The third item - 15 "Portuguese Language (PL) gives me skills", is located quite far away from the Behavioural items (at the very bottom of the plot in the lower-right hand region).

On the other hand, in the Affective partition located on the left side of the plot, two points are quite isolated from the rest of the items located in the center: Item 18 "I think it's more important to study other subjects than studying PL" located at the bottom and item 16 "I think PL has difficult subjects" located at the top.

Table 1. Monotonicity correlation coefficient matrix for twenty-two items of the Attitudes towards Portuguese Language Questionnaire – ATPLQ (decimal omitted)

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
B.01	–																				
A.02	24	–																			
M.03	69	20	–																		
B.04	77	24	74	–																	
M.05	62	15	90	71	–																
B.06	72	32	52	76	45	–															
A.07	40	67	35	45	21	56	–														
B.08	66	38	67	53	55	62	38	–													
A.09	38	59	29	40	18	47	71	46	–												
B.10	65	33	63	55	62	48	24	81	30	–											
B.11	65	21	55	71	51	75	47	59	45	34	–										
A.12	24	53	18	26	10	34	64	26	64	4	45	–									
M.13	60	22	83	65	81	56	36	71	40	56	65	36	–								
A.14	29	57	28	32	21	48	65	38	73	18	51	70	51	–							
B.15	49	-1	37	50	36	54	21	46	22	41	54	12	46	27	–						
A.16	27	40	25	18	20	24	37	33	47	26	13	37	30	55	7	–					
M.17	52	17	70	60	71	46	20	52	19	47	57	12	71	24	50	18	–				
A.18	27	36	15	37	4	37	46	13	45	7	33	48	12	45	6	39	10	–			
A.19	25	50	16	30	13	47	58	25	56	17	43	63	25	68	12	52	26	51	–		
M.20	55	27	61	49	56	46	23	70	26	62	53	16	60	27	42	20	59	5	23	–	
M.21	51	21	78	56	75	45	24	59	21	53	52	12	72	30	42	20	71	-2	24	63	–
A.22	32	49	18	30	9	46	56	29	64	20	44	62	30	71	13	52	20	52	74	25	15

Note: ATPLQ's Items aggregated by factors according to Neto et al. (2011) and Rebelo (2012): B = Behavioural, A = Affective; M = Motivational.

Fig. 1. SSA Map of the 22 items of the *Attitudes towards Portuguese Language Questionnaire* – ATPLQ (3-D, 1x2, coefficient of alienation .09).

These last two Affective items form the point of view of their location in the SSA space could be considered as belonging to the same dimension detected by EFA, despite their distance from the rest of the items matching the corresponding dimension. A similar observation can be made for two of the Behavioural items, item 10 and item 15 (especially the last one). Considering the logic underlying the CFA, it can be hypothesized that these items will show less accuracy to represent their specific dimensions or factor. On the other hand, the Behavioural item 8 could be better considered as a Motivational item, due to its location in SSA map. These observations will be verified in the next section.

3.2. Confirmatory Factor Analysis

The CFA of the ATPLQ model derived from AFE (Neto et al., 2011; Rebelo, 2012) revealed its acceptable fit to empirical data (M, Table 1), but its competing model, derived from SSA results, showed better fit results, namely a lower ECVI value (M1, Table 1). This result denoted that the shift of the

items 8 and 10 from the Behavioral to the Motivational factor produced a more plausible model and, consequently, M1 should be the model selected for subsequent analyses (i.e., the VC, DV, and CR examination).

In Table 2 we can see that all M1 factors presented a good CR, however the Affective factor presented a VC's problem: Its VME was below the desirable cutoff value (.49/.50). Moreover, signalling a model DV's problem, the shared variance between Behavioral and Motivational factors was too high ($\varphi2 = .56$; M1, Table 3), considering the AVE of each of them (M1, Table 2).

Table 2. Fit Indices of ATPLQ Models: Satorra-Bentler's Maximum Likelihood Estimation based on Polychoric Correlations

Model	ML_{SB}-χ^2/df	CFI	RMSEA	SRMR	ECVI
M	1438.26/206	.938	.065	.065	1.064
M1 (SSA)	1420.88/206	.939	.064	.064	1.052
M1a (SSA)	863.42/132	.951	.062	.062	.654

Note: M = three oblique factors with 22 items (items 8 and 10 in the Behavioral factor) (Neto et al., 2011; Rebelo, 2012). SSA = model derived form similarity structure analysis. M1 = three oblique factors with 22 items (items 10 and 8 in the Motivational factor); M1a = M1 with 18 items. MLSB = Satorra-Bentler scaled correction of maximum likelihood; CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean squared residual; ECVI = expected cross-validation index.

As expected, the exclusion of the items 16 and 18, the ones with less accuracy to represent the Affective factor, turned out its CV acceptable (M1a, Table 2).

Table 3. CFA of the ATPLQ Model Derived from SSA: Standardized Satorra-Bentler's Maximum Likelihood Estimates based on Polychoric Correlations, AVE and CR

Item (Factor)	M1		M1a	
	β	R^2	β	R^2
1 (Behavioral)	.74	.55	.74	.55
4	.81	.66	.81	.66
6	.76	.58	.76	.58
11	.76	.58	.75	.56
15	.52	.27	---	---
AVE	.53		.59	
CR	.85		.85	
2 (Affective)	.60	.36	.61	.37
7	.72	.52	.73	.53
9	.73	.53	.74	.55
12	.70	.49	.71	.50
14	.79	.62	.79	.62
16	.49	.24	---	---
18	.51	.26	---	---
19	.71	.50	.70	.49
22	.73	.53	.72	.52
AVE	.45		.51	
CR	.88		.88	
3 (Motivational)	.87	.76	.88	.77
5	.84	.71	.84	.71
8	.65	.42	.62	.38
10	.60	.36	---	---
13	.82	.67	.82	.67
17	.70	.49	.70	.49
20	.61	.37	.59	.35
21	.74	.55	.88	.77
AVE	.54		.56	
CR	.90		.90	

Note: β = standardized factor loading (with p < .001); R2 (communality) = 1 - ε (standardized residual). AVE = average variance extracted; CR = composite reliability. See Table 1 for other abbreviations. Also the previously identified DV's problem of M1 was solved with the exclusion of the items 10 and 15, respectively the ones with less accuracy to represent the Motivational and the Behavioral factors. The shared variance between the Motivational and the Behavioral factors (φ2 = .55; M1a, Table 3) was now, as was desired, lower than the AVE of each one of them (M1a, Table 2).

Table 4. CFA of the ATPLQ Model Derived from SSA: De-attenuated Correlations between Factors with Maximum Likelihood Estimates based on Polychoric Correlations

Factor	M1		
	Behavioral	**Affective**	**Motivational**
Behavioral	1.00		
Affective	.55	1.00	
Motivational	.75	.33	1.00
Factor	M1a		
	Behavioral	**Affective**	**Motivational**
Behavioral	1.00		
Affective	.56	1.00	
Motivational	.74	.39	1.00

Note: All de-attenuated correlations (φ) with $p < .001$. See Table 1 for abbreviations. Finally, it should be noted in Table 1 that the re-specification of M1 also has ameliorated model fit (M1a): The ATPLQ oblique model derived from SSA, with modifications to guarantee a good CV, CR and DV, showed a good fit to empirical data.

3.3. SSA (18 items)

Based on the SSA map presented in Figure 1 (confirmed also by the CFA - ameliorated model fit displayed in Table 1) a further SSA was computed with eighteen items (Figure 3; 3-D, 1x2, coefficient of alienation .07). In this new SSA again an axial partitioning can be observed with all items in their respective region, quite clustered together without any deviation. The Behavioural items located in the middle and the other two groups of items at the extremities: Affectivity items on the left side and Motivational on the right side. This structure is congruent with the results obtained in the CFA.
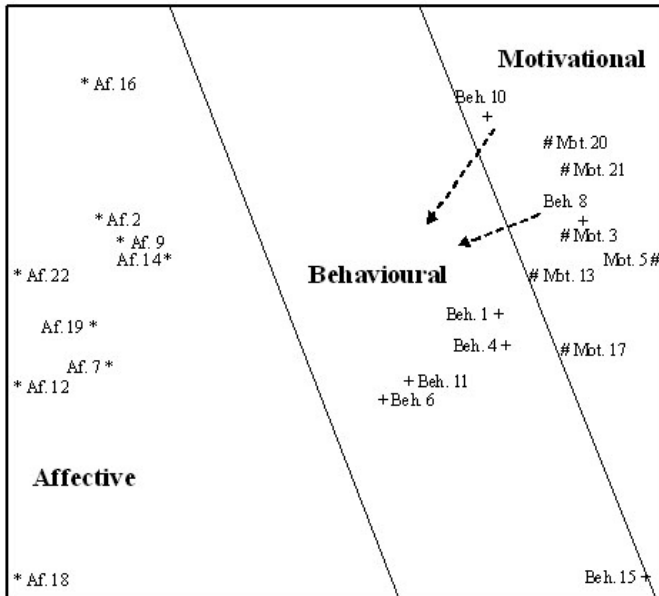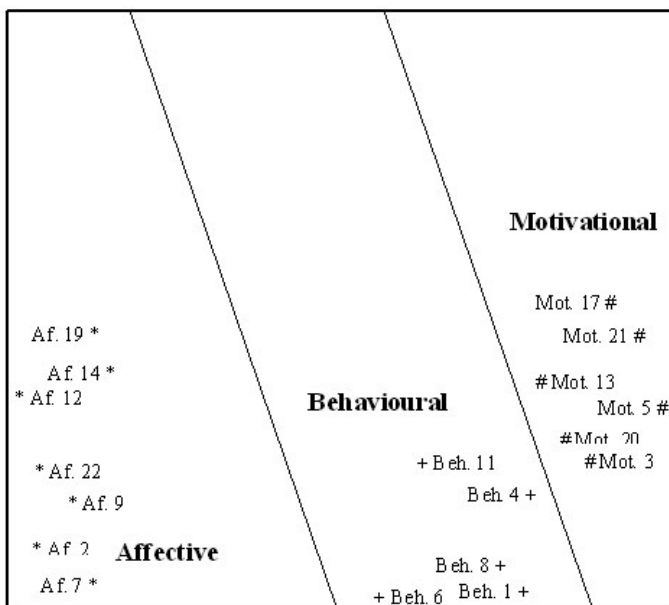
Fig. 3. SSA Map of the 18 items of the Attitudes towards Portuguese Language Questionnaire – ATPLQ (3-D, 1x2, coefficient of alienation .07).

4. Discussion

The aim of this paper was to compare, highlight and discuss the relevance and application two statistical techniques in research: SSA and Factor Analysis (EFA and CFA).

More specifically, in this study we examined the ATPLQ's structure, applying SSA's monotonicity coefficient solution, and compared that solution with the ATPLQ authors' proposed structure, derived through principal components' EFA (Neto et al., 2011; Rebelo, 2012). We aimed to see if the known limitation of the use of Pearson correlations to properly deal with ordinal variables (Babakus et al., 1987; Bollen,1989) generated a worse model than the one generated through SSA's method.

The CFA of the ATPLQ's structure, tested as a latent trait model or, in other words, modeling constructs with polychoric correlations between the underling latent continuous distributions of ordinal manifest variables, has shown differences between both methods. The structure generated through

SSA was more plausible then the structure generated through EFA. The shift of the items 8 and 10 from the Behavioral to the Motivational factor in the SSA structure produced a better model fit to empirical data. This data-driven modification is also substantively justifiable taking into account the content of both items (cf. Appendix).

This model was selected to exam factors' CV, DV and CR (Fornell & Larcker, 1981), in order to complete the assessment of ATPLQ's adequacy to the youngster Portuguese population. The CV of the Affective factor was only acceptable with the exclusion of the items 16 and 18, and the DV between the Motivational and the Behavioral factors was only achieved with the exclusion of the items 10 and 15. The decision to exclude these items was anchored not only on ATPLQ psychometric features' results, but also on their convergence with the SSA's results and, moreover, because it is also substantively justifiable through the examination of the items' content (cf. Appendix): Items 16 and 18 are not linked to emotional aspects of attitudes toward PL; and, item 10 is also related to behavioral and item 15 to motivational aspects of attitudes toward PL. It should be noted that, during data collection, most of the participants in the study showed difficulties to understand the item 15 word "*competência*" (competence).

The corollary of this assessment procedure was an ATPLQ model statistically significant and sufficiently parsimonious with four items in the Behavioural factor, and seven items in both the Affective and Motivational factors. However, an attentive look to the items of the Motivational factor leads us to rethink the denomination of that factor: The items point to students' perceptions of PL activities' usefulness to their future lives, as well as the valorisation of PL activities and learning. In future studies this factor should be named as instrumentality, a construct directly related to motivation and engagement to study (George, 2006; Simons, Dewitte & Lens, 2004).

Thus, CFA and especially SSA confirmed and improved the ATPLQ model identifying the subscales and dynamic relationships between them. In fact, SSA, a non-metric multidimensional analysis of items, presupposes less stringent assumptions regarding the distributional and metric properties of the data and enables a representation of complex relationship in a relatively intuitive manner. The loading of items on the main factors in the ATPLQ questionnaire was revealed through analysis of item clusters in the SSA map, which was further confirmed with CFA. The analyses lead to the revision of the questionnaire with

final better reliability values, giving in such a way support to the use of SSA in item analysis, which should produce more reliable testing tools.

Finally, both these statistical tools provide new heuristically important opportunities for research committed to better understanding the underlying structure of data.

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Appendix

ATPLQ's Items Aggregated by Factors (Neto et al., 2011; Rebelo, 2012)

Behavioral	
1. Percebo a utilidade da língua portuguesa (LP).	I understand the usefulness of the Portuguese language (PL).
4. A LP é útil para a minha vida.	PL is useful for my life.
6. Penso que é importante ter bons resultados a LP.	I think it is important to get good results in PL.
8. Consigo ser bom/a aluno/a a LP facilmente.	I can easily be a good student in PL.
10. Tenho facilmente boas notas a LP.	I can easily get good grades in PL.
11. Considero a LP uma área importante no dia-a-dia.	I consider the PL an important subject in my day-to-day.
15. A LP dá-me competência.	PL gives me skills.
Affective	
2. As matérias de LP provocam-me insegurança.	The subjects of PL make me insecure.
7. A expressão "língua portuguesa" provoca-me uma sensação desagradável.	The expression "Portuguese language" gives me an unpleasant sensation.
9. A LP desorienta-me.	The PL confuses me.
12. Interpretar textos de LP desanima-me.	To interpret PL texts gets me down.
14. Estudar LP assusta-me.	Studying PL scares me.
16. Penso que a LP tem matérias difíceis.	I think PL has difficult subjects.
18. Penso que é mais importante estudar para outras disciplinas do que para LP.	I think it's more important to study other subjects than studying PL.
19. Quando aparece um texto de LP para interpretar tenho vontade de desistir.	When a PL text appears to interpret, I want to quit.
22. Quando interpreto textos de LP fico incomodado/a.	When I interpret PL texts, I get uneasy.
Motivational	
3. Para mim, estudar LP é divertido.	To me, studying PL is fun.
5. Estudar LP dá-me alegria.	To study PL makes me happy.
13. Gosto de estudar LP.	I enjoy studying PL
17. Sinto-me entusiasmado/a quando vou às aulas de LP.	I feel enthusiastic when I go to PL classes.
20. Compreendo facilmente o que é explicado em LP.	I easily understand what is explained in PL.
21. Estudar LP tranquiliza-me.	The study of PL calms me down.

Note: The items in English are a product of a thinking-aloud consensus method made by four judges, based on the work of two bilinguals translators.

The Construct Validity of the Berlin Intelligence Structure Model

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Abstract: The Berlin Intelligence Structure Model (BIS) is a hierarchical and faceted model. This paper investigates the validity of this model by using different methods (CFA, MDS). The results show that the model assumptions are supported only in parts by the data. The results are discussed with regard to the validity of the BIS-Test, and the validity of the model.

Note. This paper is partially based on Süß and Beauducel (2005).

1. Introduction

The Berlin Intelligence Structure Model (BIS) of Jäger (1982, 1984) is a hierarchical *and* faceted model of intelligence. The starting point for the development of the BIS was the intention to develop an integrative structure model that can explain the differences of competing models published so far. Jäger assumed that these differences can be explained mainly by the differences of the task samples used. Therefore, an almost representative task sample of all psychometric intelligence tasks described in the available research literature at that time was used as the basis for the development of the model. All together about 2000 tasks were sampled. For the empirical investigations that followed the number of tasks in the sample was reduced while the diversity of tasks was maintained. Moreover, the marker tasks of the competing models remained in the sample.

According to these criteria, the task sample was reduced to 191 tasks, and administered to an age-homogeneous sample of college students. At first, exploratory factor analyses were performed without specific hypotheses

concerning a faceted structure. Only four broad factors representing different operations emerged from these analyses. The factors were described as *processing capacity* which corresponds exactly to reasoning, *creativity* which is close to fluency and flexibility (divergent thinking), *memory* which refers to the ability to recall lists and configurations of items after learning them, and *perceptual speed* which refers to the quick and accurate performance on simple tasks. However, typical *content* factors like verbal, numerical and figural-spatial abilities did not emerge. These factors however were already well established at that time (e.g. Guilford, 1967; Thurstone, 1938), and also part of Jäger's first model (Jäger, 1967; for a short description see Carroll, 1993). At that point, the idea of a faceted structure of intelligence came up (Jäger, 1982). The assumption was, that the content factors were just masked by the operation factors in exploratory factor analysis. Thus, the emerging factors belonged to the operation facet while a content facet was assumed which contains the verbal, numerical, and figural factors which were presumed to be masked in the analysis. The content factors probably did not occur because the variance due to content was reduced in the sample of participants. This may have happened because it was a homogeneous sample of college students in which the use of words and numbers was probably quite overlearnt. Jäger (1982) decided to form new variables through the aggregation of tasks inspired by the work of Humphrey (1962). These variables are called parcels in the following.

For the identification of the content factors, parcels were formed of tasks which were heterogeneous with respect to the operations but homogeneous with respect to one element of the content facet. For example, a parcel homogeneous with respect to verbal ability and heterogeneous with respect to the operation facet was formed through the equally weighted aggregation of a verbal reasoning task, a verbal creativity task, a verbal memory task, and a verbal speed task. In that way, verbal ability parcels, numerical ability parcels, and figural ability parcels were formed. Exploratory factor analysis of the content parcels did reveal the corresponding content factors for verbal, numerical, and figural ability (Jäger, 1982, 1984). This result indicates that the content variance was indeed masked by the operation variance and that controlled parceling enabled to disentangle the relevant content variance. In the same way, parcels which were homogeneous with respect to one element of the operation facet (e.g., processing capacity) and heterogeneous with respect to all elements of the content facet were formed. Exploratory factor

analysis of the parcels which are homogeneous with respect to the operations revealed again the four operation factors.

On this basis, a faceted structure containing four operation factors and three content factors was demonstrated. Finally, the aggregation technique was used for the demonstration of a general intelligence factor ("g"). For this the tasks were aggregated in order to form parcels which were heterogeneous with respect to the operation facet and with respect to the content facet. Exploratory factor analysis of parcels containing one task for every combination of the facet elements revealed a single factor representing general intelligence. General intelligence is relevant in the BIS because it explains the correlation between the operation and content factors which are not regarded as orthogonal.

In addition, the following theoretical characteristics of the BIS should be noted: In the BIS, the 12 combinations of four operation and three content abilities are only used for the classification of performance measures (tasks). Thus, the 12 combinations of facet elements or BIS cells have not the status of ability factors as in the structure-of-intellect model (SOI model) of Guilford (1967) who postulated an ability factor for every combination of the SOI facets. Figure 1 gives a representation of the BIS model. The effects of parceling and aggregation in the context of the BIS were described first by Wittmann (1988).
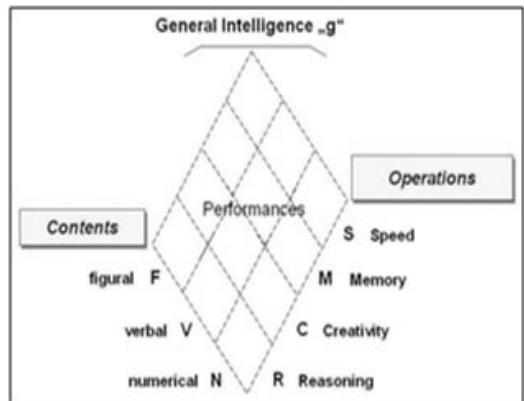
Fig. 1. The Berlin Intelligence Structure Model (BIS) of Jäger (1982).

The more general ideas behind the BIS were summarized by Jäger, Süß, and Beauducel (1997): (1) All intellectual abilities contribute to every intellectual performance, but with different weights. The variance of intellectual performance can be decomposed according to these abilities. (2) Intellectual performance and the ability constructs can be classified according to facets. Two facets were specified until now, but the model is open for additional facets, additional operations and content abilities as well as for additional differentiations of the seven complex constructs. (3) Intelligence constructs are structured

hierarchically, i.e. they can be assigned to different levels of generality.

The model could be replicated in different populations using different task sets and methods (e.g. Beauducel & Kersting, 2002; Bucik & Neubauer, 1996; Jäger et al., 1997; Rosas, 1990; Süß, Oberauer, Wittmann, Wilhelm, & Schulze, 2002; Süß & Beauducel, 2005). The replication of the BIS in a German version of the French Kit of Reference Tests (French, Ekstrom, & Price, 1963) by Jäger and Tesch-Römer (1988) demonstrated that Jäger's (1982) final task selection probably did not reduce the comprehensiveness of the task sample considerably.

In this paper, the current status of the construct validity of the model analyzing a big data set with different methods is investigated.

2. Method

2.1. Data

The sample was a pool of several studies in which the BIS-4 Test (Jäger et al., 1997) was applied. Data analyses were based on complete data sets from 910 German-speaking high schools students, of whom 536 (58,9%) were female. Participants' ages ranged from 14 to 19 years; the mean age was 16.5 years (SD = 1.3 years).

Table 1. Classification of the BIS-4 subtests into the BIS.

g	F		V		N	
S	BD OE ZS	Crossing Letters Old English Digit Symbol Test	TG KW UW	Part whole Word Classification Incomplete Words	XG SI RZ	X-greater Divisible by Seven Computation Signs
M	OG FM WE	Orientation Memory Memorizing Figures Remembering Routes	ST WM PS	Text with sense Remembering Words Fantasy Language	ZP ZZ ZW	Number Pairs Rem. Two Digit Numbers Recognize Numbers
C	LO ZF OJ ZK	Layout Complete Figures Object Design Combining Signs	EF MA IT AM	Properties Abilities Masselon Insight-Test Application Possibilities	DR TN ZG ZR	Divergent Calculation Telephon Numbers Number Equations Number Puzzles
R	AN CH BG FA AW	Figural Analogies Charkow Bongard Figure Assembly Surface Development	WA TM SV WS SL	Verbal Analogies Fact Opinion Syllogisms Word Knowledge Senseless Inferences	ZN SC TL RD BR	Number Sequences Estimation Reading Tables Computational Reasoning Letter Sequences

2.2. Material

The BIS-4 Test (Jäger et al, 1997) consists of 45 tasks (Tab. 1). Each task is classified in one cell of the model. The verbal, figural, and numerical scales contain 15 tasks each; the speed and the memory scales comprise 9 tasks; the creativity scale comprises 12 tasks; and the reasoning scale contains 15 tasks. The scale of general intelligence comprises all 45 tasks. This test is administered with time limitations. For an English description of the tasks see Süß et al (2002).

2.3. Data Analysis

This paper investigates the validity of the BIS using CFA and MDS as data analysis methods. The CFA were calculated with EQS, computations of MDS with SPSS-Proxscal.

3.Results

3.1. Data aggregation and parcel building

Theory-guided aggregation was used to build parcels. The data were aggregated in three ways: (a) aggregation across contents within one operational category, which led to parcels that suppressed content variance as part of the unwanted variance, leaving mainly operational variance; (b) aggregation across operations within one content category, which resulted in parcels that brought content variance to the fore, but let operational variance count as unwanted; and (c) aggregations within the cells of the two-dimensional matrix. Here, both, content and operational variance were wanted variance, and only task-specific variance was suppressed. Aggregated variables were the means of z-transformed task scores.
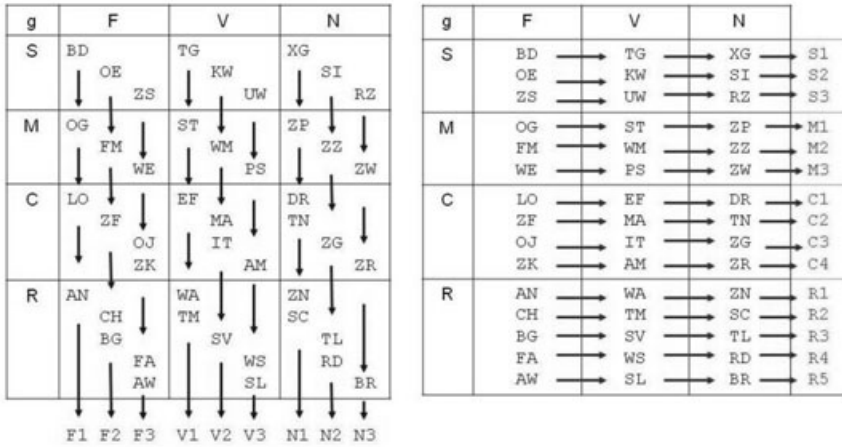
Fig.2. Parcel building of the BIS-4 Test: content- (left) and operation-homogeneous parcels (right).

Figure 2 shows how the operational and the content parcels were built. Because the numbers of variables in the cells were unequal, two variables were averaged to get the same number of tasks in each cell before the content parcels were built.

3.2. CFA and MDS with parcels

Two CFA were performed with content- and operation-homogeneous parcels (Fig. 3). General intelligence was included as second-order factor in both models. Both models have a good data fit (CFA with content parcels: Chi² = 56.390, df = 24, p < .01; CFI =.992; RMSEA =.037, 90% CI [.024, .050]; SRMR = .020. CFA with operation parcels: Chi² = 256.43, df = 86, p < .01; CFI =.971; RMSEA =.047, 90% CI [.040, .053]; SRMR=.040).
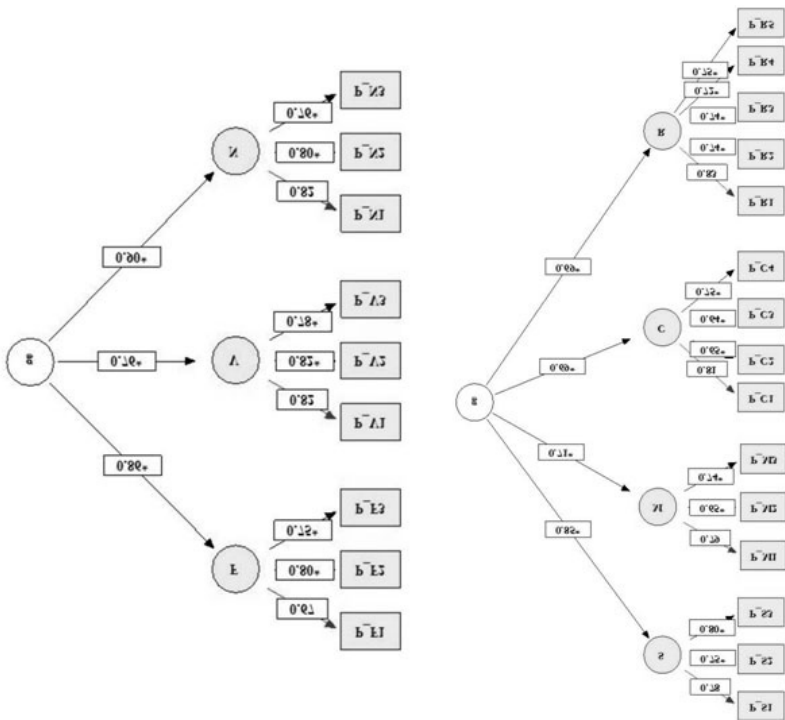
Fig. 3. CFA with content- (left) and operation-homogeneous parcels (right).
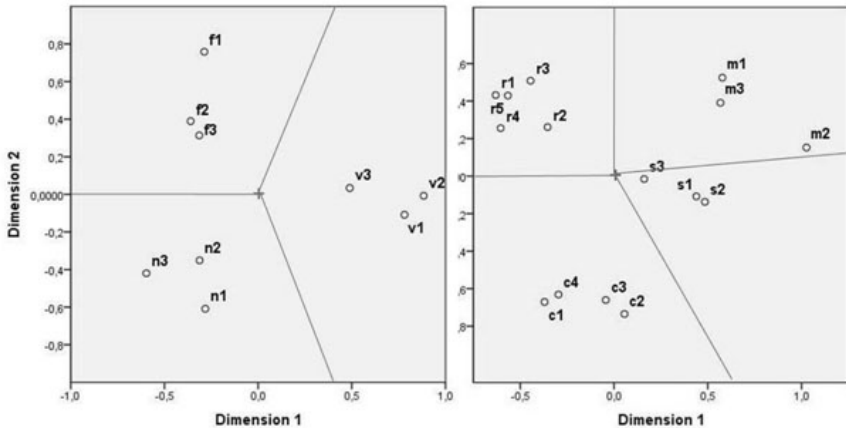
Fig. 4. MDS of the BIS-Test, based on content-homogeneous parcels (left), and the operation-homogeneous parcels (right).

Figure 4 presents the results of two MDS; again, one with content-, and one with operation-homogeneous parcels. The three content abilities as well as the four operation abilities could be clearly separated in the two-dimensional solution. The fit of the MDS of the content parcels is Stress-I = .066, the fit of the MDS of the operation parcels Stress-I = .139. In the latter one it is noticeable that the speed-parcels are near to the centre of the map.

3.3. Correlation matrix, CFA and MDS of cell aggregates

Table 2 presents the intercorrelation matrix of the BIS cell aggregates. The 12 aggregates are representing the 12 BIS cells and are based on tasks of the same operation and the same content. In this analysis, every combination of facet elements is represented by one variable. According to the contiguity hypothesis of Guttman (1965), cell aggregates sharing the same content should be correlated stronger than cells that have neither the operation nor the content in common. The common variance of the latter ones is attributed to the g-factor only. The same should be the case for correlations between cell aggregates that are sharing the same operation in comparison to cells that have only g-variance in common. In Table 2, cell variables that are sharing the same content or the same operation are bold italicized.

Table 2. Intercorrelation matrix of the 12 BIS cells.

	SF	SV	SN	MF	MV	MN	CF	CV	CN	RF	RV
SV	*0.444*										
SN	0.321	0.446									
MF	0.282	0.240	0.263								
MV	0.247	*0.493*	0.317	*0.369*							
MN	0.295	0.266	*0.320*	*0.405*	*0.466*						
CF	*0.337*	0.255	0.303	*0.234*	0.168	0.166					
CV	0.146	*0.339*	0.319	0.194	*0.290*	0.131	*0.500*				
CN	0.230	0.276	*0.513*	0.281	0.224	*0.270*	*0.482*	*0.381*			
RF	*0.140*	0.250	0.381	*0.342*	0.139	0.149	*0.179*	0.264	0.318		
RV	0.093	*0.462*	0.405	0.250	*0.366*	0.140	0.213	*0.471*	0.275	*0.465*	
RN	0.110	0.330	*0.608*	0.340	0.255	*0.224*	0.210	0.314	*0.436*	*0.627*	*0.528*

Box plots summarize the results (Fig. 5). Cells sharing the same operation are more strongly correlated (Md = .46; range: .32 to .63) than cells having no facet in common (Md = .25; range: .09 to .40). This is also the case for cells sharing the same content (Md = .34; range: .14 to .62). However, these correlations are lower than the correlation of cells sharing the same operation, and the variance is much bigger. In particular, the four figural cells are rather poorly correlated, especially figural speed with figural reasoning (r = .14). On the other hand, the correlations of verbal reasoning with numerical speed (r = 40) and figural reasoning with numerical speed (r = 40) are stronger correlated than expected. Summing up, these results clearly indicate that the model assumptions are only in part supported by the data.
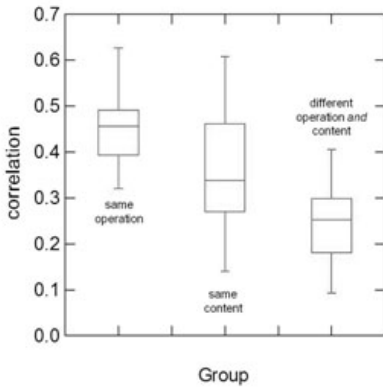
Fig. 5. Box plot of the cell correlations.
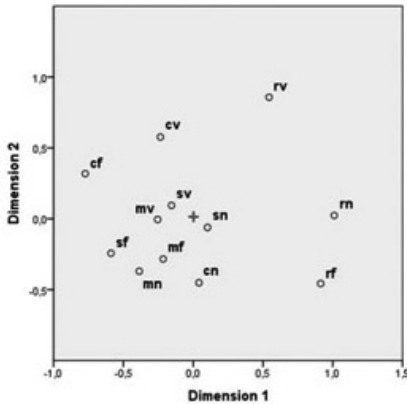
Fig. 7. MDS of the 12 cells.
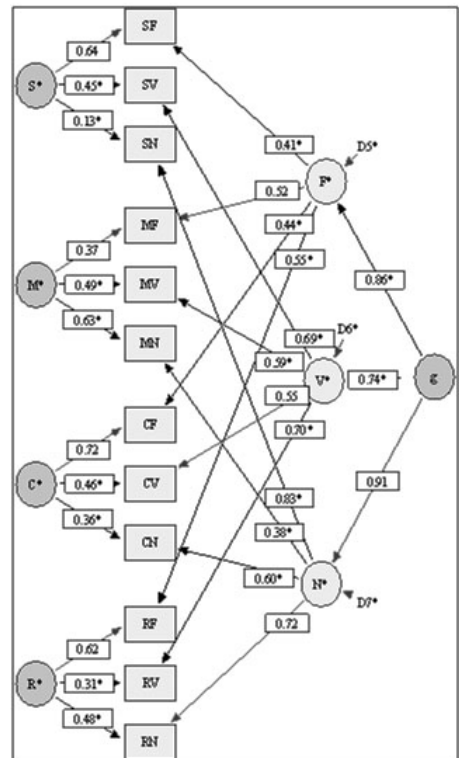
Fig. 6. CFA of the 12 BIS cells.

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Figure 6 gives the results of a CFA of the cells. This model has only a moderate fit. (*Chi²* = 276.507, *df* = 39, p < .0001; *CFI* = .937; *RMSEA* = .082, 90% CI [.073, .091]; *SRMR* = .051). This model allows the simultaneous investigation of the operation and the content facet of the BIS. However, the g-factor is only based on the content factors, and the operation factors are orthogonal to each other resulting in a nested factor model (Gustafsson & Balke, 1993). Both assumptions are not in line with the assumptions of the BIS. Instead, "g" should be based on all content and operation factors. However, in a model, in which "g" is related to both, the content factors and the operation factors, identification problems for some of the loadings generally occur. In the present data, the figural loadings were extremely low when "g" was forced to load both the operation and the content factors. This indicates that the large number of free parameters may limit the possibility to test hierarchically faceted structures within a single analysis with structural equation modeling. In addition, when the "g"-factor was based on the operation factors, the data fit was even worse.

Figure 7 presents the results of the MDS of the cell aggregates. The centre of the map is marked by a cross. The model fit for this two-dimensional solution is Stress-I = .181.

4. Summary and general discussion

4.1. Summary of the empirical results

The results demonstrate that the model assumptions of the BIS are supported only in part by the data.

Data analyses based on theory-guided aggregates support the assumptions of the BIS to a great extent. The hierarchy and the bimodality assumption are supported by the data showing the three content factors and the four operation factors in the same data set. The results demonstrate that "g" and reasoning (i.e. Gf; Horn, 1988) can be separated clearly in a broad test battery. This result is in line with the Three-Stratum theory of Carroll (1993), the extended Cattell-Horn model (Horn, 1994; Horn & Noll, 1997), and the Cattell-Horn-Carroll theory (CHC theory) of McGrew (1997; 2005) who could also differentiate both factors. However, this result contradicts the assertion

of Gustafsson (1984, 1999) that within a broad battery of intelligence tasks "g" and Gf cannot be differentiated. The multitude and heterogeneity of the tasks used for the measurement of BIS-g is a clear consequence of its faceted definition. When a theoretical background is set up which helps to identify the domain of intelligence tasks (see also Guttman, 1965), then a concrete task sample can be evaluated against this background. Such kind of analyses show that in many cases construct validity is not given, e.g. the simple identification of Raven's matrices with Gf, or the equation of verbal intelligence with Gc (see Süß & Beauducel, 2011).

Limitations of the BIS were revealed analyzing the cell level. On this level, Jäger assumed performances, not abilities. He assumed that every intellectual performance can be decomposed in at least three variance components: content, operation, and "g". The results show that the variance components of each cell are differently sized. The interesting question is: Does this result question the model? Or is this result only the result of psychometric weaknesses of the specific test, the time limited test administration, and/or a sample effect? The model fits presented in this paper are weaker than those reported earlier (Süß et al, 2002; Süß & Beauducel, 2005). This could be the result of the more heterogeneous sample, especially the broader education and age range. The time limited test application and the sample characteristics together could have increased the speed effects resulting in the strong relation of "g" and perceptual speed. Moreover, the numerical speed tasks were strongly correlated with verbal and figural reasoning. This indicates that in this sample the basic numerical skills were not overlearnt in many cases changing the character of the tasks from perceptual speed to reasoning tasks. From this view, the demonstrated problems are owing to a great extent to the limited area of validity of this test. The BIS-4 Test was originally developed for persons with medium to higher education level. It is necessary to adapt many tasks before the test is given to broader samples. Nevertheless, it is an illusion that the variance components can be balanced completely as the model suggests. In so far, there will always be a disjunction between theory and empirical results.

Guttman (1957) originally introduced a facet referring to the level of complexity of tests. Guttman predicted that complex tests would be located at the periphery of the radex because complex tests would have fewer components in common with each other than simple tests because they diverge in different directions of complexity. However, Guttman's initial prediction failed in

empirical analyses since the complex tests were located in the centre of the radex (e.g., Schlesinger & Guttman, 1969). Therefore, the complexity facet was replaced by a rule task facet: tests of rule-inference are located in the centre of the radex, followed by tests of rule-application; tests for learning or achievement are located at the periphery of the radex (e.g. Guttman & Levy, 1991; Schlesinger & Guttman, 1969). The most complex tasks of the BIS are probably the reasoning tasks, the most simple tasks are surely the speed tasks. The results that perceptual speed is most strongly related to "g" (Fig. 3), that the speed parcels are not far from the centre in the MDS of the operative parcels (Fig. 4), and that the reasoning cells are at the periphery of the map in the MDS of the cells (Fig. 7) are in line with Guttman's original assumption, but contradict the later version of the radex model. Again, are these empirical facts the result of the specific properties of the BIS test, especially the time limited test administration? Or are these results also of theoretical interest? Further research is needed based on tests without the limitations of the BIS-4 test.

4.2. Extensions of the BIS

The necessity to extend the BIS could be demonstrated up to now for practical and auditive intelligence. In both cases, an additional content ability was suggested.

Practical intelligence has two very different meanings. Traditionally, the global concept covers manual-mechanical and psychomotor-coordinative abilities, practical-technical and technical-constructive reasoning and acting as well as practical ingenuity (e.g. Thurstone, 1949; Vernon, 1949; Fleishman, 1967). Of course, practical intelligence is important in every technical occupation. A second meaning, later introduced in the literature by Sternberg and Wagner (1986), covers practical intelligence more generally as every-day problem solving ability, but this concept is not considered here (for a critical review see Gottfredsen, 2003). Practical intelligence in the original meaning requires the intelligent manipulation of concrete material. Sperber, Wörpel, Jäger, and Pfister (1985) could show that practical intelligence is closely related to figural-spatial reasoning, but more detailed data analyses gave evidence that both constructs can be separated indicating the necessity of an additional content ability in the BIS (Süß & Jäger, 1994). However, it remains unclear,

whether the new content ability can be combined with all four operative abilities maintaining the concept of symmetry of the model (Figure 1).

Auditive intelligence (i.e., auditory abilities) in its broadest meaning was defined by Stankov (1994) as cognitive abilities that depend on sound as input and on the functioning of our hearing apparatus, encompassing simple sensory processes and the abilities required for the solution of complex (nonverbal or speech) problems. In the extended Gf -Gc theory (Horn, 1994; Horn & Noll, 1997), a general auditory factor (Ga) was located on the second level and considered as an indicator of either Gf or Gc depending on the corresponding auditory task. Carroll (1993) covered auditory intelligence as the individual's capacity to apprehend, recognize, discriminate, or even ignore the characteristics of auditory stimuli, independent of the individual's knowledge of structures in language or in music. Carroll integrated a broad auditory perception factor into the second stratum of his Three-Stratum theory (Carroll, 1993). A broad auditory ability factor, named "auditory processing" (Ga) is also located on the second stratum of the CHC theory of McGrew (1997, 2005). The question, why is auditory intelligence not part of the BIS, is rather simple to answer. Jäger excluded auditory tasks from his task sample for pragmatic reasons. Therefore, in two recent studies we investigated the relationship of auditory intelligence and the BIS using the marker tests of Stankov and Horn (1980) as well as some newly developed tasks (Conzelmann & Süß, 2013). Auditory intelligence revealed two separable factors, nonverbal and speech. The variance of the speech factor could be explained completely by the BIS, but the nonverbal factor was not. This factor was strongly correlated with reasoning, but the factor was still completely stable when controlled for the BIS variance. The results clearly indicate that the BIS has to be modified to extend the area of application to auditory intelligence. Again, an additional content ability is necessary, but it is unclear, whether auditory nonverbal indicators can be developed also for memory, speed, and creativity. However, tonal memory is already a primary factor of the extended Gf-Gc theory (Horn, 1994; Horn & Noll, 1997) and of the Three-Stratum theory (Carroll, 1993). Musical creativity could be the missing link for auditory creativity, and there is also some evidence for an auditory speed factor (Zajac & Burns, 2011).

In sum, there is need for an extension of the BIS, and the faceted structure of the BIS gives the basic frame for the development of tasks as well as for the validation strategy. Insofar, the facet theory is the theoretical framework for

the further development of the BIS as well as for the further development and validation of the BIS test.

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3 | Organizational Phenomena

CEO Influence in the Boardroom: Comparing Perceptual Structures Using Facet Analysis

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Abstract: This paper presents a preliminary analysis of Chief Executive Officer (CEO) perceptual structures involving boardroom dynamics. The methodology of facet analysis with multidimensional scaling enables the development of structural hypotheses and the exploration of the mechanisms impacting such processes in the boardroom. Drawing on corporate governance, upper echelon and strategic leadership theories, as well as social psychological theories on social identity, this framework focuses on the unique dynamics facing CEOs in the boardroom.

This preliminary analysis is based on survey responses by 963 CEOs from Norwegian firms. We identify similarities and differences in the structure of perceptions of these CEOs when compared to the total sample of 2,356 boardroom participants. Within a broader pattern of structural similarity, variations in configurations relate primarily to differences regarding power dynamics and CEO influence in the boardroom. By applying the methodology of facet analysis to boardroom dynamics, future research can enhance clarity around theorizing and empirical testing of structural hypotheses. In the iterative process of theory construction and its refinement by partnership between theory and method envisioned by Dr. Louis Guttman, this methodology can further the corporate governance research agenda, and help better understand the relationship between CEOs and the board of directors.

1. Introduction

The impact of the Chief Executive Officer's (CEO) behavior on the firm and the dynamics of the interactions between the Governing Board and the CEO have been studied extensively. Given the presumed importance of collaboration among these groups for a firm's outcomes, research has sought to address governing inertia and the paradoxes involved in the process. The governing board is expected to monitor management, the group from whom it needs to obtain information. Additionally, governing boards need to simultaneously control and collaborate, whereby the CEO and the governing board have divergent objectives. Contributing to this divergence are asymmetries in power and information among boardroom participants, which may be reflected in their varying perceptions of reality.

Corporate governance has been defined as "the structures, processes, and institutions within and around organizations that allocate power and resource control among participants (Davis, 2005). For CEOs, their perceptions regarding the allocation of power and control, including processes inside the boardroom, may have important implications regarding perceptual dynamics and action both inside the boardroom and beyond.

The examination of the multiple functions of board directors has focused on the requirement for control of managerial behavior through monitoring, the service to the organization through advice and counsel, provision of access to resource dependencies, and the influence on strategic decision making (Daily, Dalton, and Cannella, 2003, Johnson, Daily and Ellstrand, 1996, Zahra and Pearce 1989). Key among the functions of the board is monitoring, which centers on interactions with senior management and the CEO. The governing board's monitoring function pertains to the responsibility for boards of directors to evaluate management actions in order to safeguard shareholder rights.

The theoretical foundations for the monitoring function originate with agency theory, and focus on the potential for conflicts of interest resulting from the separation of ownership and control (Berle and Means 1932, Fama and Jensen 1983). Boards of directors are required to monitor the actions of managers – agents, so as to protect the interests of owners - principals (Eisenhardt 1989, Hillman and Dalziel 2003, Jensen and Meckling 1976). CEO monitoring is among the primary activities of this board function (Boyd,

1995, Daily, 1996), along with CEO succession planning (Pitcher, Chreim and Kisfalvi, 2000). Additionally, strategy implementation (Rindova, 1999), together with evaluating and rewarding the CEO/top managers (Conyon and Peck, 1998) are usually included as part of board monitoring.

However, monitoring can provoke polarization among boardroom participants. A major finding in social psychological research on intergroup behavior is the tendency for a distinction between in-group and out-group, which has implications for attitudes and behaviors. Social identity theories (Tajfel, 1978; Tajfel and Turner, 1979) focus on these challenges in bringing subgroups together. Research on intergroup behavior has found that groups define who we are and as a consequence groups strive to be separate from other relevant subgroups and to be superior (Abrams and Hogg, 2010; Dovidio and Gaertner, 2010; Tajfel and Turner, 1979; Turner, Hogg, Oakes, Reicher and Wetherell, 1987). Social identities derive from group membership and comparisons with other groups. These often result in intergroup biases, which reflect overly simplified negative views regarding the out-group, and polarizing stereotypes. For CEOs, based on identity theory, behaviors by out-groups involving monitoring or conflict, may be perceived as identity threats (Fiol, Pratt, and O'Connor, 2009; Petriglieri, 2011). Such processes may generate intergroup biases in the boardroom, including the CEO, and may influence the willingness to cooperate with other groups.

Regarding the groups likely to be considered as in-groups in the boardroom, studies of CEOs have demonstrated their tendency to identify with other CEOs (McDonald and Westphal, 2011 Westphal , Park, McDonald, and Hayward, 2012) and other elite groups of similar background. Consistent with the social exchange theory, individuals tend to share social identification with those occupying similar social roles or sharing the same community (Buchan, Croson, and Dawes, 2002; Lawler, Thye, and Yoon, 2008). CEOs are therefore likely to view as their in-group in the boardroom other equal status elite groups, such as the shareholders.

Current developments in the field of corporate governance urge for greater focus on understanding processes, to obtain a more detailed knowledge about boardroom behavior. Such studies recently have included measures of boardroom discussions (Forbes and Milliken, 1999; Huse, Minichilli and Schøning, 2005; Simons, Pelled and Smith, 1999, Tuggle Schnatterly, and Johnson, 2010) and provided evidence of positive relations between open and

creative boardroom discussions and various aspects of board task performance.

Our project follows the tradition of exploring the "black box" of actual board behavior (Daily, Dalton and Cannella2003) by analyzing boardroom dynamics, considering the board as an open system with intersecting processes inside and outside the boardroom (Pettigrew, 1992; Solomon, 2003, 2005). It views the board as a strategic decision-making and focuses on actual board behavior (e.g., Hillman and Dalziel, 2003; Huse, 2007, 2009; Pye, 2004; Roberts, McNulty and Stiles, 2005).

Study of actual processes is also needed to supplement research guided by the upper-echelons theory (Hambrick, 2007; Hambrick and Mason, 1984) which has contributed by studying director demographic characteristics. As stated by Hambrick, after decades of research, "the psychological and social processes by which -executive profiles are converted into strategic choices still remain largely a mystery—the proverbial black box." (Hambrick, 2007). See also (Finkelstein, Hambrick and Cannella, 2009). This research applies the methodology of Facet analysis on perceptions of actual board processes by the CEOs, and seeks to explore further this area of research.

2. Methods

2.1. Sample

The sample for this preliminary analysis consists of 963 CEOs who are members of the board in Norwegian firms. The CEO responses were compared to those of the total population of directors, consisting of a sample of 2,356 respondents. The surveys were collected as part of a larger study on the value creating board, a study which was conducted in 2005-2006 on Norwegian firms (Huse, 2009; Sellevoll, Huse, Hansen, 2007). The participants in this survey held the CEO position and not that of board chair, since regulations in Norway prohibit CEO duality.

2.2. Instruments

The CEOs responded to a 39 item questionnaire which asked for their assessment of aspects of boardroom dynamics. The response range was from "strongly agree" to "strongly disagree" on a 7 point Likert type scale. The

items addressed aspects of decision-making processes, influence exercised by individuals or groups, board monitoring of management, aspects of trust and personal relationships, expectations, potential sources of bias and manifestations board culture.

Table 1 presents the interim mapping sentence used for the structural hypotheses. This is a modification of the previously developed mapping sentence on the boardroom dynamics items in this survey (Solomon and Huse, 2011).

The mapping sentence in table 1 includes the facets classifying the study's items, along with the narrative. The definition of the facets, and specifications regarding order relations among the elements of each facet, provide a rationale for the structural hypotheses of the research. The mapping sentence defines the population facet, the six domain facets, and the range of responses. The population Facet P expresses the differentiation of the CEOs from the total sample of board directors

Table 1 Mapping Sentence for Boardroom Dynamics

In assessing the boardroom dynamics respondent (x) who is
- Population Facet
  - the CEO
  - board participant
in his/her organization evaluates

them as
- A, Orientation
  - a_1 Opportunities
  - a_2 Challenges
whereby the board is viewed as
- B. Influence Mode
  - b_1 Asserting its authority
  - b_2 Acquiescing
with

an orientation towards
- C. Social Proximity orientation
  - c_1 Approaching
  - c_2 Distancing
relative to situations involving
- D. Intensity
  - d_1 Controversy
  - d_2 No controversy

and expresses influence as
- E. Mode of Power
  - e_1 Episodic Power
  - e_2 Systemic Power
  - e_3 Uncoordinated Action
by focusing on
- F. Behavior modality
  - f_1 Cognitions
  - f_2 Emotions
elicited by

the dynamic, which is assessed as being ⟹
- Range
  - High
  - .
  - .
  - to
  - .
  - .
  - Low
in terms of its presence in their boardroom.

led to the structural hypotheses. The correspondence between the definitional framework and the empirical data was examined by the use of the multivariate procedure of Smallest Space Analysis (Guttman, 1968, 1971; Lingoes, 1973). The combination of the facets and their elements led to the regional hypotheses regarding a cylindrex, consisting of the combination of a radex (Guttman, 1954) and an orthogonal linear partitioning to be reflected in the structure of the data. Cylindrical configurations representing the overall structure of the data have been previously established in organizational research (Elizur and Guttman, 1976) and such a structure was confirmed in the previous study of the Norwegian governing boards (Solomon and Huse, 2011).

2.3 Structural Hypotheses relating to CEO perceptions

The structural hypotheses predicted that there would be an overall pattern of structural similarity between the CEOs responses regarding boardroom dynamics, with the responses of total sample of directors, consistent with the facet definitions and specifications.

Perceptions of CEOs specifically were predicted to reflect the in-group, out-group division among participants involved in the boardroom processes. A key facet impacting the structuring CEOs perceptions would be Facet C on "social proximity orientation", which distinguishes between processes indicative of "approaching", c1, and those expressing "distancing", c2, behaviors. The two elements of this facet for CEOs would also correspond to the orientations towards in-group and out-group, and reflected CEO responses as addressing approaching-distancing behaviors in the boardroom.

Furthermore, drawing upon social identity theory, we predicted that CEOs would perceive their own exercise of power and that of shareholders as constituting approaching behaviors and contributing to unity in the boardroom, and consistent with effective decision making. Therefore, for the CEOs, the configuration of variables including CEO domination as exercise of power and board acquiescence to shareholders, would be located in region proximate to shared decision making, rather than in the more distant region in the radex structure as reflected in the total sample of board directors.

3. Results

The preliminary results reported in this paper examine the configurations and interrelationships emerging in the CEO responses and compare them to the overall sample of directors. It used multidimensional scaling guided by a theoretical framework and structural hypotheses. The geometric representation of the correlation matrices by use of Smallest Space analysis (SSA) revealed the need for a three-dimensional representation of the data. The coefficients of alienation for the sample of CEOs were .200 and .126, for the two and three-dimensional solutions respectively.

This preliminary analysis of the structure of CEO perceptions confirmed the pattern of overall similarity with the structural relations among variables predicted in the overall sample of boards of directors. Similar three-dimensional structures represented the CEO data and were reflective of a pattern of overall similarity with some exceptions regarding the radex configurations for each sample.   Second, the hypothesis specifically related to the CEO perceptual structures were supported. It predicted that the in-group vs. out-group differentiation would be dominant in organizing aspects of boardroom dynamics in the CEO perceptual structures.

Additionally, the CEO data regarding exercise of power presented a different lawfulness in the structure of perceptions as compared to the overall sample regarding orientations to power. Figures 1 and 2 attempt to exemplify these differences, based on the preliminary analysis.

3.1. Graphic Presentation of the Structure – The CEOs

Figure 1 presents an abstraction of the preliminary results on CEO perceptual structures regarding corporate governance processes. For purposes of demonstration, this figure represents a simplification of the two dimensional radex of the CEO responses. Figure 1 also depicts the two principle axes that define the space of the boardroom dynamics radex configuration, the "approaching-distancing" axis, and the "assertive board – acquiescing board" axis.
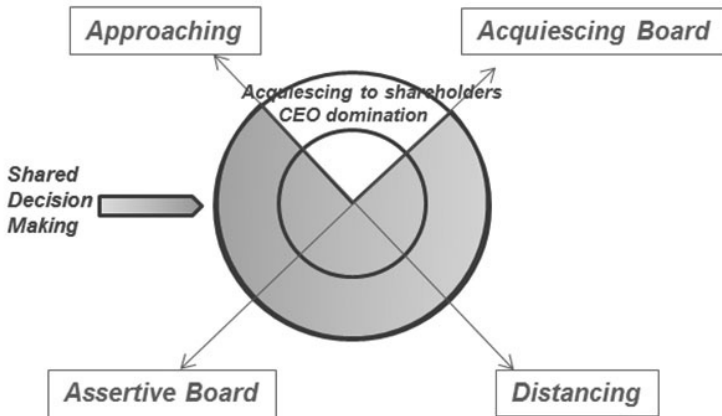
Fig. 1. Abstracted Representation of CEO Perceptual Structures Regarding Boardroom Dynamics.

As reflected in figure 1 consistent with the facet definitional framework, the preliminary results of the CEO perceptual structures regarding boardroom dynamics also confirm key facets of the design. The partitions in figure 1 correspond to a radex (Guttman, 1954), which is part of the cylindrical structure representing the overall structure of the CEO responses. For simplification purposes, the SSA space has been partitioned according to facets B, C, and D. Facet B of "board power orientation", differentiating between processes reflecting an "assertive board, b1"or "acquiescing board, b2", and Facet C, of social proximity orientation," distinguishing "approaching" from "distancing" processes, play jointly the polarizing role. Additionally figure 1 reflects divisions according to specifications in ordered facet D, on "debate atmosphere". This facet plays an axial role, the items of greater intensity being located in outer band around theperiphery.

According to the representation of CEO responses in figure 1, the power configuration including processes that reflect the board's acquiescence to shareholders and their own domination are located at the upper most quadrant wedgelike region in the SSA space. This region reflects the combination of facet elements referring to the "approaching" c1 and the "acquiescing" b2 element of the board process orientation.

Also indicated in figure 1 is the power configuration and an arrow pointing to the approximate location of shared decision making configuration of items. The relative location of these regions to each other in the radex structure can be interpreted as reflecting a CEO view that such power behaviors contribute to togetherness in boardroom dynamics, from the CEOs' perspective, and are consistent with shared decision making in the boardroom.

3.2. Graphic Presentation of the Structure – The Total Sample

To enable comparison between the preliminary results of CEO perceptual structures to those of the overall population of directors regarding their boardroom dynamics, we also present this data in an equivalent graphic depiction. Figure 2 presents an abstraction of the results regarding perceptual structures regarding boardroom dynamics for the entire sample, consisting of 2,356 respondents. This figure also highlights the location of the power configuration, which includes CEO domination in the boardroom and board acquiescence to shareholders. Figure 2 reflects the same partitioning in the SSA space relative to the two axes that define the space of boardroom dynamics and the radex configuration, the "approaching-distancing" axis, and the "assertive board – acquiescing board" axis. This figure also reflects the axial partitioning according to the axial facet D of the debate atmosphere.
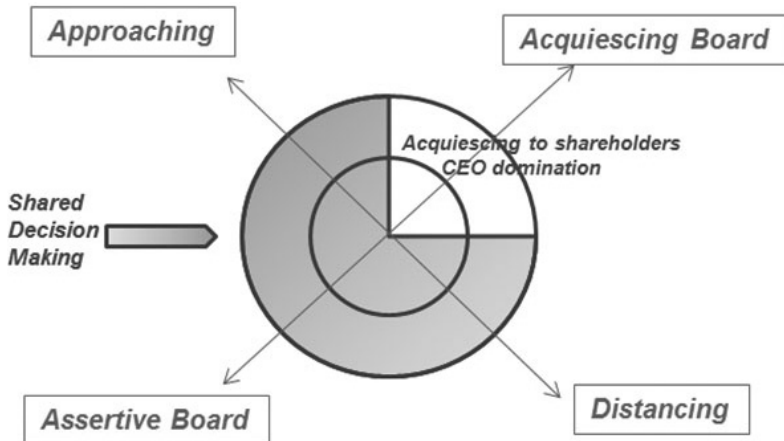
Fig.2. Abstracted Representation for Total Sample of Board Directors Perceptual Structures Regarding Boardroom Dynamics.

Unlike the structure of perceptions by the CEOs in Figure 1, the results for the total sample of directors reflect a different location for the power configuration in the radex. As Figure 2 indicates, the configuration including CEO domination and board acquiescence to shareholders falls strictly in the region of "acquiescence" along the board dominance-submission coordinate.

Additionally, its location relative to the shared decision making region identified by the arrow, point to differences from the CEO results. The greater perceived incompatibility between the power configuration and shared decision making reflected in the structures by the total sample when compared to CEO perceptions, points to inconsistencies in their orientation towards power dynamics in their boardroom.

4. Discussion

This preliminary analysis is based on survey responses by CEOs from Norwegian firms regarding their perceptions of dynamics in their boardroom. We identify similarities and differences in the structure of perceptions of these CEOs when compared to the total sample of boardroom participants. Within a broader pattern of structural similarity, variations in configurations relate primarily to differences regarding power dynamics and CEO influence in the boardroom.

These differences relate to inconsistencies between CEOs and the total sample of board members in their orientation towards power dynamics in their boardroom. In our analysis CEOs perceived their domination and that of shareholders as constituting approaching behaviors and contributing to unity in the boardroom, and consistent with effective decision making. Therefore, for the CEOs, the configuration of power variables was located in the region proximate to shared decision making, rather than in a more distant region of the radex configuration as occurred in the total sample of board directors. In this preliminary analysis CEOs perceived their domination and that of Shareholders as contributing to unity rather than undermining shared decision making. The fact that this favorable overestimation includes the shareholders as well as the CEOs, in our view, is interpreted as consistent with social identity theory.

CEOs, as other individuals, are likely to categorize boardroom interactions in terms of in-group versus out-group behaviors. This is particularly

so since CEOs are being evaluated and monitored in the boardroom. Consistent with previous research individuals tend to develop negative stereotypes against out-group members, and positive attitudes toward in-group members. For CEOs, based on identity theory, behaviors by out-groups involving monitoring or conflict, may be perceived as identity threats (Petriglieri, 2011) and their responses in this study can be interpreted as related to identity issues, which have been hypothesized to be conducive to intractable conflicts in organizations (Fiol , Pratt, and O'Connor, 2009). Future research exploring such dynamics can provide insights into boardroom behaviors,   group fragmentation, and potentially shed light to the phenomenon of governance inertia.

Although further exploration of the preliminary findings of this study is needed before drawing conclusions, the results suggest a lack of congruence between CEOs perceptual structures and those of the overall population of board directors regarding power dynamics. CEOs and the overall sample reflect different views regarding board acquiescence, defined as giving in to powerful participants such as the shareholders and the CEO in the boardroom.

Complex organizational and interorganizational phenomena such as corporate governance and CEO dynamics require comprehensive methodologies for theory development and analytic methods that can capture the lawfulness underlying these dynamics. In response to the recent appeals among corporate governance scholars for incorporating context, integrating macro and micro research, and incorporating levels of analysis, facet analysis can play a leading facilitating role.

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The Structure of Coping with Stress

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Abstract : Coping refers to what the individual does in order to handle a stressful situation. Coping includes a great variety of behaviors (i.e. coping strategies) that may be adopted in stressful situations. The most well-known classification of coping strategies: problem-focused and emotion-focused, was originated by Lazarus and Folkman. Since then, many researchers have classified coping strategies, but few of them have suggested a comprehensive structure on the basis of a theoretical framework. The major objective of the present study was to develop a theoretical definitional frame for the coping strategies domain, by means of Facet Theory. Developing a formal definitional framework for the coping with stress domain may help to overcome the limitations of previous attempts of categorization and interpretation of coping strategies (Dewe, O'Driscoll & Cooper, 2010, p.41-45). The definition proposed here associates coping modalities and coping direction. This theoretical framework then served as a basis for the development of a questionnaire examining how individuals cope with stress.

554 employees of various organizations, representing a wide range of jobs and positions, were interviewed. The results support the definitional framework suggested. A two-dimensional structure was obtained, in which the modalities facet organizes the space from the center to the periphery, and the direction facet polarizes. The total structure is a radex structure.

1. Introduction

Coping is concerned with the way people manage stressful life conditions (Lazarus, 1999). Lazarus and Folkman (1984, p.141) defined coping as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person". Hobfoll (1989) presents a resource-based theory of coping, arguing that when in stress, individuals try to minimize the net loss of their resources by investing in other resources.

In an attempt to understand the structure of coping, studies referred to two different and mutually exclusive theoretical approaches: coping as a trait/style/disposition or coping as a dynamic process. Coping as a personality trait claims that the individual consistently chooses the same way of coping in various contexts and stress stimuli (e.g. Goldstein, 1973; Schwartz, Neale, Marco, Shiffman & Stone, 1999; Carver, & Scheier, 1994; Terry, 1994).

The dynamic-process approach, represented by Lazarus (Lazarus & Folkman, 1984; Lazarus, 1966), emphasizes the changing man–environment relations (called transactions) in the process of coping. The connection between a specific person and a specific situation determines the kind of coping effort called coping strategies/skills (not coping styles).

After Lazarus introduced the dynamic-process approach, many other researchers tried to understand the coping structure (e.g. Krohne, 1996; Parker & Endler, 1996; Skinner, Edge, Altman & Sherwood, 2003; Holahan & Moos, 2003).

In a recent attempt to analyze the coping process Skinner et al, 2003, suggested a hierarchical conceptualization of the structure of coping, and categorized several levels of order: *instances of coping, ways of coping or coping strategies, "families" of coping and adaptive processes*. It appears that the structure suggested is indeed very extensive, but weak theoretically, since it was based on analyzing previous data of ways of coping and classifying them.

In the present study we adopted the dynamic-process approach of Lazarus. Our question is: How should strategies for coping with stress be defined? We developed a definitional-formal framework of coping strategies that would bring a specific systematic, macro-level answer to the coping ways and families presented in the literature.

2. Strategies of Coping with Stress

Coping strategies are basic categories used to classify how people cope, namely, how they actually react to stress. The most known classification (Lazarus & Folkman, 1984) identified two major process-oriented functions of coping strategies: *problem-focused coping* and *emotion-focused coping*. In problem-focused coping, a person obtains information about what to do and mobilizes actions for the purpose of changing the reality of the troubled person-environment relations. Emotion-focused coping is aimed at regulating the emotions tied to the stress situation, for example, by avoiding thinking about the threat or by reappraising it without changing the realities of the stressful situation (Lazarus, 1999). Both functions are essential parts of the total coping effort, and ideally, each facilitates the other (Lazarus, 1999).

This classification of coping has provided a broad practical framework for thinking. Many other classifications emerged, differing in the number and range of coping categories. But, "despite the plethora of research on coping with stress, and although attempts have been made to construct conceptual frameworks of coping behavior, the determination and interpretation of their underlying dimensions remain a challenge to researchers" (Abella & Hesslin, 1989).

There is a great deal of discussion concerning how the coping items should be constructed, based on theory or arbitrarily (Dewe et al, 2010). Various studies focus on the measurement of coping, and the result is that coping is defined simply through the use of critical analysis of 'coping checklists' (Coyne & Gottlieb, 1996).

Similarly, there is a problem in the way that coping strategies are statistically classified, mostly using factor loading that ignores the fact that a coping item may serve a number of functions or that a number of coping items fulfill the same function (Stone & Kennedy-Moore, 1992; Watson & Hubbard, 1996).

In light of these arguments, "coping research requires refashioning (Coyne & Racioppo, 2000), bringing with it a level of conceptual and methodological sophistication that has yet to reflect the field as a whole" (Somerfield & McCrae, 2000). We applied Facet Theory to meet the challenge. Facet theory attempts to formally define the universe of observations and to test hypotheses about the relationship between the definitional framework and the

structure of the empirical observations (Elizur, 1984). Facet theory is a method by which the components of a problem or the issue under investigation can be defined formally (Guttman, 1957). A facet is a group of common traits that represents semantic components of a context field (Yaniv, 2011).

In the present study we attempted to develop a **general** framework of coping with stress, and examine it to coping with work-related stress. Based on the literature we distinguished two basic facets to define the coping with stress domain: A - modalities of coping, and B –direction of coping.

2.1. Facet A - Modalities of Coping

The general definition of coping is concerned with the individual's cognitive and behavioral efforts when under stress (Lazarus & Folkman, 1984; Latack & Havlovic, 1992). Cognitive coping includes "mental strategies and self-talk" (Latack & Havlovic, 1992, p. 492), and a wide range of strategies: situation evaluation, action planning, thoughts and beliefs. Other studies included cognition in the coping process (Billings and Moos, 1981; Roth and Cohen, 1986; Compas et al, 2001). Therefore, we defined the first element: a1 – cognitive.

The literature also refers to emotion-focused coping, which is a relief of accumulated stress (Lazarus & Folkman, 1984). Lazarus (1999) claims that certain emotions such as anger, jealousy, anxiety, fear, shame and sadness can be called "stress emotions" because they usually arise in stressful situations. Stanton, Parsa and Austenfeld (2002) conceptualized 'emotional approach coping'(EAC), which involves active movement **towards** the stressful encounter, and includes: emotional processing (active attempts to admit, investigate significance and understand one's emotions) and emotional expression (active verbal and/or nonverbal attempts to communicate or to signify one's emotional experience) (Austenfeld & Stanton, 2004, p. 1342). In contrast, emotional avoidance involves active movement **away** from the stressful encounter. Accordingly, we defined the second element: a2 – emotional.

Behavioral coping is defined as "taking action or doing something" (Latack et al, 1992, p.492). Behavioral coping (we prefer to call it instrumental) can include for instance: requesting help from friends, finding a new job, or diversion activities such as watching TV. Billings and Moss (1981) found

support for the active behavioral coping category. Thus, we defined the third element: a3 – instrumental.

The behavior modalities facet is a basic facet in behavioral research, and is common in mapping sentences (Yaniv & Elizur, 2008). We felt that it was also suitable for the issue of coping.

2.2. Facet B - Direction of Coping

Lazarus and Folkman (1984) presented two main ways of coping. The first is problem-focused coping, which aims to cancel or reduce the stressors by means of problem solving, decision making and direct action (Folkman, 1984). In problem-solving coping, the individual actively seeks to solve the problem created by stress. Consequently, we defined the first element: b1 – change the source of stress.

The second mode of coping presented by Lazarus and Folkman (1984) is emotion-focused coping. Its goal is to change the emotional distress created by the stressor (without changing the stressor itself). In emotion-focused coping, the individual perceives the environment (the source of stress) as given and active on the individual himself. The distinction between coping that attempts to affect the environment and coping that accepts the environment while changing the self can be found in the literature (Compas et al, 2001; Rudolph et al, 1995; Perrez & Reicherts, 1992; Brandtstadter & Renner, 1990). We believe that coping with stress without changing the environment can be divided into two types:

Acceptance - The individual accepts the stressor as a fact that cannot be changed. He decides to adapt and adjust himself (perceptions, thoughts and feelings) to the stressful situation. Acceptance of the stressor occurs in a number of ways, for instance by reevaluation of the situation, emphasis on positive aspects, or faith in God/fate. Acceptance implies a restructuring of one›s experience so as to come to grips with the reality of the situation that one confronts. Acceptance may thus involve a deeper set of processes, in which the person actively works through the experience, attempting to integrate it into an evolving world view (Culver, Carver and Scheier, 2003, p.41).

Another category suitable to acceptance is meaning-focused (Park & Folkman, 1997; Folkman and Moskowitz, 2007), in which people use their

beliefs, values and goals to find or remind themselves of the benefits of experiencing stress, and thereby supporting coping. This form of coping is more passive than the previous one, and primarily involves readapting to demands through cognitive-emotional change. Hence, we added the second element: b2 – accept the source of stress.

Withdrawal - The individual feels "trapped" in a stressful environment without being able (subjectively) to change it, so he withdraws psychologically, i.e. distances himself mentally from the stressful environment (Schuler, 1986). He can also distance himself physically from the stressful environment (Rosse et al, 1985). Withdrawal corresponds with avoidance - an effort to avoid actively confronting the problem (Endler et al, 1994; 1999; Folkman et al, 2004). The degree of coping actively depends on the type of withdrawal. Accordingly, we added a third element: b3 – withdraw from the source of stress.

2.3. Mapping Sentence

The definitional framework for formally defining a content universe is called a 'mapping sentence'. The mapping sentence serves as a guide for formulating hypotheses, to create structured assumptions, to plan and collect observations, and to analyze data (Levy, 2005). The following mapping sentence presents the definitional framework suggested for the coping domain. The product of the facet elements provides 3X3 = 9 combinations. The domain of coping can be sampled methodically by creating at least one item for each combination. The items that were created were consequently used to build a facet questionnaire of coping.

The assessment of subject (x) that in order to resolve stressful situation (Y) he\she will respond in:

A- Modalities   B- Direction

{ a1 cognitive   } response directed to { b1 change the   } source of stress ⟶
{ a2 emotional   }   { b2 accept the   }
{ a3 instrumental }   { b3 withdraw from }

R - range
{ positive }
{   } for his/her well-being.
{ negative }
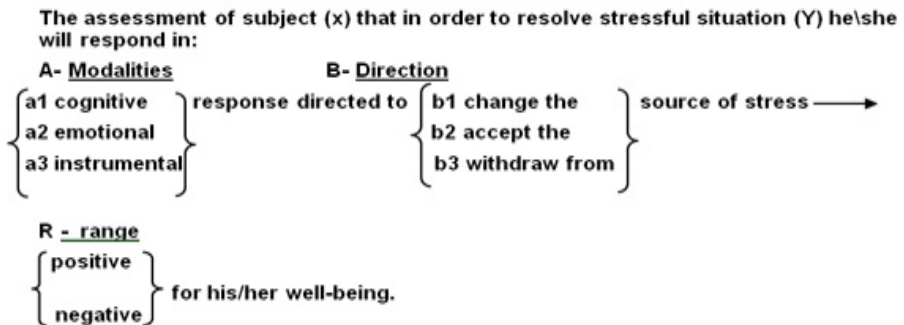
Fig. 1. Mapping sentence definition of coping strategies

2.4. Hypotheses

H1 – The empirical results will reflect the components of the concept of coping, as defined in the mapping sentence. A distinct area will be found for each facet and each element,

H2 – The coping modalities facet (A) will have a polarizing role, when its elements away from the center (the origin) in a different direction in the geographic space (Friedman, 2008). This is a general facet and can be found in many Behavior Sciences studies. It can fulfill various roles, depending on the hypotheses and the research context: a modulating role (for instance, Azam & Maslovaty, 2008; Sternberg, 2002; Sagie, 1995; Elizur & Tziner, 1985) or a polarizing role (Elizur, 1984; 1991). There is no reason to assume that there is any order, so we assume a polarizing facet.

H3 – The coping direction facet (B) will be modulating. A modulating facet organizes the elements from the center to the periphery. The higher the correlations between the items, the closer the region will be to the center of the map. We assume that the elements in this facet will be ordered. As discussed above, the distance between changing the stressful situation and withdrawing from it, is greater than changing the stressor and accepting it. The reason is that the two forms of coping – acceptance and withdrawal – act on the individual, whereas changing the stressor mostly acts on the environment. In addition, we hypothesize that low correlation will be found between the items of the first element – changing the source of stress, because it includes a variety of distinct possibilities of coping. Thus, this element will be distant from the center of the circle. On the other hand, the third element – withdrawal, includes only two categories, and in each category there is a high correlation between the behaviors. For instance, a high correlation was found between withdrawal-tardiness, absence and departure behaviors (Koslowsky, Sagie, Krausz & Singer, 1997). Therefore, this element will be close to the center of the circle.

H4 – The total structure obtained from facets A and B will be a circular-radial structure. Such a structure is called radex, and is created by the combination of a polarizing and modulating facet.

We should note that whereas the modalities facet is a general facet common to the Behavior Sciences, the direction facet is unique to coping
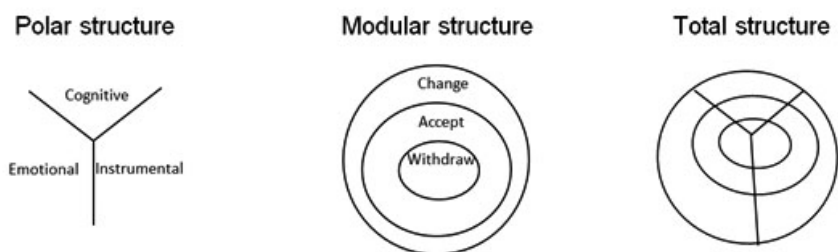
Fig. 2. The roles of the facets

3. Method

3.1. Sample and Procedure

The sample included 554 employees of various organizations in Israel, representing a wide range of jobs; 51% female and 49% male. Their age was between 18 and 67 (average=37.8, SD=9.57). Employment period in the organization was between two weeks and 45 years (average=8.18, SD=8.08), and in the job between two weeks and 35 years (average=4.46, SD=5.07). Concerning employment: 44% work in the hi-tech industry, 13% in traditional industries, 31% in services, and 12% in other industries. 20% are employed in public institutions, 73% in private organizations, and 7% in other frameworks (NGO, kibbutz, etc.). 44% hold various levels of managerial positions, and 56% are not managers.

Participants were sampled in three ways: 100 hard-copy questionnaires were filled out by Business Management or Behavior Sciences graduate students at Netanya Academic College (delivered by the researcher); 459 questionnaires were distributed by a "snowball" method convenience sample, of which 367 were filled out electronically (EST– electronic survey technique) by means of a designated online questionnaire. Online questionnaires were found to be a valid research method, which gives the respondents flexibility in terms of time and place, while maintaining total anonymity (Simsek & Veiga, 2000). The remaining 92 questionnaires were distributed by hardcopy. Five questionnaires were not complete, and were excluded from the sample.

4. Questionnaire

We constructed a structured self-reporting questionnaire to assess ways of coping with stress. The questionnaire was constructed based on the defined facets: coping modalities and coping direction. The product of the elements (3X3=9) provided 9 structuples, which together represent the conceptual space. We added two combinations in order to enrich the questionnaire.

5. Results

Table 1 presents means, standard deviation and correlations for the study variables.

Table 1: Correlation between the variables

6	5	4	3	2	1	SD	M	Variable	
					-	0.95	3.97	Change	1
				-	.37**	0.82	4.03	Accept	2
			-	-.05	.09*	0.98	2.11	Withdraw	3
		-	.39**	.73**	.59**	0.78	3.44	Cognitive	4
	-	.34**	.64**	.05	.52**	0.91	3.12	Emotional	5
-	.50**	.50**	.66**	.37**	.52**	0.63	3.12	Instrumental	6

** P<0.01* P<0.05, N=554

6. Similarity Structure Analysis (SSA)

Similarity Structure Analysis (SSA) was applied to analyze the structure of the coping with stress domain (hypotheses H1 to H4). SSA is an intrinsic data analysis technique with an emphasis on looking at regions in the space of variables rather than at coordinate systems (Levy, 2005).

When the similarity between two items is high, the distance between the points representing them is relatively small. Conversely, when the similarity between two items is low, the distance between their geometric points should be relatively large (Elizur, 1984).

The coefficient of alienation for a two-dimensional solution was 0.11, which is considered a relatively good fit between the correlation matrix and the graphic presentation of the variables. Observing Figure 3 presenting the structure of Facet A, coping modalities, three circular regions can be distinguished– cognitive items in the center, instrumental items next in the second circle, and the motional items in the periphery. A facet that organizes the items from the center to the periphery is called a modulating facet. The coefficient of alienation 0.11 indicates a good fit, and the regionality index 0.91 indicates as well a very good fit.
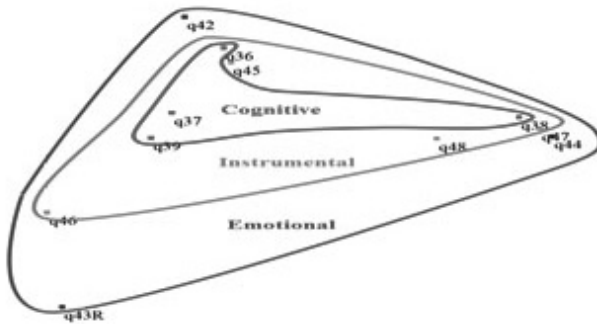
Fig. 3. Structure of coping modality – two-dimensional SSA, Regionality 0.91, Coefficient of Alienation 0.11

Figure 4 represents the structure of Facet B – the coping directions. The map shows that the facet components are located in regions moving away from the center toward the periphery. Such a facet is called a polarizing facet. The obtained structure supports our hypothesis of three coping directions. The regionality coefficient 1.00 indicates an excellent fit.

Fig. 4. Structure of coping direction – two-dimensional SSA, Regionality 1.00, Coefficient of Alienation 0.11

Figure 5 represents the total structure of coping with stress. The two facets together, modalities of coping and coping directions, one modulating and one polarizing, create a radial structure, called Radex.
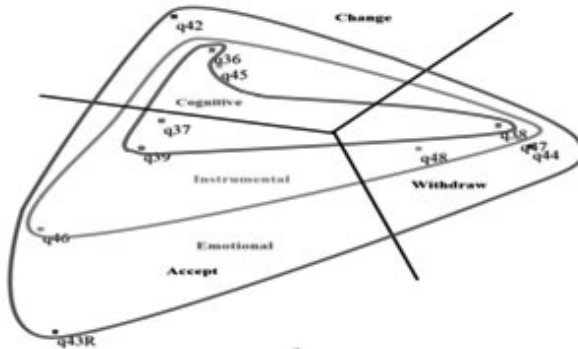
Fig. 5. The Radex structure of the coping with stress domain, two-dimensional SSA

The results clearly support our hypotheses that:

1. Coping with stress can be classified according to the modalities of coping facet (cognitive, emotional, instrumental) and the coping direction facet (change, accept, withdraw). That is to say, the empiric results reflect the components of coping, as defined in the mapping sentence. Each facet and its elements occupy a distinct region.

2. Facet A is modulating – cognitive in the center, instrumental in the middle and emotional in the periphery. Thus, hypothesis **H2** (that the

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coping modalities facet would be polarizing) was not confirmed.

3. Facet B is polarizing – each coping direction was found in a distinct area. Thus hypothesis **H3** (that the coping direction facet would be modulating) was not supported.

4. The total structure of the coping with stress domain provides a radex structure, as hypothesized.

7. Discussion

The major objective of the present study was to develop a theoretical conceptual frame for coping strategies. We assume that the new framework provide a new perspective that would contribute to the coping discourse. To examine the structure of coping, we developed a questionnaire that served as a theory-based measuring tool. The structure of the coping with stress domain was analyzed by means of Similarity Structure Analysis (SSA).

The empiric results support the definitional framework suggested for the coping with stress domain. The results indeed reflect the components of coping as defined in the mapping sentence. Distinct regions for each of the facets and their elements (A Modalities: emotional, cognitive and instrumental; B Direction: change, accept and withdraw) could clearly be distinguished. Our hypothesis concerning the total structure of the domain was similarly supported. The two facets together provide a radial structure, a radex.

However, the internal order of the elements within the facets was reversed. The 'modalities of coping' facet was found to be modulating, elements ordered from the center to the periphery, rather than polarizing, as expected; The direction facet was found to be polarizing. A modulating structure for behavior modalities was found in certain studies (e.g.: Elizur, 1979; Carmeli, Elizur & Yaniv, 2007; Azam & Maslovaty, 2008), and polarizing in some other studies (Elizur, 1984; Elizur, Borg,Hunt & Beck, 1991). Since the modalities facet is a common facet in the Behavior Sciences, its structure depends on the other contributing variables. In case that the facet is polarizing, there is no order between the elements, they are polarizing in the various direction angles around the origin. In case that the facet is modulating, in some studies the order was from instrumental to cognitive and affective (Carmeli et al, 2007), and sometimes from instrumental to affective and cognitive (Elizur, 1984). In both cases the cognitive and affective are near

each other. The rationale of the proximity of the cognitive and emotional items is that both represent covert behavior, the relations between them are not restricted by external constraints. In instrumental behavior, however, external restraints should be considered more carefully. The unusual finding in the present study that the instrumental items are located between the cognitive and the affective items, may be due to the special conditions of coping with stress, requiring action to reduce the tension. Thus, both cognitive as well as emotional response is leading directly to instrumental response.

The 'coping direction' facet is unique to the issue of coping, and consequently warranted a great deal of attention in this study. The coping direction facet was found to be polarizing, rather than modulating as expected (hypothesis H3). That is to say, in the geometric space, each of the elements is located in a different direction, away from the origin; withdrawal is a different direction than change and acceptance. The relationship between change and acceptance is understandable, since in both, the solution to stress is found, in all modalities. Previous research has indicated a high correlation between problem-focused coping and positive reevaluation, a form of acceptance coping (e.g. Folkman & Lazarus, 1985; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). Folkman et al (1986) claimed that the consistency with which these ways of coping appear in tandem, beyond studies, suggests that positive reevaluation could help problem-focused forms of coping, or that there is something about stressful encounters in which problem-focused coping is used (for instance, a potential for positive change) that also stimulates positive reevaluation. Withdrawal, on the other hand, considers solutions outside the organization. The polarizing structure of the direction facet means that each of the elements is bothering the other two. The link between change and withdrawal is reasonable, since neither accepts the stressful situation – change tries to change the stressor, while withdrawal tries to physically or mentally avoid it.

Facet theory welcomes extension of the model, by adding elements to the facets, or intention by adding new facets. A possible additional facet that may be elaborated in future research could be whether the person is coping on his/her own or with contribution by others.

In summary, the results support the definitional framework suggested for the coping with stress domain. The basic structure of the coping domain, based on the 'modalities of coping' facet, modulating, and the 'coping direction' facet, polarizing, is that of a radex structure.

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The wave syndrome:
A career span of principal's self-efficacy

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Abstract: The major objective of the study was to analyze the structure of the Principal's Self-Efficacy domain and to investigate the relationship between principal's self-efficacy and work experience.

The Brama- Friedman Principal Self-Efficacy scale (PSES, Brama & Friedman, 2007), based on Facet Theory, was applied for data collection.

During the 2010 school year, 123 principals participated. Exploration of PSES was based on Facet Theory (Guttman, 1959).

PSES is comprised of organizational leadership (OL), educational and pedagogical leadership (EPL) and external and communal relations (ECR).The highest levels of Principal Self-Efficacy (PSE) pertained to principals in their first year. Self-efficacy levels dropped significantly during principals' second year and up to the fifth year of work experience. The levels of PSE started to rise after the fifth year, and stabilized after 10 years.

The sample was relatively small and mostly from the school district of central Israel. The second limitation was that the sample included only Jewish principals. Given that Arab citizens comprise 20% of Israel's population, further studies should include all minorities in order to shed more light on the issue.

Understanding the relations between PSE levels and work experience could assist policy makers with decisions concerning the need to address principals' professional development (in service training).

Little is known about the relations between perceived self-efficacy of principals and their work experience.

1. Theoretical Framework

Within the field of educational research, self-efficacy has primarily been studied in four different areas: student self-efficacy (Bandura 1994; Schunk and Meece, 2005), teacher self-efficacy (Skaalvik and Skaalvik, 2007), collective teacher efficacy (Bandura, 1997; Goddard et al., 2000; Skaalvik and Skaalvik, 2010) and, more recently, principal self-efficacy (Brama, 2004; Sierman Smith, 2007; Smith and Guarino, 2005; Tschannen, Moran, and Gareis, 2004, 2005).

1.1. Professional self-efficacy and principal self-efficacy

The self-efficacy concept has been applied in organizational psychology, termed "professional self-efficacy", and defined as the belief in one's ability to control events and behaviors affecting professional activities and life (Cherniss, 1993). Professional self-efficacy has to do with the complexity of the profession (Stajkovic and Luthans, 1998). Therefore, it is necessary to define self-efficacy for specific occupations or for groups or clusters of occupations that share a common denominator (Gist, 1987).

Principals' self-efficacy (PSE) is of great importance with respect to the overall managing of schools. It may be defined as a type of leadership self-efficacy, involving a certain level of confidence in one's knowledge, skills, and abilities, which are associated with the task of leading others (Hannah et al., 2008). Research on principal self-efficacy usually includes measures of multidimensional self-efficacy, in order to capture the various aspects of principals' work.

The job of school leaders has changed radically, as countries have transformed their education systems to prepare young people for today's rapid technological change, economic globalization, and increased migration (Pont, Nusche, and Hopkins, 2008). Principals play a vital role in setting the direction for successful schools (Fisher, 2008), but there is as yet no knowledge on the best way to prepare and develop highly qualified candidates (Davis, Darling-Hammond, LaPointe and Meyerson, 2005).

1.2. Objectives and Hypotheses

The major objective of the study was to analyze the structure of the Principal's Self-Efficacy domain. A systematic definitional framework was developed based on Facet Theory (Guttman, 1959).

An additional objective was to retestBrama and Friedman's (2007) Principal Self-Efficacy Scale (PSES). The PSES was originally developed ten years ago (Brama, 2004). Since the leadership skills required of principals have changed radically in the last decade, it is of most interest to retest the PSES. The effect of changing demands on principals' professional self-efficacy has not yet been tested. 1959).

In addition to that the study intends to investigate the relationship between Self-efficacy and work experience.

Previous studies have shown that the principals' preservice studies and the school that they lead are predictors of professional self-efficacy (Brama and Friedman, 2007; Friedman and Brama, 2010). Thus, it seems that very few studies have considered the relationship between principal self-efficacy and work experience (Dembo and Gibson, 1985; Imants and De Brabander, 1996). The results of the few studies that have been done are contradictory. Dembo and Gibson (1985) found that perceived principal self-efficacy levels increased with experience, while Imants and De Brabander (1996) did not find an overall increase in perceived self-efficacy of principals related to experience. Both of these studies were conducted more than two decades ago.

1.3. Defining the Principal's Self-Efficacy domain

Two basic facets could be distinguished: Facet A area of functioning, with three elements and Facet B freedom of action with three elements, and the range facet (self-efficacy level). The following mapping sentence presents the definitional framework for the Principal's Self-Efficacy domain.
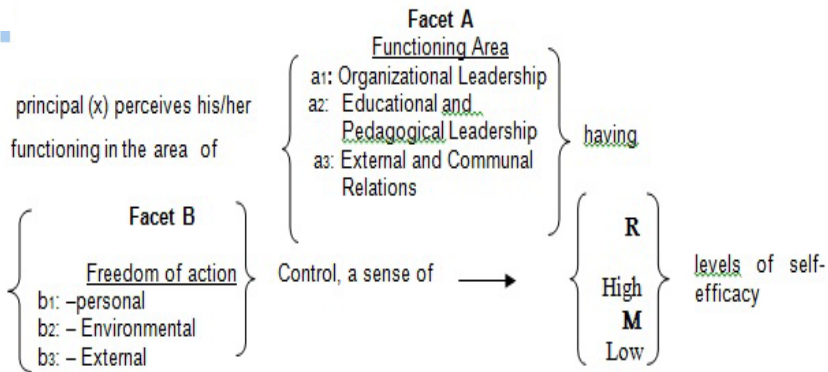
Fig. 1. A mapping sentence definition of principals' self-efficacy domain

2. Methodology

2.1. Sample

Participants in the study were 123 principals of public schools, including elementary, middle and high schools (1st–12th grade) in Israel.

The sample consisted of 32.5% (40) males and 67.5% (83) females. The age of the principals ranged from 29 to 55+ years old: 0.8% (1) below the age of 30; 23.6% (29) between the ages 31-40; 60.2% (74) between the age 41-55; and 15.4% (9) were above the age of 55. First year principals (23) comprised 18.7% of the sample; 30% (37) had between 2 and 5 years of experience; 24.4% (30) had between 6 and 10 years; and 26.8% (33) had more than 10 years of experience. Only 3.3% (4) of the principals were single; 85.4% (105) were married; 8.9% (11) were divorced; and 2.4% (3) were widows or widowers. In terms of school assignment, 78.2% (93) worked in elementary schools and 21.8% (26) worked in combined middle and high-schools.

2.2. Instruments

The research instrument was an anonymous quantitative self-report questionnaire entitled "The professional self-efficacy of school principals,"

which was based on a previous study (Brama and Friedman, 2007) of principals' professional self-efficacy. The questionnaire contained three sections. The first section contained an opening letter to the principals explaining the aims and objectives of the research, committing to maintain responders' anonymity, and asking for their sincere cooperation. The second section contained a seven-point Likert scale ranging from 1 (not capable at all) to 7 (definitely capable), with items pertaining to different school managerial tasks (57 items), divided into 5 sections: managing school as an organization (11 items); working with people (14 items); relationships beyond the school perimeters, as with parents and the community (7 items); pedagogy and professional knowledge (6 items); and various personal capabilities (19 items).

Respondents indicated their perceived degree of capability on each item. The third part of the questionnaire contained items pertaining to the principal's background variables (6 items: gender, age, education, type of school, and experience).

2.3. Data collection and analysis

The questionnaires were distributed directly to the school principals during 3 regional meeting of school principals. The aim was to distribute 350 questionnaires in an attempt to reach a sample of 300 principals. However, only 95 questionnaires were completed (27% return rate). It was decided then to try a different approach and e-mail the questionnaires to different groups of principals, who did not take part in the regional meetings. In this round, 300 questionnaires were emailed, but the return rate was even lower, and only 28 (9%) were fully completed. At this stage, it was decided to proceed and use the data as a pilot study.

Similarity Structure Analysis (SSA) was applied to analyze the structure of the Principal's Self-Efficacy domain. using the Hebrew University Data Analysis Program (HUDAP) (Borg and Shye, 1995; Shye, 1998), based on the calculated correlation matrix.

Computation of descriptive statistics, including means, variance, and item-total correlation for each item was performed. Internal consistency of the scale was measured using Cronbach's alpha coefficient. Cronbach's alpha coefficient for the scores in the whole scale was 0.96. One-way ANOVA analysis was performed to test the research hypotheses.

3. Results

Based on Facet Theory (Guttman, 1959) a formal definitional framework for analyzing the structure of the Principal's Self-Efficacy domain was developed.

This study was based on Brahma and Friedman's PSES (Brama, 2004, Brama and Friedman, 2007, and they both argued that five dimensions, each representing a different skill, were found: (1) Managing the school as an organization, (2) Directing the academic and administrative team, (3) Interrelationships with the neighbouring community, (4) Leadership, and (5). Directing the school pedagogy. Factor analysis was intended to assist with first stage confirmation, before examining the data with SSA. The correlation matrix of the scale's item scores was subjected to factor analysis. The number of factors extracted was decided based primarily on Brama and Friedman's findings (2007), and the procedure was treated as CFA (confirmatory factor analysis). Kaiser's rule (Nunnally, 1978), Cattell's (1966) scree test, and comparison with the observed correlation matrix revealed only three dimensions. The complete scale has a reliability level of α = .98. The three dimensions and their internal coefficient alphas were:

a. Organizational Leadership (OL) α = .97
(17 items: 1,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,20)

b. Educational and Pedagogical Leadership (EPL) α = .96
(28 items: 2, 15, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 55, 56)

c. External and Communal Relations (ECR) α = .96
(12 items: 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 57)

Data deployment was examined first in a 2-dimensional display. The coefficient of alienation in the 2-dimensional display was .24, a fair correlation between the correlation matrix and the graphic representation of the variables on the map. A 3-dimensional presentation yielded a better alienation coefficient of .18, but the general pattern of item deployment was highly similar to the

one obtained in the 2-dimensional presentation. Therefore, it was decided to present the 2-dimensional display, which is much more easily comprehended. Data deployment on the SSA map exhibited both a polarized form (or angular form) and a radial form in a Radex configuration.

Figure 1 presents the distribution of the items of Facet A. SSA map has an angular order (Facet A). Facet A divides the map into three regions that emanate from the origin (center), where each region faces a different direction away from the origin, they are polarising, see Figure 1. The findings demonstrate almost a perfect fit between the empirical data and the estimated structure (separation index =0.98).

Facet A is an unordered polarized facet, since it is not possible to prefer one management task to another. The facet's regions (similar to factors or dimensions) were identical to the ones found in the CFA and include the following:
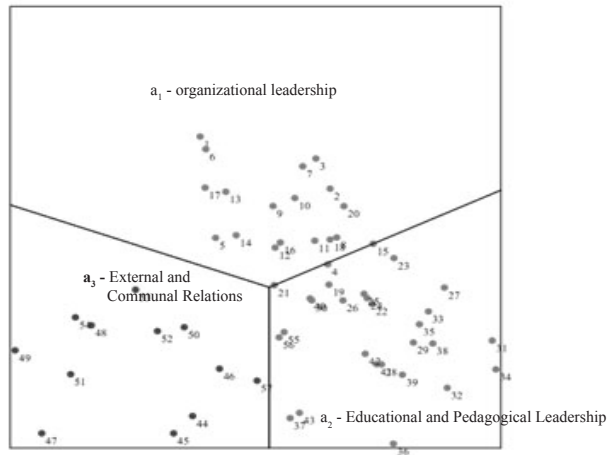
Fig.1. Polarising structure of Facet A: managerial tasks

a_1 - The upper section of the map (Figure 1), which contains items relating to OL (Organizational Leadership), e.g. "Set clear targets for both the school's pedagogical team and students"

a_2 - The lower right-hand section of the map (Figure 2 and Table 4), which contains items relating to EPL (Educational and Pedagogical Leadership), e.g. "Use proficient methods for evaluating teacher functioning" item 56).

a_3 - The lower left-hand section of the map (Figure 1), which contains items relating to tasks pertinent to ECR (External and Communal Relations), e.g. "Be actively involved in fund raising and obtaining resources for the school" (item 47).

Based on previous studies (Fisher, 2011; Friedman, 2011 a), we expected to find a Radex configuration. The deployment of the variables in Figure 2 shows that the SSA map has also radial aspect (Facet B). The separation index was 1.000, indicating perfect separation. The radial nature of the deployment is indicated by the distance of the items from the point of origin.

b_1 - Exclusive control by the principals

b_2 - Control by the principals and their closest environment

b_3 - Control by the principals, their
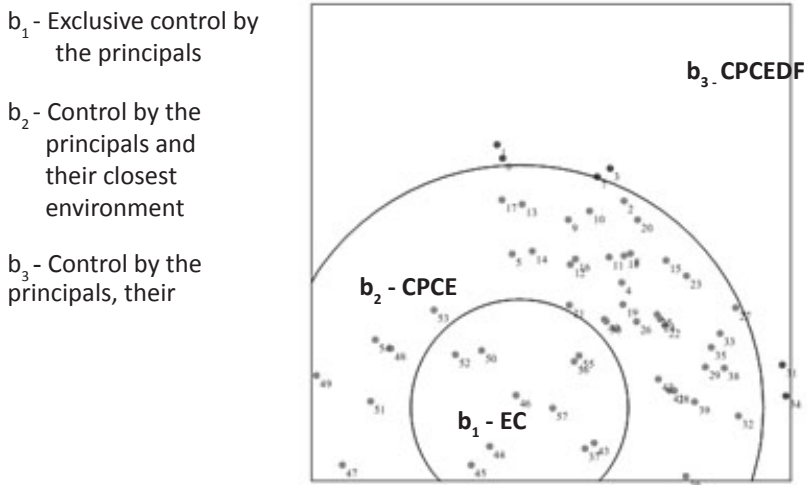
Fig. 2. Facet B: Freedom of action is modulating

Facet B it represents the principals' perceived freedom of action in performing managerial tasks. It is an ordered facet, it orders the elements from center to the periphery, such an order is modulating.

b1 – The inner circle (Figure 2): the common denominator of all 10 items in this circle is the principals' maximal degree of freedom in performing managerial tasks, i.e. principals have exclusive control over actions, based solely on their will (EC). These items are associated with managerial tasks such as developing curriculum, using evaluation methods and managing conflicts. For example: "Be accessible and available to students, teachers, and parents at any time" (item 37); "Be a resource of pedagogical knowledge for the teachers"

(item 55); "Provide the teachers with useful and detailed feedback on the quality of their work" (item 57).

   b2 - The second concentric circle, i.e. middle circle (Figure 2): the common denominator of all 41 items is the control by the principals and their closest environment (controlled by them) (CPCE). These items are associated with managerial tasks such as building up professional capability, decision making, and using a variety of teaching and evaluation methods, e.g. "Reprove a teacher who is not functioning as desired" (item 5); "Make decisions utilizing a systematic deliberations process" (item 10); "Identify prevailing innovations in other schools, and import them to your school, utilizing in-service training" (item 49).

   b3 - The third and outermost circle (Figure 2): the common denominator of the 5 items is managerial tasks controlled by the principals themselves, those in their closest environment, and distant factors (CPCEDF). These items are associated with managerial tasks such as good communication skills, manpower planning, and work plans. For example: "Survey the school's neighbouring community needs in order to formulate your school's vision to best suit the community's requirements" (item 3); "Prepare the school's work plan for a time range extending beyond the present school year" .

   Nine structuples were derived from the combination of the elements in facets A and B:

a_1b_1: The principals perform tasks pertaining to organizational leadership (a_1- OL), over which they have exclusive control and which are based solely on their will (b_1- EC)

a_1b_2: The principals perform tasks that pertain to organizational leadership (a_1- OL), which are controlled by the principals themselves and those in their closest environment (b_2 - CPCE)

a_1b_3: The principals perform tasks pertaining to organizational leadership (a_1- OL), which are controlled by the principals themselves, those in their closest environment, and distant factors (b_3 - CPCEDF)

a_2b_1: The principals perform tasks pertaining to educational and pedagogical leadership (a_2 - EPL), over which they have exclusive control and which are based solely on their will (b_1 - EC)

a_2b_2: The principals perform tasks pertaining to educational and pedagogical leadership (a_2 - EPL), which are controlled by the principals themselves

and those in their closest environment (b_2 - CPCE)

a_2b_3: The principals perform tasks pertaining to educational and pedagogical leadership (a_2 - EPL), which are controlled by the principals themselves, those in their closest environment, and distant factors (b_3 - CPCEDF)

a_3b_1: The principals perform tasks pertaining to external and communal relations (a_3 - ECR), over which they have exclusive control and which are based solely on their will (b_1- EC)

a_3b_2: The principals perform tasks pertaining to external and communal relations (a_3 - ECR), which are controlled by the principals themselves and those in their closest environment (b_2 - CPCE)

a_3b_3: The principals perform tasks pertaining to external and communal relations (a_3 - ECR), which are controlled by the principals themselves, those in their closest environment, and distant factors (b_3 - CPCEDF)

The combined radial and modular orders deployments seen in the two-dimensional representations of the data on the SSA map (Figure 3) indicate that each of the principal's perceived freedom–of-action tasks forms part of one of the three managerial tasks. Figure 3 shows these points of proximity.
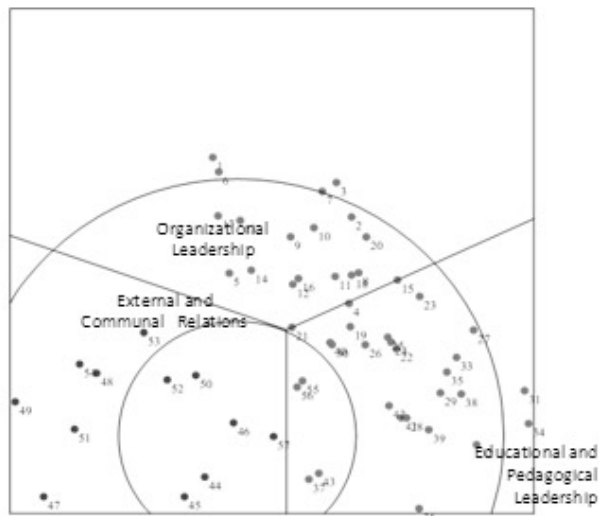
Fig. 3. Two-dimensional representation of the data deployment on the SSA map – Radex configuration

3.1. Relationship to principal's sense of self-efficacy

3.1.1. Work experience

A one-way ANOVA was conducted to compare the effect of the 11 organizational and background variables on PSES. There was a statistically significant effect of work experience on PSES at the p < .05 level [F(3, 122) = 2.938; p < .036]; η2 (Eta squared) = 0.062 (medium effect size). Eta squared indicates the proportion of PSE variance accounted for by work experience, in other words, 6.9% of observed PSE variance can be explained by work experience.

Post hoc comparisons using the Tukey HSD test indicated that the mean score for PSES of principals during their first year (M = 5.79, SD = 0.62) was significantly higher than the PSE of principals with 2 to 6 years of experience (M = 5.17, SD = 0.71). No other significant effects were found. Taken together, these results suggest that work experience has an effect on PSE. Specifically, the results suggest that principals with only one year of work experience have higher levels of PSE than principals with 6-10 years of experience.

As shown in d in Figure 4, the highest levels of PSE were indicated by principals in their first year on the job. A drop in PSE levels begins in the second year and reaches the lowest levels between 6 – 10 years of work experience. PSE levels begin to rise after ten years of experience, but do not yet reach the levels associated with the first year of management.

* statistically significant effect on the level of p<0.05
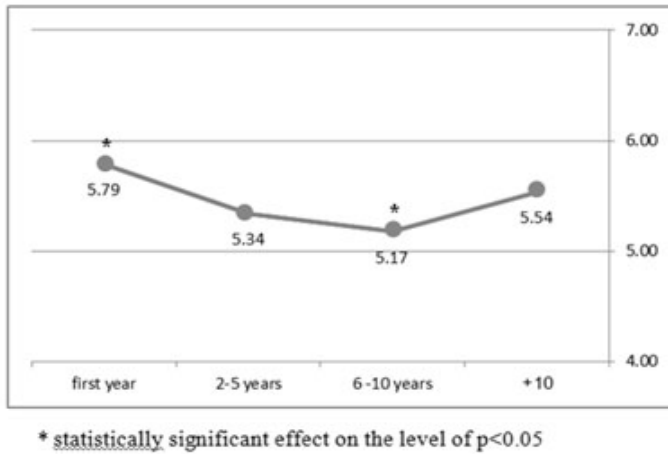
Fig. 4. The effect of work experience on PSES

3.1.2. Marital status

There was a statistically significant effect of the marital status of the principal on PSE at the $p < .01$ level [$F(3, 123) = 5.586$; $p < 0.001$]; η2 (Eta squared) = 0.123 (medium effect size), meaning that 12.3% of observed PSE variability can be explained by marital status.

Post hoc comparisons using the Tukey HSD test indicated that the mean score for PSE of married principals (M = 5.54, SD = 0.64) was significantly higher than the PSE of divorced principals (M = 4.54, SD = 1.09). No other significant effects were found. In terms of the effect of marital status, married principals perceived highest levels of PSE and divorced principals perceived the lowest levels of PSE.

4. Discussion

The results of this study are a persuasive demonstration of the theoretical and practical relevance of our conceptualization of the efficacy construct. Empirical evidence shows clearly that PSES is a two-layer conception. It is indeed important to underscore the unique contribution of Facet Theory, which

provided the evidence in support of the Two-Layer theoretical conception.

The first layer of PSES is composed of tasks related to OL organizational leadership, EPL (educational and pedagogical leadership), and ECR (external and communal relations Facet A). Furthermore, the principals perceived that control over these tasks depended on their perceived freedom of action in performing these tasks (Facet B). The perceived freedom of action could be measured on a three-level scale, with each level representing the complexity of the task:

EC (exclusive control) by the principals, based solely on their will. The tasks on this level are perceived as simple and unique.

CPCE (controlled by the principals and those in their closest environment): the principals feel that they can perform various tasks, based on their will and the will of those who work with them, and that at the same time they have direct influence on those in their immediate environment. The tasks pertaining to this level are perceived as complex.

CPCEDF (control by the principals, those in their closest environment, and distant factors): the managerial tasks depend in part on external and distant factors, with which the principals may not be well acquainted. The tasks on this level are perceived as simple and not unique.

EFC (exploratory factor analysis) and CFA (confirmatory factor analysis) could and did provide sufficient evidence that PSE is based on three main components: OL, EPL and ECR. However, as shown, this is only a partial, one layered definition. Facet Theory enabled us to have a better understanding. PSE is contingent not only on the principals' ability to carry out one task or another, but also on the degree of control or freedom they perceive they have when performing such tasks. The level of control that the principals feel they have over these tasks is an inherent part of PSE. Principals feel that most of their managerial tasks (41 out of 57, as shown in Figure 3) are controlled not only by them but also by those in their closest environment (i.e. teachers, students, parents etc.). These items, over which they have less than total control, are divided evenly between OL, EPL and ECR. Principals feel that they have the abilities and skills to disseminate valuable ideas that were developed and implemented at their schools within/ professional forums (Figure 3), but whether they succeed is not entirely up to them. The acceptance of such ideas depends on the forums before which they present the ideas. Likewise, a principal can comment on the work of a teacher, and while the intention may be

to say a word of encouragement (Figure 3), the manner in which the comment is perceived, whether it is considered a positive or a critical comment, is not exclusively in the principal's control. It depends on the teacher's perception of the words and the message.

The ten managerial tasks over which they have exclusive control are divided between EPL and ECR. This is the "comfort zone" for the principals. Providing the teachers with useful and detailed feedback on the quality of their work (Figure 3 -ECR) is undoubtedly under the control of the principal alone. Other items within the comfort zone include "running the school in such a way that whoever wants is able to track procedures, decisions, and positions assigned" (Figure 3 ECR); being accessible and available to students, teachers, and parents at any time (Figure 3 - EPL). These managerial tasks are fully controlled by the principal in the sense that it is the principal who decides the level of accessibility to be maintained. Six other managerial tasks are controlled not only by the principals themselves, but also by those in their closest environment, and by distant factors. These are mainly OL and EPL tasks. By contrast, in communication-related tasks, such as communicating clearly and in an even manner with both low-ranking personnel as well as with influential authority figures (Figure 3 - EPL), principals do not have full control, since the communication path involves others. The same is true for planning-related tasks, e.g. planning the scope of human resources, the assignment of roles, the delegating of responsibilities, or the allocation of resources (Figure 3 - OL). In public schools in Israel, the decisions of manpower and resources are taken primarily by the Ministry of Education, and the principals have very little control over these decisions, although they do have a say.

Understanding the two-layer conception of PSE may have implications for both the selection and training of principals. In particular, the training of principals should cover a wide range of areas of responsibility. In Israel, for instance, school principals have a wide range of responsibilities, which in the past had been maintained by the local education authority, such as managing the school's budget, the building maintenance, the hiring of teachers, and local curriculum development. In the last few years, the role of principal in Israel has changed, and it is clear today to all principals that the main function of a school principal is to serve as an educational and pedagogic leader for the school, in order to enhance the education and learning experience of all students.

Four additional management aspects facilitate and support this educational and pedagogic function: Developing the school's vision and image, and managing the resulting transition; leading the staff and fostering its professional development; focusing on the individual; and managing the relationship between the school and the community. As the leader of the school, the principal must be able to grasp all of the school system's dimensions and aspects and create close connections between these elements, in order to ensure the success of all pupils.

The change of the principal's role could definitely explain the new two-layer conception of PSE (as seen in Figure 3), in contrast to Brama and Friedman's (2007) five dimension scale.

The results emphasize clearly that work experience has a significant effect on PSE. To date, this issue has not been discussed. There have been some reports mentioning work experience and principals' self-efficacy, but no evidence of a significant relationship has been reported (Tschannen-Moran and Gareiseven, 2004, 2005).

This study has shown that we can describe this phenomena as a "wave syndrome" meaning that principals that have just started their pricipalship perceive high levels of of self-efficacy (M = 5.79). These levels drop to lower levels with 2-6 years of work experience (M = 5.34) and keep dropping to even lower levels with 6-10 years of work experience (M = 5.17). Only after 10 years of work experience, we see that the levels of perceived self-efficacy start rising (M = 5.54). The tendency of "high-low-high" associates with the wave cycle. This finding requires a rational explanation, particularly since Bandura (1997) had suggested that self-efficacy develops and grows based on the acquisition of skills and positive experience. Thus, we would have expected to find a linear connection between PSES and work experience: lower levels of PSES in the first years and higher levels as the years of experience increase. Yet, this study shows that not only was there no increase in PSE levels after the first year, the levels in fact decreased.

Therefore, the more probable explanation is related to Glass and Singer's theory of "Perceived Control" (Glass and Singer, 1972). It is possible that principals in their first year of principalship still feel that they have full control of the events and activities pertaining to their managerial tasks. The inexperienced principals who have just received their nomination feel very capable, since surely that is the reason they were appointed to their current

position. However, after their first year in the job, as stressful or unpleasant management events occur, they feel that they do not have full control and therefore their PSE levels drop.

Another explanation for this phenomenon may be based on Langer's theory of "Illusion of Control" (1975). Langer argued that people tend to believe that they can control the outcome of purely incidental events. Only after principals have had first-hand experience with difficult situations do questions arise regarding the significance of their role and their ability to influence adaptation, quality of learning, quality of teaching, and students' and teachers' performance and well-being (Eyal and Roth, 2011). With the experience and questions come doubts. According to Langer (1975), the illusion of control fades after entering the "Hall of fame"; after the "initiation" period, principals understand what it really means to be the leader of a school, with all the responsibilities associated with this title, as well as the purely incidental events over which they truly have no control.

Since self-efficacy pertains to people's confidence in their knowledge and skills, it is odd that PSE levels rise only after a period of ten years. This has significant implications for ensuring the continuous professional development of principals, which should be an important objective for those responsible for improving the quality of leadership in schools. Principals must receive professional mentoring not only through their first year, but mostly from their second to fifth year. This could be done through personal mentoring provided by highly experienced principals who have ten or more years of work experience, since the PSE of those principals is likely to have risen with the accumulation of experience.

The third interesting finding is the relationship between marital status and PSE. Married principals expressed higher levels of PSE (M = 5.54) than did divorced principals (M = 4.54). This issue has not been addressed in the context of PSE; however, some studies have reported that general self-efficacy is correlated negatively with marital status and gender (Cinamon, 2006), and that general self-efficacy may be undermined by stressful life events (Maciejewski et al, 2000). Although some conclusions and practical implementations could be drawn from this finding, this should be done carefully, particularly in attempting to relate this data to continued professional development. Marital status is a private issue and its discussion among colleagues is culture based. There are many countries in which there is complete separation between one's private

and professional life. Therefore, even though it is an interesting finding that merits a mention in the professional literature, any support offered to divorced principals in order to help them gain higher levels of PSE should come from the principals themselves.

While these reflections concerning the relationships between work experience, marital status, and PSE are speculations that exceed the boundaries defined by the study's data, they point to important questions for future research, as well as for practical school governance.

As described herein, results of the study offer several theoretical as well as practical implications. Thus, it is suggested that further studies should include larger and more diverse samples, in order to confirm the two-layer theoretical conception of PSE. It is advised also to analyze the data from larger and diverse samples by conducting factor analyses, in order to explore whether the factor structure found in this study (first layer of the SSA) is stable across several types of population. Thus, further studies utilizing multiple reporters and behavioural observations would be very helpful in confirming the results.

Another difficulty related to the current cross-sectional data is that they do not allow for causal interpretations. It is therefore important to test the hypotheses with prospective longitudinal research.

Although obtaining measures of the participants' perceived self-efficacy was not the immediate goal of this study, the re-measures scale could be used as a guideline for decision makers and heads of in-service-training programs. They could use the self-efficacy questionnaire as part of the decision-making process when nominating mentors for first and second year principals, as mentioned before. As findings indicate that the PSES of principals with 2-5 years' seniority is lower than the PSE of principals who have just started their principalship career, while principals with 10 years of seniority have respectively higher levels of PSE, mentors should be selected from the latter group. With their experience and stable levels of PSE, they can definitely guide the others through the crisis points of PSES.

Given that this finding has not emerged in previous studies, it may be relevant not only in Israel, but also in other countries. Yet, it is important to keep in mind that we still do not know if PSES is culturally based. There is definitely room to conduct a cross-national study in order to elaborate this most interesting issue.

Keeping this in mind, it is important to state that each country has a different policy regarding the training and development of principals. There is currently no evidence of common perception. Thus, we need to establish an adequate knowledge base before we can attempt to "join forces" on such an important issue.

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Facet Theory Study on the Vocational Interest Structure of Chinese College Students

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Abstract: The continuant refinement of social division of labor will inevitably lead to the demand for professional vocational service. In order to help people seek for their interested vocations, psychologists are pressing forward on the vocational interest research. Facet theory is a distinctive psychometric approach which uses the space diagram to represent the relationship of the focal variables with many excellent advantages like intuitiveness, non-linear hypothesis, and so on. It is becoming more and more popular in social sciences. Sampled 5831 university students in Beijing as subjects and a 28-item instrument developed through the facet theory approach was responded to. The mapping sentence includes two facets. Facet A, a polar facet, contains 6 elements, namely, Realistic, Investigative, Artistic, Social, Enterprising and Conventional characterized vocations. Facet B, a modular facet, contains 3 elements, namely, low, middle, high prestige. The fitting index of the facet A is 0.661 and the Facet B is 0.667. The fitting index of the two facets is bigger than 0.6, signifying that the facet region partition is reasonable.

1. Introduction

The vocational interests have been always a hot issue studied in the academic fields. Many scholars have put forward various theories of vocational interest structure (Gati, 1991; Guilford, Christensen, A. Bond Jr, & Sutton, 1954; Meir, 1973; Roe, 1977) . In the last 20 years, Holland's theory (Holland, 1973, 1997) has been concerned by many people. His vocational interest structure model has become a standard one in the field of the vocational interest

research(Borgen, 1986). According to his opinion, the vocational interests contained 6 types which were arranged on a circle, namely, Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E) and Conventional, which has been widely approved(Gati, 1991; Prediger, 1982; Rounds & Tracey, 1993, 1996; Rounds & Zevon, 1983). Later, he further proposed that these 6 vocational types formed a hexagon (Guttman, 1954). Tracey and Rounds(Tracey & Rounds, 1993) verified the existence of the circular structure of the RIASEC scale with the American sample, but there is no enough evidence supporting this hypothesis in the cross-cultural samples. Terence J.G and Tracey(Tracey & Rounds, 1996) found that the circular structure of the RIASEC scale was not verified in the international and an American minority samples. At the same time, Rounds and Tracey questioned the two-dimensional structure of the vocational interest. According to them, with the existence of the vocational prestige dimension added, these three dimensions would form a sphere. As a dimension with broad implications, the vocational prestige included status(Holland, 1970), prestige, socio-economic status, training level(Holland, 1997), vocational status, difficulty and responsibility level(Roe, 1977). Its stability and generalization were also supported by the empirical study. In addition, Reed found the existence of the vocational prestige dimension did not depend on the sample. Although the existence of the vocational prestige has been supported by many studies, it is not a main dimension of the vocational interest like other two dimensions. One reason for this may be that the vocational prestige is generally considered as a part of the value rather than the interest. Dawis held that the major difference between value and interest was that the former emphasized the importance of things to people while the latter emphasized the exploring tendency of people towards the mystery of things. In his opinion, their difference in emphasis (importance VS love) was just that in project format rather than the substantial one. Rounds and Tracey (Tracey & Rounds, 1996) used the principal component analysis to prove the existence of the vocational prestige, but their test samples were from America, and it's still not clear whether it's suitable for the Chinese people. A purpose of this study is to explore whether the vocational prestige dimension exists in the vocational interest structure for Chinese people through the facet theory which is different from the previous research approaches.

The facet theory mainly contains three elements, namely, facet, elements and mapping sentence. Methodologically, the facet theory is a research strategy

which integrates theoretical idea, research design, variable selection and data analysis together systematically and organically. To conduct research by the facet theory approach is to determine the research field a researcher is interested in first and then construct the assumed facets which are interdependent according to the subfield of this field. Each facet represents a specific stimulus variable. In the mapping sentence, each facet characterizes a relevant sub-facet concept. The mapping sentence includes the contents of all facets and reveals the relationship among facets and among all elements concerned.

In the practical study, facets divide a multidimensional space into some meaningful areas which are easy to explain. At this instant, the facets serve three roles, namely, axial, modular and polar. The geometric model of the data can be constructed to be conical, cylindrical or spherical which depends on its role and the region partition of various facets in the geometry.

2. The Facet Theory Analysis of the Vocational Interest

2.1. The Facet Design of the Vocational Interest Structure and the Mapping Sentence

Constructing the mapping sentence is the basis for the research by the facet theory approach. The mapping sentence is to express the research subject, the range and the relationship among the content facets. The mapping sentence consists of the following 3 facets:

(1) The research subject, also known as the target population, written as P for short. P is the test subjects of interest and the object of observation in the experiment.

(2) The content facets classifying the research variables (behavior, intelligence, attitude, etc.), namely, the content. The content facets involve a series core conceptsrelated to the research issue. The number of the content facets can be one or more without restriction. Each facet contains several elements. Due to the differences among these elements, each facet can be observed.

(3) The range facet, written as R for short. This facet is composed of all possible answers. It can be always expressed from very relevant to completely irrelevant and from totally agree to completely disagree, etc.

For the three types of facets above, the first two define the research scope. In this study, the two-content-facet mapping sentence is designed as the following according to Holland's division of the vocational interest and the facet of the vocational prestige being concerned:
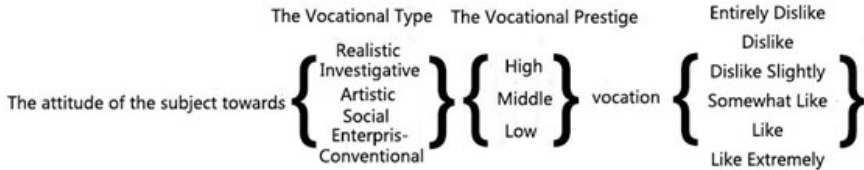
Fig. 1. Mapping Sentence of Vocational Interests.

Facet A: The professional personality type. This facet mainly contains 6 elements, namely, R (Realistic), I (Investigative), A (Artistic), S (Social), E (Enterprising) and C (Conventional).
Facet B: The vocational prestige. This facet mainly contains 3 elements, namely, high, middle and low.

3. Research Method

3.1 Research Object

5831 full-time juniors and seniors were chosen as the samples, including 129 majors (The repeat count exists in different universities). The investigation were conducted in four batches, in which there were 1094 students in the first batch, 2081 students in the second batch, 834 students in the third batch and 1822 students in the fourth batch. Some majors like administration, pharmaceutical engineering, history, geology, statistics, environmental engineering, land resource and management were measured repeatedly.

According to the mapping sentence of the vocational interests, if one element is taken from Facet A and B, respectively, they can form 18 (6×3) combinations, such as a1b3, a2b2, etc. Based on the element combination and the research requirements, a questionnaire regarding the vocational interests of university students is designed, including 36 items. Referring to Each combination an item was constructed or selected from the existing questionnaires

and at last a questionnaire was yield. The questionnaire takes the six-level scoring method, namely, entirely dislike (1 point), dislike (2 points), dislike slightly (3 points), somewhat like (4 points), like (5 points) and like extremely (6 points).

This research proposes the following hypothesis: the vocational interest structure contains two aspects: one is the professional personality type which is a polar facet including six elements and the other is the vocational prestige which is a modular facet including three elements. The vocational interest structure made up of these two facets shows the radar structure.

3.2 Data Analysis Technology

In order to better understand the complicated relationship in the large data set, this study uses the smallest space analysis (SSA) to carry out the data analysis. Being put forward by Louis Guttman, this technology represents the relationship of data in the multidimensional space graphs, which facilitates the exploration of the potential law of data.

The points in the multidimensional space represent the items in the research: the more relevant two items are, the closer they are in the space graph. Conversely, the less relevant they are, the more distant they are in the space graph.

4. Result and Analysis

4.1 . Item Analysis

The critical ratio (CR for short) is adopted as the item distinction degree index in the item analysis. The total scores of each subject are calculated and ranged from high to low. 27% of the test subjects are taken from two ends as the high score group and the low score group. The independent sample t test is taken to analyze the difference of each item between the high and low score groups, so as to obtain the CR value and the items which do not reach the significant difference are deleted. The test results of the independent sample t test show that most items reach the significant level of 0.01, indicating their high distinguishing ability. Items which do not reach the significant level like 4, 8, 9, 14, 23, 27, 30 and 31 are deleted and other 28 items are maintained to form the terminal formal questionnaire.

4.2. Analysis of the Reliability of the Questionnaire

The internal consistency reliability (Cronbach alpha coefficient) is adopted to test the questionnaire. The internal consistency coefficient is 0.842, meeting the requirements of surveying.

4.3. Facet Analysis

The study applies HUDAP6 and SPSS15.0 to analyze the data. And, the smallest space analysis (SSA) in HUDAP6 is used to analyze the multidimensionality of the vocational interests of the university students and the coefficient of alienation is used to judge the choice of the number of dimensions. The coefficient of alienation reflects the degree of inconsistency between the original input data and the output of the multidimensional space representation. It's acceptable if being less than 0.20. In this study, the coefficient of alienation of the data in the three-dimensional distribution map is 0.193, which can be accepted.

The degree of agreement between the region partition of facets and the data is expressed by the regional index.

Facet A refers to the vocational type. In this facet, a precise line exists between elements, so it's more reasonable to divide the facet in the wedge way. The regional index of the wedge partition is 0.661, bigger than 0.6, so it meets the requirement.
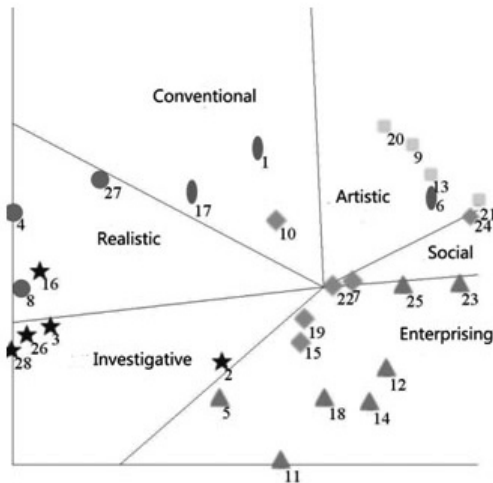
Fig 2. The Vocational Type Facet Graph

Facet B refers to the vocational prestige. In this facet, a precise line exists between elements, so it's more reasonable to divide the facet in the modular way. The regional index of the modular partition is 0.667, bigger than 0.6, so it meets the requirement
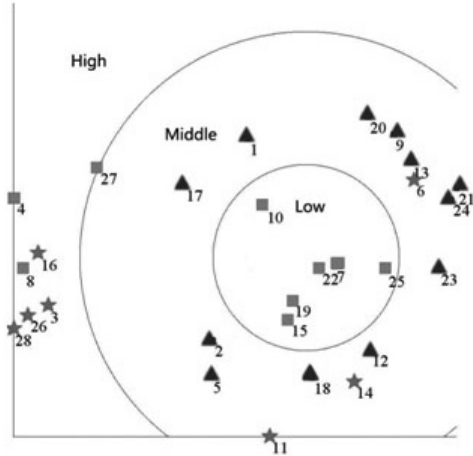
Fig. 3. The Vocational Prestige Facet Graph.

The combination of the two facets forms a radex as shown in Fig.4.
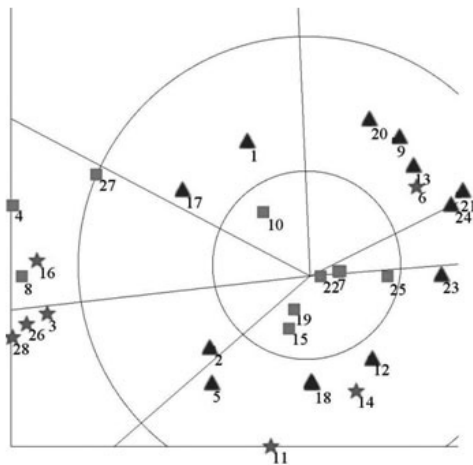
Fig.4. Two - facet Radex

5. Discussion

The essential characteristics of the facet theory is to combine the theoretical hypothesis with the empirical research, include the theoretical hypothesis into the mapping sentence at the beginning of the research, develop the questionnaire according to the mapping sentence and reflect the guiding role of the theory to the empirical research essentially. In addition, the facet theory developed a set of data processing technology in the multi-dimensional structure which processes the multiple variable data and explores the human attitude and behaviors. The smallest space analysis in the facet theory is a data analysis model which is not subject to the limitations of the normal distribution of the traditional statistics technology, the linear relationship among variables and others, so it has a wider range of application. This technology represents the analysis results in the space graphs, which is more intuitive(Shouying, 2004; Shouying & Weiwei, 2005; Shouying, Xinhui, & Peiqun, 2005; Shuang & Shouying, 2006). Since the facet theory not only reflects the guiding role of the existing theories but also can conduct the empirical research and analysis, it can be considered as an ideal verification research method. This study developed a questionnaire regarding the vocational interests of university students according to the idea facet theory and puts forward the hypothesis of the vocational interest structure of university students based on the existing research results. The hypothesis has been verified to be valid through the empirical data, which provides the powerful support for further promoting the application of the existing research results and also shows that the existing research conclusions are generally reasonable without the influence of the research method. In the existing vocational interest researches, the researchers explored the structure and developed the scale mainly relied on the factor analysis technology. The exiting questionnaires are eithertoo long or too complex which is very inconvenient in use. The vocational interest scale in this research is very concise and convenient.

It can be seen from Fig. 2 that Facet A shows the wedge distribution. In this facet, R, I, E, S, A and C form a circle in turn, which is similar to Holland's vocational interest circular structure. The difference is that the positions of A and E are reversed here, which may be caused by the cultural difference between China and America. The Chinese people always think investigation is a boring practical job while the American people hold that it's an artistic job.

According to Fig. 3, the items in the central circle have the low vocational prestige, those in the second circle have the middle vocational prestige and the rest have the high vocational prestige. However, the regional index of this facet is not very high, which may be because that the assessment of the vocational prestige is very complicated. Moreover, the deletion of some items causes that there are only a few items with the high vocational prestige.

From Fig. 4, the starting points of two facets are basically consistent to form a radex, which proves the radex structure of the vocational interest. It can be imagined that the 2D projection of spherical forms the radex structure. Tracey and Rounds (1996) studied the structure of the vocational interest with a series of complicated analysis technologies and drew the conclusion that the structure of vocational interests had three potential dimensions. They further verified the relative positions and characteristics of these three dimensions in the space and proposed the spherical structure theory of the vocational interest. The radex structure proved by this study supports the research conclusion of Tracey and Rounds to a certain extent.

Applying the facet theory into the investigation of the vocational interests of university students, this study finds that: (1) For exploration of the vocational interest structure and the development of the vocational interest questionnaire facet theory is an optional method; (2) The vocational interest structure is distributed in a radex graph, which is basically consistent with the research hypothesis; (3) By facet theory approach the results this research focusing on the vocational interest structure of university students support Holland's vocational personality clarification; (4) This study supports the research conclusion of Rounds and Tracey that the vocationalprestige dimension exists in the vocational interest structure; (5) This paper only studies whether the region partition of each facet is in line with the theoretical hypothesis with the method of SSA and does not make a further discussion on the significance of the dimension which is worth exploration in the follow-up researches.

The study completed the research design and developed a psychological rating scale for university students' vocational interests, including 28 items. The results showed that the facet theory can be applied into the investigation of the vocational interest. However, the inadequate representativeness still exists to a certain degree. In other words, some regional items are blank in the radex graph, indicating the loss of items reflecting the corresponding characteristics, which needs the further discussion in the future researches.

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The use of Similarity Structure Analysis in the identification of students' functional profiles of competence – A study with Portuguese elementary school students

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Abstract: This study aims to identify students' functional profiles - describing the representational functions available to consolidate certain school competences, in a sample of 670 students of the Portuguese Basic Schools, in which 58,3% were girls and 41,7% were boys (33,6% from 1st level, 36,0% from 2nd level and 30,4% from 3rd level). Four instruments were used: Questionnaire of the Attitudes Towards School, Questionnaire of the Attitudes Towards Portuguese Language, Questionnaire of the Attitudes Towards Mathematics and EQi-yv.

Based on SSA the polar structure observed, combined with the relative position of the external variable, it is possible to suggest the existence of differentiated profiles considering personal and scholar features that become more neat with school progress, pointing out the necessity to consider these variables independently when school politic decisions are taken. The advantages of these techniques to improve the characterization and interpretation of the complexity and multidimensionality of students´ profiles and their consequences for educational and psychological assessment and intervention are discussed.

1. Introduction

Once at school, there are a set of competencies that pupils need to enhance to succeed in school and society. Those competencies are knowledge, skills and attitudes that help people to gain personal fulfilment, employability and enable them to take part in society. These include the 'traditional' competences like mother tongue, foreign languages, basic competences in math and science, and digital competence, but also the more 'transversal' ones such as learning to learn, social and civic competence, initiative-taking and entrepreneurship, and cultural awareness and expression (European Commission, 2013).

Teaching and learning in schools have strong social, emotional, and academic components. In one hand, emotions can facilitate or impede children's academic engagement, work ethic, commitment, and ultimate school success. Many students lack social-emotional competencies and become less connected to school as they progress from elementary to middle to high school, and this lack of connection negatively affects their academic performance, behaviour, and school engagement (Durlak, Weissberg, Dymnicki, Taylor & Schellinger, 2011). On the other hand, student's attitude towards a course is important because it affects the entire learning process. A positive attitude enables students to develop thinking skills on the subject, to apply knowledge acquired in everyday life, and to have an enjoyable experience throughout the course. Attitude is an individual way of thinking and act on a phenomenon. Positive attitude allows individuals to achieve excellence in the field of undertaking. Conversely, negative attitude cause someone to feel depressed in the task given and could not move forward. Attitude is an important element to be addressed by course instructors. Unlike, negative attitudes such as feel tired to study the subject, incapable to appreciate the subject benefits or unable to focus in class, tend to interfere during class progress and lead to absenteeism (Judi, Ashaari, Mohamed & Wook, 2011).

The complexity progressively assumed in many studies on emotions and attitudes towards school and school learning has been calling for the need for a multidimensional look more on the interaction between the variables that explain it. The need to cross the understanding of these variables and respective interactions with the understanding of its manifestations in individuals and to identify possible patterns of expression led to a resurgence of the interest in studies of profiles (Candeias & Rebelo, 2012). As referred by González, Solano

and González (2008), the differential profile analysis allow us to identify domain-specific skills that are best associated with emotional reactions, behaviour and performance in school, opening a promising field since it enable to identify predictors of behavior and academic performance.

2. Functional Profile

Although it is well know that there are developmental differences between boys and girls, how these differences manifest themselves in the several subjects of the school curriculum is not well explored (Yeung, Lau & Nie, 2011). According to Antão and Veiga-Branco (2012) the study of the relevance of the students' functional profiles, regarding the expression of emotions and attitudes that justify their behaviour, should now meet other components, as sex and its manifestations in emotional competency profile, which allows the researcher to think about their relations with the motivation and learning.

Profile is understood as a set of resources that can be combined to produce certain complex behaviours. The profile may diversify as we assign more importance to the description of the resources or to the resulting behaviours. What gives meaning to the profile is the combination of elements, their interactions and complexity (Castelló, 2008). As stated by this author, the type of profile that we can evaluate is the functional profile, from which we make indirect estimates are made from indirect basic resources. We should not fall into the bias of pass directly from the functional equipment of one person to the field of his/her competences. Competence implies greater complexity and demands the interaction of multiple affective, cognitive and behavioural features. Therefore, a functional profile describes the representational functions available (which, until then, were built), many of them needed or essential - so that students can consolidate certain skills.

In order to understand how students develop, improve, or change, it is important to characterize the students' profiles with regard to their attitudes towards school and the school subjects, right from its beginnings and the evolution over the school years. It is also important because these beliefs will, in part, become the basis on which students interpret the academic experiences (Eccles, 1994). When perceptions of competence are negative and the attitudes become consolidated, it becomes increasingly difficult to reverse the negative

perception that students have of themselves and of the school (Valeski & Stipek, 2001). On the other hand, positive attitudes and efficacy beliefs about school appear as protective factors to students at risk of school failure or students whose families have supplies (Baker; Pianta, apud Valeski & Stipek, 2001).

Thus, we analysed the difference in the students' profiles of attitudes and emotional intelligence along the school levels, once previous data suggest that as the child grows, his/her auto perceptions may differ according to the re-evaluation they made of his/her own competencies, which assessment tends to made according to specific subjects (Marsh, Craven & Debus, apud Yeung et al., 2011). Indeed, children tend to ground their perceptions of competence in unrealistic expectations and so assess those selves as more competent, but while growing up youths ground their perceptions of competence in real academic performance, leading to the decrease of self-perception of competence in later ages (Yeung et al., 2011).

Analysing the relationships between attitudes, levels of motivation, affections, perception of academic competence and emotional intelligence, and using a model of students interactions, we may see how these variables act together in different levels, shaping the way pupils see themselves in the school environment, by defining their attitudinal and emotional profile.

The study proposed in this paper aims to contribute to filling this gap by mapping, analysing and characterizing the functional profile of attitudes towards school and the disciplines of English and mathematics, and emotional intelligence of students attending primary school Portuguese. We aim to explain how attitudes and emotional intelligence assessment may contribute to understand students' functional profile.

3. Attitudes

According to Legendre (cit. by LaFortune & Saint-Pierre, 2001, pp. 30-31) an attitude "is a state of mind, an acquired inner disposition concerning himself or any element of the surrounding environment that encourages a way of being or acting, favourable or unfavourable". To Morissette and Gingras (1999) an attitude is "an inner disposition of the person which results into moderate emotional reactions that are assimilated and then experienced when a person is brought before an object; these

emotional reactions lead in approaching the object (be positive) or away from (being negative)" (p. 31).

Knowing students' attitudes allow to access to their evaluations about the school and the main school subjects, which will allow the development of curricular and extracurricular activities that take into account their attitudes, interests and aspirations (Candeias, Rebelo & Oliveira, 2012). The knowledge of the emotional component of attitudes will, at the level of intervention, work students' emotions towards school and school subjects, facilitating the change of negative attitudes and strengthen positive attitudes.

a) Attitudes Toward School (ATS)

The interest in students' attitudes towards school results, in part, because it is there that children and adolescents spend much of their time and where they live a significant number of their social experiences. Attitudes are also important for their relationship to educational participation, including the intention to continue studies after finishing compulsory education (Attwood & Croll, 2011). Knowing the attitudes expressed by the students toward school and school subjects is important, not only, for creating adjusted educational policies, but it is also an indicator of school quality.

The behaviour of students in school, their relationships with peers and teachers and the investment they make in extracurricular activities and academic aspects are heavily influenced by the attitudes that they demonstrate towards school (Hauser-Cram, Durand & Warfield, 2007).

b) Attitudes Toward Portuguese Language (ATPL)

Portuguese language is a very important subject of the Portuguese educational curriculum, because besides its unique character, is a multidisciplinary subject that underpins the acquisitions to be make in other disciplines (Antunes & Monteiro, 2008). But even with this importance, little is known about the interaction between the attitudes of students and their performance and motivation to study this subject.

International studies for reading and writing reveal that girls get higher scores for reading than boys and girls have attitudes toward reading more positive than their male classmates, and this is another indicator that attitudes

are related to performance (PIRLS, 2001). Other studies cited by Archambault and colleagues (2010) show that over the time girls value more literacy activities and consequently report more confidence in their literacy skills than boys.

c) Attitudes Toward Mathematic (ATM)

Mathematics is a transversal knowledge, imperative in modern societies because of its unprecedented technological development, but the reality shows it as one of the most inaccessible knowledge to many students (González-Pienda et al., 2007).

One possible definition of attitudes towards mathematics considers them as "a set of beliefs and affective orientations related mathematics, such as anxiety towards mathematics, mathematical gender stereotypes, self-concept and mathematical expectations of success and failure in mathematics" (Gunderson et al., 2012, p. 153). Also, the authors note that these attitudes play a key role in math performance, the choice of courses related to mathematics and pursuit of careers related to this discipline. The willingness of students to study mathematics is related to attitudes, emotions and beliefs that the student uses to benefit, or avoid, the mathematical literacy that has already reached (PISA, 2012).

3.1. Emotional Intelligence (EI)

In recent years, the role of emotions in learning has attracted much more attention (e.g., Pekrun, Goetz, Titz & Perry, 2002a,b), because of the influence of positive attitudes or because of the negative ones. These interactions are particularly important in the self-regulation of learning, where students are often required to face negative information about themselves and their capabilities, as happens in test situations (Ruthig et al.; Maidment & Crisp, cit. by Antão & Veiga-Branco, 2012; Efklides & Petkaki, 2005).

Bar-On (1997) defines emotional intelligence as "*an array of non-cognitive capabilities, competences and skills that influence one's ability to succeed in coping with environmental demands and pressures*" (p.14). This definition seeks to address the dimensions of emotional, personal, social and survival of intelligence that, according to the author, are often more important

for daily functioning than the more traditional and cognitive aspects of intelligence. The Bar-On model of emotional intelligence (2000) considers socioemocional intelligence as a section of the interaction between social and emotional skills, capabilities and facilitators that determine how an individual effectively understand and express his/her self, understand others and relate with them and how he/she deal with daily issues (Bar-On, 2006). It represents a break with the more cognitive knowledge and seeks to understand which social and emotional factors that lead an individual to improve his/her psychological well-being.

The component of EI that seems to be particularly important in the school context is emotional regulation, once students who can regulate their emotions are more competent to manage stress. Also, be able to perceive and understand emotions make it easier for students to build the task and maintaining social support because academic success is not only about having good grades, is also to establish collaborative relationships in group work (Lopes, Salovey & Straus, cit. by MacCann, Fogarty, Zeidner & Roberts, 2011). Students who can self-regulate their emotions experience less negative emotions associated with evaluation and some of them can even generate positive emotions that facilitate performance (Pekrun et al., cit. by MacCann et al., 2011).

In another perspective of the school context, the EI contributes to increase motivation, to facilitate planning and decision making, which in turn positively influence academic performance (Lam & Kirby, Salovey et al., cit. by Downey, Mountstephen, Lloyd, Stough & Hansen, 2008). While it's well recognized the importance of EI for school and professional performance, it is known that their importance varies depending on the academic or professional fields, that is, depending on the subject in study, the EI components that acquire more importance are different (Boyatzis, Goleman & Rhee, cit. by Castejón, Cantero & Pérez, 2008).

Results from several studies pointed that the EI moderates the relationship between IQ and academic performance (Downey et al., 2008), for example, has a stronger relationship with the English than with mathematics or the sciences (Petrides & Furnham, cit. by Jordan, McRorie & Ewing, 2010). Jordan and colleagues (2010) found positive correlations between overall performance and adaptability and negative correlations between performance and stress management; when they analysed the sample by subjects, found

positive relationships between mathematics and adaptability. These data suggest the need to consider the subscales of EI and disciplines separately when studying the relationship between EI and academic performance. Other studies show a moderate association between the EQ-i results and students' grades, particularly in groups of high, medium and low academic success, which means that academic success, is strongly related to the different dimensions of EI (Parker et al., cit. by Downey et al., 2008).

4. Study of Attitudinal and emotional profiles - The Facet Theory and SSA Analyse

In order to study the functional profiles of attitudes and emotional intelligence we used the Louis Guttman's Similarity Structure Analysis (SSA; a nonmetric Multidimensional Scaling - MDS procedure), a data analysis *technique* that display the structure of distance-like data (our variables under study) as a geometrical picture. The use of this technique, based on Facet Theory, allows formulating a cumulative explanation for the profile; every facet specifies a type of variable under study and by its location on the map of SSA is studied the conceptual relationship between them. The facet theory is useful because allows to study the experience of the individual within the world without withdraw its complex and multidimensional nature, that is, breaks with traditional techniques which study the behaviour of an isolated and compartmentalized way (Roazzi & Dias, 2001).

The Multidimensional Scaling is an exploratory multivariate technique that allows to represent parsimoniously, in a reduced dimensional system, the proximities (similarities/dissimilarities) between subjects or objects, from a set of multivariate attributes measured or perceived (Moreira, 2009).

The Similarity Structure Analysis identifies relationships between variables, like factor analysis and cluster analysis do, but this is a non-metric technique (Bilsky, 2003), and so is free of assumptions, that is, it is not necessary that the data follow a normal distribution and are homogeneous (Moreira, 2009). On SSA the similarities or dissimilarities are reflected in proximities and distances between points, in order to group together in multidimensional space the similar variables and aside the different variables (Bilsky, 2003). This type of analysis allows transforming psychological distances in Euclidean distances

in the form of space-geometric representations, based on similarity judgments, meaning, and is rendered a correlation matrix between n variables in Euclidean space (Roazzi & Dias, 2001). The points in the multidimensional space mark the distance of each variable in relation to all other variables. It is assumed that the geometric distances correspond to the real psychological phenomenon under study (Nascimento, Roazzi, Castellan & Rabelo, 2008). The higher the correlation between two variables, the closer they will appear on the projection and vice versa forming regions of continuity or discontinuity which represent the correlations between the items (Roazzi & Dias, 2001).

This technique also enables the study of the external variables and these relationships with the founded dimensions, by using the technique of external variables as points. Thus, it is possible to position spatially variables, as sex or study cycle in the structure of the facets founded with the SSA without changing the internal structure of the profile.

Thus, in this investigation our aim was to examine whether distinct student profiles would emerge from different attitudinal and emotional variables in a sample of Portuguese students. Additionally, profile differences in self-reported attitudes and emotional intelligence were examined, as well as changes in student profiles over academic levels. Within any community of learners, there probably exist subgroups that share similar attitudinal and emotional patterns. Uncovering such subgroups within the same school year and understanding what characterize them with respect to other personal aspects may give us knowledge that is important not only for theory building but also for educational practice.

5. Method

5.1. Sample

The sample consisted of 670 students from Portuguese basic schools, who were in the first, second and third levels. The sample included 392 females and 278 males, ranging in age from 8 to 17 years, with an overall median age of 11.0 years at the outset of the study. From this sample, 224 students are from de first level, 242 are from the second level and 204 students are from the third level.

5.2. Instruments

5.2.1 Questionnaire of Attitudes Toward School (QATS)

The QATS (Candeias & Rebelo, 2011, original version of Candeias, 1997, 2005) measures the attitudes of students towards school on three factors: Learning, Motivation and Competence. The questionnaire consists of 24 items to which students respond in a Likert scale of 4 points (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree), arranged in the factors: Learning and motivation, Competence, and time management.

5.2.2 Questionnaire of Attitudes Toward Portuguese Language (QATPL)

The QATPL (Costa et al., 2011) consists of 22 items, grouped into three factors: affections, liking and motivation and utility and facility to which students responded on a Likert scale of 4 points, where 1 = strongly disagree, 2 = disagree 3 = agree, 4 = strongly agree. The questionnaire has three factors: Affections, Liking and motivation, and Utility and facility.

5.2.3. Questionnaire of Attitudes Toward Mathematics (QATM)

The QATM (Pomar et al., 2011) consists of 26 items, grouped into three factors: Affections, Liking and motivation, and Facility. Like in the other ones, students has to respond in a 4-points Likert scale, where 1 = strongly disagree, 2 = disagree 3 = agree, 4 = strongly agree.

5.2.4. Emotional Intelligence Questionnaire - EQi-yv

The EQi-yv (Candeias et al., 2011) results from adaptation to Portuguese of the original version of Bar-On and Parker (2004). The EQi-vy consists of 28 items, ranged in five factors: interpersonal, intrapersonal, adaptability, stress management, general mood. The student must respond by evaluated the items by a numerical Likert scale, where 1 = never, 2 = sometimes, 3 = Often, 4 = Always.

6. Design

The study of the profiles was computed using SSA (Similarity Structure Analysis; Borg, Groenen & Mair, 2013). To characterize the profiles of the students through the SSA analyses, it is considered that each construct under study is a facet, what means, there are four facets: Emotional intelligence (EQ); Attitude towards school, Attitude towards Portuguese and Attitude towards mathematics, which is the variables of content. Once the SSA builds a representation of proximities based on correlations between variables, we can say that the closer two variables are in the Euclidean plane, the more they contribute to explain the profile.

To study the relationship of these profiles with the sex of the students, we used the technique of external variables as points (Roazzi & Dias, 2001) in order to establish the correlation between sex and the structure found (Oliveira & Roazzi, 2007). The inclusion of these external variables will not change the internal structure of the SSA projection, so instead of creating a map for each sex, we only have an integrated map that represents both the profiles of attitudes and emotional intelligence in each cycle and the two subgroups (male and female) (Roazzi & Dias, 2001).

7. Results

7.1. 1st level of elementary school (LES)

The SSA analysis for students of 1st level (Figure 1) identified three partitions, in a polar configuration: Attitude towards school, Emotional Intelligence and Attitudes towards Portuguese and Maths. To this level, it appears that the affects to the disciplines correlate mainly with the factors of school and stress management from emotional intelligence. The ability to handle the stress comes away from the emotional intelligence and gets closer to the attitude towards school and affects for the subjects. This shows how the four variables in study are grouped in three regions, and not the four foreseen.
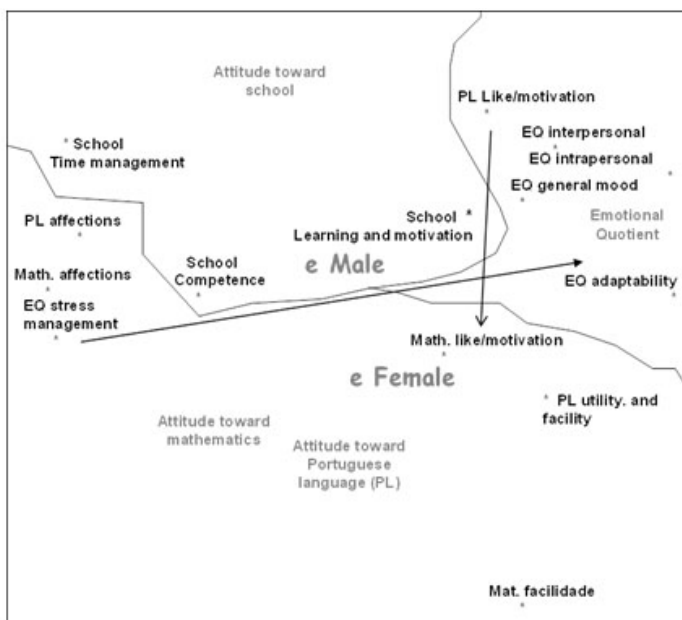
Fig. 1. SSA factor of the 4 scales for 1st LES considering as external variables (e) sex (1x2 Coordinated Solution 3-D, Coefficient of Alienation .08)..

7.2. 2nd level of elementary school (LES)

The configuration in Euclidean space to the SSA from the 2nd level (Figure 2) is organized in polar format, revealing the distinction between four regions. Here it appears that the EQ regions is placed in opposition to the region's attitude towards school, and region that mark the Attitude towards the Portuguese language is located in opposition to the region's Attitude towards mathematics. This shows how the four groups of variables are grouped in the four regions theoretically assumed.
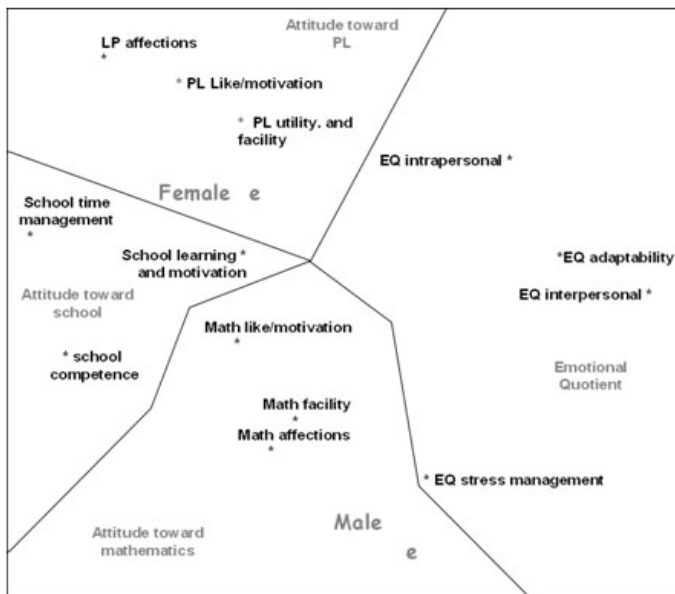
Fig. 2. SSA factor of the four scales for 2nd LES considering as external variables (e) sex (1x2 Coordinated Solution 3-D, Coefficient of Alienation .15).

7.3. 3rd level of elementary school (LES)

In the SSA considering the 3rd level students a polar structure can be observed dividing the plot in four regions (Figure 3). The Attitude towards mathematics forms a unique region with its factors, which are placed in the space in direct opposition to the Attitude towards the Portuguese language and closer to the external variable "male". Again emotional competence emerges on the opposite attitude towards school, even with the two factors that appear closer to the field of Attitude towards the Portuguese. Likewise Figure 2, this Figure shows how the four variables in study are grouped in the four regions theoretically assumed.

Stress Management from EQ arises at this map in a more central position, between the four facets in the study. The factor affects LP comes closest to school Learning and motivation than the other facet Attitude towards the Portuguese.

In this school lever, the external variable "female" is closer to the Portuguese language, but also to the intrapersonal competence. The female profile is mediated by emotion regulation (Intrapersonal EQ).
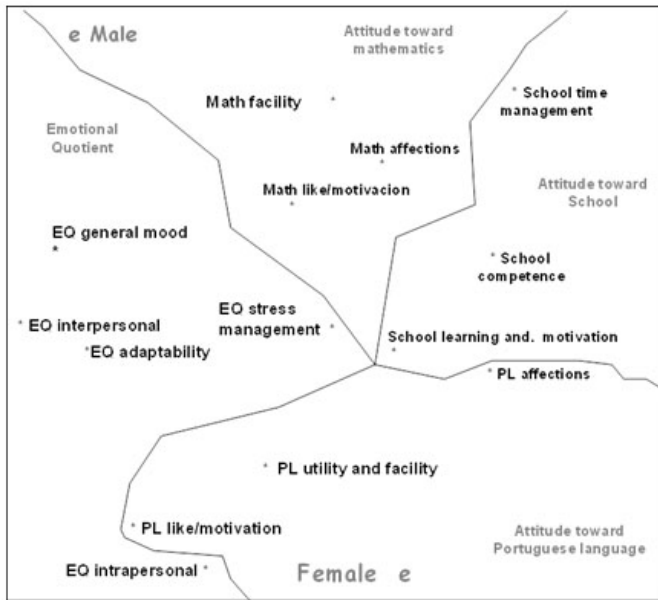
Fig. 3. SSA factor of the 4 scales for the 3rd LES considering as external variables (e) sex (1x2 Coordinated Solution 3-D, Coefficient of Alienation .14).

8. Discussion and Conclusion

At the 1st level of elementary school (LES), we found a profile characterized mainly by the separation of emotional competence, attitude toward school and attitude towards the subjects of Portuguese and Mathematics. That is, students do not have an attitude formed for each of the subjects in the study, which may be due to the fact that children in this study level are very optimistic about their ability to have good results in various areas, including those related to school work, such as reading and math (Eccles, 1999). The non-perception of competence by study areas comes from these students auto-evaluate the overall performance of the class and not just related to their actual abilities and performances. The judgments of competence in relation to the performances

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appear after the age of 10 and after that tend do progressively decline, leading students to avoid certain courses (Eccles, 1999).

In this level there is no typical male or female profile. In these ages is common that social comparison do not occur or that is just at the beginning (Jacobs, Lanza, Osgood, Eccles & Wigfield, 2002), or furthermore that there are not many opportunities to make these comparisons (Jacobs et al., 2002), in such a way that children will be guided to be interested in the disciplines considered more appropriate for their gender (Hill & Lynch, 1983).

In the 2nd LES it is possible to find two profiles, one featuring the female students and another featuring male student, and it is also visible the distinction of the four theoretical dimensions in this study. Thus, girls' attitudes are characterized by higher attitudes toward Portuguese language, more intrapersonal competence and general mood, motivation to learn more and better time management in school. At the other hand, boys have more positive attitudes in mathematics, improved stress management and more sense of responsibility to be at school. The emotional skills adaptability and interpersonal are equidistant and so are important for both profiles. These profiles should be noted that stress management comes closer to attitudes towards mathematics than emotional intelligence, demonstrating that the ability of the student to regulate their impulsivity is important to have a good attitude to mathematics.

In the 3rd LES results are similar to 2nd LES, that is, it is possible to differentiate between emotional intelligence, attitude towards school, attitude towards Portuguese language and attitude towards mathematics. Moreover, the males and females profiles are even more marked, as can be seen by the extreme positions of external variables. In this cycle, the female profile is characterized by more positive attitude to the Portuguese language, motivation for school learning and intrapersonal skills. The relationship between intrapersonal competence and like and be motivated to learn Portuguese language which occurs in girls can be explained by the content of the items. Factor Affects PL refers to joy, enthusiasm and tranquillity transmitted by this discipline and Intrapersonal Competence refers to self-knowledge of the emotions and the ability to assertively express, knowing and recognizing individual skills in a specific area. The male profile is characterized by positive attitudes towards mathematics, perception of time management in school and stress management while emotional competence. Students' choices are strongly influenced by their attitudes and performances in school subjects and these are, in turn, profoundly

influenced by school experiences that students have in these subjects (Nardi & Steward, 2003). Similarly, but on an emotional level, dissatisfaction or negative affect experienced in schools result of previous school experience.

Students with lower levels of engagement in learning tasks, those who perceive the subjects as unimportant or uninteresting to the world outside school and to their needs, interests and experiences, or those who perform the tasks but are not engaged, are those who have more negative attitudes, less investment and more negative emotions towards the school, and those with weaker performances. We can then say that what leads students to enjoy school are, not only the curriculum, but an environment promoter of self-discovery and global development that fosters continuity in school (Nardi & Steward, 2003).

Results presented here enable decision-makers on education policies, as well as teachers and students themselves, to set new goals and establishing specific learning procedures that fit the needs of all students.

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Cognitive Assessment System (CAS): Psychometric studies with Portuguese children from 7 to 15 years

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Abstract: The Cognitive Assessment System (CAS) is a new measure of cognitive abilities based on the *Planning, Attention, Simultaneous* and *Successive* (PASS) Theory. This theory is derived from research in neuropsychological and cognitive Psychology with particular emphasis on the work of Luria (1973). According to Naglieri (1999) and Naglieri and Das (1997), the PASS cognitive processes are the basic building blocks of human intellectual functioning. *Planning* processes provide cognitive control, utilization of processes and knowledge, intentionality, and self-regulation to achieve a desired goal; *Attention* processes provide focused, selective cognitive activity and resistance to distraction; and, *Simultaneous* and *Successive processes* are the two forms of operating on information. The PASS theory has had a strong empirical base prior to the publication of the CAS (see Das, Naglieri & Kirby, 1994), and its research foundation remains strong (see Naglieri, 1999; Naglieri & Das, 1997). The four basic psychological processes can be used to (1) gain an understanding of how well a child thinks; (2) discover the child's strengths and needs, which can then be used for effective differential diagnosis; (3) conduct fair assessment; and (4) select or design appropriate interventions. Compared to the traditional intelligence tests, including IQ tests, the Cognitive Assessment System (CAS) has the great advantage of relying on a modern theory of cognitive functioning, linking theory with practice.

In this paper we present the studies of the Portuguese adaptation of CAS with a sample of 240 elementary and middle school students. The aim of this work is to obtain the psychometric properties of the instrument, using the traditional psychometric parameters and non-metric multidimensional scaling techniques (SSA). Besides the Confirmatory Factor Analysis data were analyzed through Louis Guttman's SSA - a non-metric multidimensional scaling (MDS) procedure. CFA and SSA confirmed the psychometric qualities of CAS and identified the subscales and dynamic relationships between them. Finally, we discuss the findings and its implications for future use of CAS with Portuguese population.

1. Introduction

Since the initial formulation of the Binet and Wechsler scales, there has been a consolidation of thinking that intelligence is what these tests measure. It is important to consider, however, that the fact that IQ tests have remained stable during the 20th century does not contradict the evidence that the tests can be effective as measures of general intelligence. Where IQ tests fail is in situations when more information than the general IQ score is needed. In today's context, the content of the general intelligence test does not allow for sensitivity to the specific cognitive problems that underlie, for example, learning disabilities and attention deficits (Naglieri, 1999).

During the 20th century, but especially during the latter half, considerable research has been conducted on the construct of intelligence. In particular there has been much examination of specific abilities that extend beyond the concept of general, undifferentiated intelligence. But in the 1960s, in particular, a growing number of cognitive theorists studied neuropsychology, neuroscience, and higher mental processes. Described as the cognitive revolution (Naglieri, 1999), this movement had a substantial influence in theoretical psychology and more recently in applied psychology. The impact of the cognitive revolution was first felt with the publication of the Kaufman Assessment Battery for Children (Kaufman & Kaufman, 1983) and most recently with the publication of the CAS in 1997. These tests are based on cognitive, neuropsychological, and factorial views of intelligence studied by contemporary psychologists and have therefore been described as "non-traditional" because of the intent to link theory and practice (Naglieri & Das, 1997).

The CAS is a new measure of cognitive abilities based on the Planning, Attention, Simultaneous and Successive (PASS) theory. The PASS model is a neuropsychological and information-processing theory of cognition, and the CAS is the only test based entirely on this theory (see Das, Naglieri & Kirby, 1994 for more information).

The PASS theory is an alternative to approaches to intelligence that have traditionally included verbal, nonverbal, and quantitative tests. Not only does this theory expand the view of what "abilities" should be measured, but it also puts emphasis on basic psychological processes and precludes the use of verbal achievement-like tests such as vocabulary.

This PASS (Planning, Attention, Simultaneous and Successive) model of intelligence makes use of Luria's three functional units that are said to "work in concert, and necessary for any type of mental activity" (Naglieri & Readon, 1993).

According to Luria's PASS theory, there are three types of cognitive processes responsible for mental activity associated with three functional units of the brain. These processes refer to the mental activities which involved attention (first unit), simultaneous and successive processing (second unit), and planning (third unit) cognitive processes. The first functional unit, located in the brain stem and reticular activating system, provides the brain with the appropriate level of arousal or cortical tone for focused attention and resistance to distraction. The second functional unit (occipital-parietal and frontal-temporal areas of the brain) is responsible for "receiving, analyzing and storing information" using simultaneous and successive processing. The third functional unit is located in the frontal lobes of the brain and is responsible for planning, including the programming, regulation, and verification of behavior (Luria 1973, p. 67). This provides the capability for behavior such as asking questions and problem solving and the capacity for self-monitoring (Das et al., 1994).

Planning is a cognitive process that involves selecting and using strategies in decision making and problem solving. According to Naglieri and Das (1997), "planning is a mental process by which the individual determines, selects, applies, and evaluates solutions to problems". This process requires the ways to solve problems of varying complexity and may involve attention, simultaneous, and successive processes as well as knowledge. According to Naglieri (1999) planning is central to all activities in which there are both

intentionality and a need for some method to solve a problem. This process includes self-monitoring and impulse control as well as plan generation. Planning processes are involved in many school tasks.

Attention is a cognitive process that involves focus and concentration to stimulus when there are distractions. This functional unit concerns self directing, information selecting and persistence of responding. Naglieri and Das (1997) describe attention as "a mental process by which the individual selectively focuses on particular stimuli while inhibiting responses to competing stimuli presented over time". This process stresses on the demand of the tasks that involve focused, selective, sustained and effortful activity. According to Naglieri (1999), *focused attention* refers to directed concentration toward a particular activity. While *selective attention* requires the inhibition of responses to distracting stimuli. *Sustained attention* refers to the variation of performance over time which can be influenced by the different amount of effort required.

Simultaneous is a cognitive process which integrates several different stimuli into a whole. In this process, individual have to acquire the ability of making connections between the pieces to be an overall concept. According to Naglieri and Das (1997), "Simultaneous processing is a mental process by which the individual integrates separate stimuli into a single whole or group". The important key of this process is that the person must see how all the separate elements are interrelated in a conceptual whole. Simultaneous processing has strong spatial and logical dimensions for both nonverbal and verbal content. The spatial aspect refers to the perception of stimuli as a whole.

Successive is a cognitive process which applying existing information in more specific requirements. This process demands respondents to remember or use information that follows in a strict, defined order, especially serial and syntactical information. Naglieri and Das (1997) describe successive processing as "a mental process by which the individual integrates stimuli into a specific serial order that forms a chain-like progression".

The PASS processes form an inter-related system of cognitive processes or abilities that interact with an individual's base of knowledge and skills. For example, the child, in the early stages of reading, might use Planning processes when making decisions about what to read, finding the first page, and determining how to decode each word. Attention is needed to focus on the appropriate stimulus and ignore distraction. Simultaneous processing is involved in seeing the sentence as a whole, and Successive processing is

used to decode words and comprehend information on the basis of syntax or ordering of events. All PASS processes are involved, but at any point there may be a shift in the contribution each is making to the particular goal (Naglieri & Readon, 1993).

In order to operationalize the PASS theory, Naglieri and Das (1997) developed the CAS following a systematic and empirically based method to obtain efficient measures of the PASS processes that could be individually administered. There were several basic assumptions and goals when development of the CAS, which are as follows:

1. A test of intelligence should be based on a theory of ability;
2. The concepts of IQ, intelligence, aptitude, ability, or any other similar terms should be replaced with the concept of cognitive processes;
3. Before being considered as the foundation for a test, a possible theory of cognitive processing should be based on a sizable research base and have been proposed, tested, modified, and shown to have several types of validity;
4. A theory of cognitive processes should inform the user about those specific abilities that are related to academic successes and failures, have relevance to differential diagnosis, and provide guidance to the selection and/or development of effective programming for intervention;
5. A test of cognitive processing should evaluate an individual through items that are as free from acquired knowledge as possible.

The CAS was standardized on a sample of children representative of the U.S. on the basis of race, gender, parental education, geographic location, community setting, and educational placement. The standardization sample was comprised of 2,200 children aged 5 to 17 years. The average Basic Battery reliability coefficients are as follows: Full Scale (.87), Planning (.85), Attention (.84), Simultaneous (.90), and Successive (.90) (Naglieri & Das, 1997).

Numerous studies have shown that measures of processes PASS enjoy construct validity and are related significantly with academic performance. Naglieri (1999) summarized much of this research and concluded that tests based on the PASS theory: (i) are sensitive to the problems shown by children with attention deficit disorder and reading recoding disabilities;

(ii) relate to academic achievement; and (iii) have relevance to intervention and instruction.

The purpose of this study was to examine the structure of CAS with a Portuguese sample of 240 elementary and middle school, using the traditional psychometric parameters and non-metric multidimensional scaling techniques (SSA). We will verify if the construct of constructs of planning and attention as described in the PASS theory of information processing are interdependent processes, questioning the separation of planning and attention processes. Consequently a three dimensional model would be better than a four-factor model, implying the key focus is to treat planning and attention as a variation of speed. If a three dimensional model would result confirmed we will give support to the argument recently advanced by Kranzler, Keith, and Flanagan (2000), which essentially faults the Das-Naglieri Cognitive Assessment System (CAS; Naglieri & Das, 1997) as being unrepresentative of the four cognitive constructs of planning, attention, simultaneous, and successive processing.

Several factor analytic methodologies were utilized to assess the underlying structure of the CAS and provide support for the test`s validity. Confirmatory factor analysis included the assessment of the fit of the PASS model and the comparison of the PASS model to alternative models. Besides the Confirmatory Factor Analysis data were analyzed through Louis Guttman's SSA - a non-metric multidimensional scaling (MDS) procedure.

2. Method

2.1. Participants

The sample included 240 students (120 boys, 120 girls), ages 7 to 15 (M = 10.44 years; SD = 2.63 years), from the general education classes of elementary and middle schools in Portugal. Roughly, equal samples were taken from each of four grades: 2nd year of elementary school (age 7/8, n=60), 4th year of elementary school (age 9/10, n=60), 6th year of middle school (age 11/12, n=60) and 9th year of middle school (age 13/15, n=60). None of the participants was receiving special education services.

2.2. Instrument

The Cognitive Assessment System (CAS) was developed to assess the PASS cognitive processes of children and adolescents (Naglieri & Das, 1997). The basic CAS battery consists of 8 subtests. The PASS processes are reflected in four scales that include the following subtests: *Planning*: Matching Numbers (MN) and Planned Codes (PC); *Attention:* Expressive Attention (EA) and Number Detection (ND); *Simultaneous:* Nonverbal Matrices (NVM) and Verbal-Spatial Relations (VSR); and Successive: Word Series (WS) and Sentence Repetition (SR). PASS scale scores are based on an equally weighted composite of the subtests underlying each respective scale. Naglieri and Das (1997) stated that the PASS scale scores can be used to identify cognitive processing strengths and weaknesses. The Full Scale (FS) score is based on an equally weighted aggregate of the PASS subtests and is interpreted as an estimate of overall cognitive functioning. Further information on the PASS theory, organization of the scales, and development of subtests can be found in the *Interpretative Handbook* (Naglieri & Das, 1997, p.1-25). Additional information can be found in Das, Naglieri & Kirby (1994) and in Naglieri (1999).

2.3. Procedure

The school director, teachers and parents authorized the study. All sub-tests of CAS were administered and scored according to standardisation guidelines as prescribe in the respective test manual. The administration time is approximately one hour (one session).

3. Results

3.1. Descriptive statistics and reliability analysis

Table 1 shows the statistical indices (means, standard deviations, skewness and kurtosis) of the raw results obtained for the 8 subtests from Basic Battery CAS, namely: *Planning:* Matching Numbers (MN) and Planned Codes (PC); *Attention:* Expressive Attention (EA) and Number Detection (ND); *Simultaneous:* Nonverbal Matrices (NVM) and Verbal-

Spatial Relations (VSR); and Successive: Word Series (WS) and Sentence Repetition (SR). All the subtests have an adequate Skewness and Kurtosis values (bellow 3 and 7, cf. Kline, 1998), which indicate that the results follow a normal distribution.

To study the reliability was used the internal consistency analysis by the split-half method for all Simultaneous and Successive subtests. These coefficients were corrected using the Spearman-Brown formula. Test-retest reliability was considered the most appropriate reliability estimate for the Planning and Attention subtests because these tests involved time. The coefficients ranging from .77 to .92, with an average reliability of .83 (see Table 1). These reliability coefficients also meet the standards suggested by Bracken (1987).

Table 1. Descriptive statistics and reliability for the CAS subtests (based on raw data)

CAS Subtests	Mean	SD	Skewness	Kurtosis	Reliability
Planning: MN	9.98	4.648	1.357	3.077	.89
Planning: PC	53.92	27.759	1.228	1.793	.90
Simultaneous: NVM	18.70	5.809	.173	-.940	.92
Simultaneous: VSR	16.16	3.595	.511	.341	.79
Attention: EA	43.53	16.114	.796	1.242	.84
Attention: ND	53.16	18.347	.635	.336	.77
Successive: WS	10.88	2.583	.645	.822	.79
Successive: SR	7.63	2.263	.078	-.308	.77

3.2. Construct Validity

The progression of scores across age is "a major criterion employed in the validation of a number of traditional intelligence tests" (Anastasi, 1988, p. 153). For this reason, these values are presented in Table 2. The raw scores presented in table 2 demonstrate that the CAS subtests show appropriate changes with age.

Table 2. CAS subtest Mean Raw Score Changes by Age for the Sample (N = 240)

Ages	N	MN	PC	NVM	VSR	EA	ND	WS	SR
7/8	60	5.57	28.68	14.37	14.40	29.97	34.78	9.80	6.40
9/10	60	8.17	40.50	16.90	15.23	37.02	46.13	10.12	7.05
11/12	60	10.93	58.40	19.50	16.45	45.07	58.80	11.32	8.28
13/15	60	15.25	88.08	24.02	18.55	62.05	72.93	12.27	8.80

In Table 3 we presented the correlations (*Pearson product-moment coefficient*) between the standardized results of the CAS subtests. These correlations provide information about the interrelationships among the various CAS subtests. The results show the evidence of the convergent and discriminant validity.

Table 3. Intercorrelations of CAS Subtests Scores (N = 240)

CAS Subtests	1	2	3	4	5	6	7
Planning: MN	1						
Planning: PC	.40**	1					
Simultaneous: NVM	.28**	.21**	1				
Simultaneous: VSR	.14*	.18**	.35**	1			
Attention: EA	.28**	.26**	.30**	.33**	1		
Attention: ND	.43**	.41**	.18**	.17**	.31**	1	
Successive: WS	.22**	.17**	.27**	.32**	.23**	.09	1
Successive: SR	.33**	.24**	.32**	.33**	.28**	.21**	.72**

$* = P< 0.05$ $** = P< 0.01$

With the purpose of verify if the CAS structure stayed in the study population, we applied Confirmatory Factor Analysis (CFA). The analysis has been performed with AMOS 21.0. The data was previously standardized. We used the procedure of Maximum Likelihood (ML) as an estimation method, which is better suited in terms of the statistical processing for relatively small samples (200 to 500 subjects). Fit indices chosen were chi-square analysis, CFI (*Comparative Fit Index*), TLI (*Tucker Lewis Index*), RMSEA (*Root Mean Square Error of Approximation*) and AIC (*Akaike Information Criterion*), taking the indices suggested in the literature (Bentler, 1992; Marôco, 2010). We've considered the following values indicative of good fit: CFI and TLI $\geq$ .90; $\chi2/gl$

≤ .02 and RMSEA < .08. The values of AIC are used for comparing models it is desirable to obtain low values, usually associated with most suitable models (MacCallum and Austin, 2000).

As displayed in the Figure 1, the model derived from the PASS theory provided a acceptable factor structure (χ^2 (14) = 28,553, p = .012, χ^2 / df = 2.040, CFI = 0967; GFI = 0.971, RMSEA = .066, P [rmesea <0.05] = .202). To highlight that all the factorial weights are beyond .05 and R^2 > 0.25. The four factors have significant positive correlations, there is a strong correlation between the Planning and Attention (r =. 99).
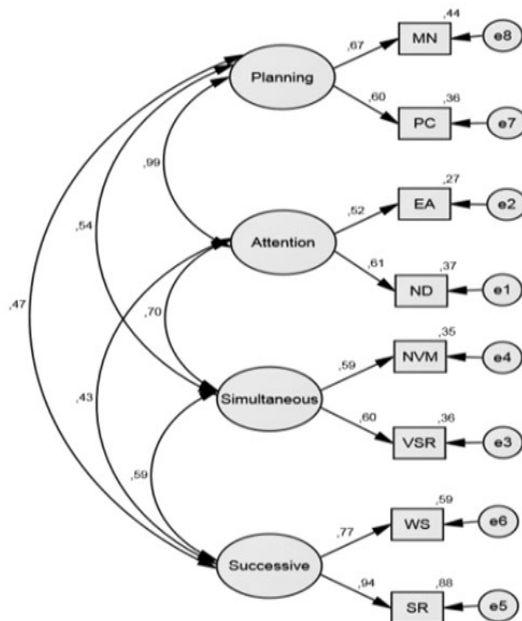
Fig. 1. Confirmatory Factorial Model PASS

Confirmatory factor analysis was used also to assess the comparative fit of two kind of models: (i) Hierarchical and (ii) Non-hierarchical. First, we propose to test the hierarchical model (PASS + g) with our sample. In accordance to Kranzler and Keith (1999) studies, based on Confirmatory Factor Analysis to look at CAS tests, revealed that "they do not support the construct validity of the CAS", suggesting that the constructs measured by CAS are related and that planning and attention are indistinguishable. These authors (p. 26) also

believe that "planning and attention are indications of processing speed" and that "successive scale is a measure of short-term memory."

The test of hierarchical model (PASS + g), using CFA are provided in Table 4, and shows values of chi-square and RMSEA higher and CFI and TLI values lower. The lowest AIC for non-hierarchical PASS model indicates that this model is more suitable; underline the arguments from Naglieri and Das (1995).

Table 4. Comparison of Models of the CAS.

Models	χ^2	df	χ^2/df	TLI	CFI	RMSEA	AIC
PASS model	28.553*	14	2.040	.934	.967	.066	72.553
Hierarchical PASS model	42.907*	16	2.682	.894	.939	.084	82.907

Second, we test several non-hierarchical models: a one-factor model – all subtests comprising one factor; a two-factor model – Planning and Attention subtests comprising one factor and Simultaneous and Successive subtests including a second factor [(PA)(SS)]; a three-factor model – Planning and Attention subtests involving one factor, Simultaneous subtests comprising a second factor, and Successive subtests a third factor [(PA)SS]; and the four-factor PASS model. Results from these analyses are provided in Table 5.

Table 5. Comparison of Models of the CAS

Models	χ^2	df	χ^2/df	TLI	CFI	RMSEA	AIC
(PASS)	147.979**	20	7.399	.595	.711	.164	179.979
(PA)(SS)	58.802**	19	3.095	.868	.910	.094	92.802
(PA)SS	31.239*	17	1.838	.947	.968	.059	69.239
PASS	28.553*	14	2.040	.934	.967	.066	72.553

*$p<.05$ **$p<.01$

The chi-square values, TLI and RMSEA for the one factor model indicated poor fit to the data. Each successive model displayed a decrease in the chi-square values. The four factor PASS model resulted in the lowest chi-square values; but, the (PA)SS model presents the highest values of TLI and CFI and lower RMSEA. AIC values indicate that the model (PA)SS is the most suitable (see Table 5).

As we could observe, these results afford support for a four or three factor PASS solution. This distinction between the three and four factor solution, previously stated by experimental versions of CAS designed according to the PASS theory (Kranzler & Weng, 1995a, 1995b; Naglieri & Das, 1995). The decision to derive separate Planning and Attention Scales has been based on theoretical, empirical, and clinical grounds.

As example, we could mention Luria (1973) that differentiated between the first functional unit responsible for cortical tone and "specialized forms of activation or of directed selective attention" (p.265) and the third functional unit, which deals with the creation of plans and verification of activity. Another contribution derives from Barkley (1996) which proposes that behavioural disinhbition plays the central role in attention-deficit/hyperactivity disorders and the several executive functions are secondarily impaired, including one that is critically related to planning.

Naglieri and Das (1997, p. 59) summarize that distinction underline that: "planning and attention have been described as separate but interwoven processes, and the CAS results mirror this complex relationship". According Naglieri and Das (1997), the application of four constructs separately according to the theoretical perspective described in PASS Theory, has a considerable clinical utility, especially with studies conducted with special groups (such as mental retardation, learning disabilities, traumatic brain injuries, attention deficit disorders and for severe emotional disorders). The results of such studies suggest the importance of the distinction between planning and attention, as well as simultaneous and successive processes to make assessment and to plan intervention.

3.3. SSA

In order to verify the empirical structure of the Cognitive Assessment System (CAS) that is a new measure of cognitive abilities based on the

P*lanning, Attention, Simultaneous* and *Successive* (PASS) Theory data were analysed using Louis Guttman's SSA - a non-metric multidimensional scaling (MDS) procedure. SSA (Smallest Space Analysis our Similarity Structure Analysis; Guttman, 1968) is a technique for structural analysis of similarity data. It provides a metric representation of nom-metric information based on the relative distances within a set of points. Each variable is represented by a point in a Euclidean space of one or more dimensions. The points are plotted in the space of smallest possible dimensionality which preserves the rank order of the relations.

The distance among the points are inversely related to the observed relationships among the variables as defined by the correlations coefficients. When the correlation between two variables is high, the distance between them should be relatively small; on the other end, when the correlation between two variables is low, the distance between their geometric points should be relatively large. This method has been successfully applied in various studies to verify structural hypotheses (e.g., Canter, 1986; Guttman, 1959).

When the SSA dimensionality is higher than two, the program prints out a series of two dimensional plots of the multidimensional configuration. The structure of the relationships among items can readily be examined by considering the configuration of the points. When there is an a priori definitional framework suggested, it is possible to examine whether the space can be partitioned into regions that reflect the facets and their elements. The division into regions is accomplished by introducing partition lines according to the facet definition of the items.

In the previous analysis using Confirmatory factor analysis results supports a non-hierarchical models for a four or three factor PASS solution [PASS and (PA)SS, respectively). Based on these results we would expect to find a non-ordered partition with Planning and Attention subtests very closed together in one region. Another aspect non detected by CFA is the fact that some subtest involve words (3: *Successive*-Word Series, *Successive*-Sentence Repetition and *Successive*-Verbal-Spatial Relations) and not involving words (5: *Simultaneous*-Nonverbal Matrices, *Planning*-Matching Numbers, *Planning*-Planned Codes, *Attention*-Expressive Attention and *Attention*-Number Detection). We would also expect in this case a separation in two regions of this type of facet.

Figure 2 presents a two-dimensional projection of the SSA space derived from the intercorrelation matrix (Monotonicity Coefficient – see Table 6) of the eight substests of the Cognitive Assessment System (CAS). As we expected the structural organization of the SAC's subtests shows a configuration of polar type, which implies the absence of a sequence, consisting of three distinct regions; a region where the subtests of the Planning and Attention Scales, another region with the Successive Scale subtests and third region with Simultaneous Scale subtests. This structural organization in which the Planning and Attention subtests located together in one region, had already been detected in the Confirmatory Factor Analysis, having been discussed as well.

Table 6. Intercorrelations among the eight subtests of the Cognitive Assessment System (CAS) (Monotonicity Coefficient)

Subtests	1	2	3	4	5	6	7	8
1. Successive: Sentence Repetition	100							
2. Successive: Word Series	89	100						
3. Attention: Number detection	32	15	100					
4. Attention: Expressive Attention	44	36	50	100				
5. Simultaneous: Verbal-Spatial Relations	37	31	9	33	100			
6. Simultaneous: Nonverbal Matrices	47	41	26	44	45	100		
7. Planning: Planned Codes	38	27	58	40	18	33	100	
8. Planning: Matching Numbers	46	33	59	47	15	46	51	100

Decimals were omitted

The nature and content of the tasks that constitute the subtests of Planning and Attention may justify their proximity, as the results in these subtests depend not only on the number of right answers but also on the runtime, which requires processing speed. On the other hand, they are all nonverbal content subtests.

Given the spatial placement of the Successive Scale's subtests, it appears that besides these subtests belong to a clearly defined region which is detached from the others, the distance between these two subtests is minimal, given that they exhibit a strong correlation. A possible explanation could be that these subtests present identical nature and content (repetition of words and repetition of phrases).

On the other hand, the Simultaneous Scale subtests appear in the same region but slightly apart from each other: the Nonverbal Matrices subtest is

nearer the Planning and Attention Scales because of their non-verbal nature; and the Verbal-Spatial Relations subtest is more distanced from all others, since it has a verbal content (which brings it closer to the Successive Scale subtests) and requires at the same time the establishment of spatial relationships, as the Nonverbal Matrices subtest does. Thus a further facet it is possible to be detected: items involving verbal content and items involving non-verbal content. On the right side of the map verbal content items and on the left side non-verbal content items
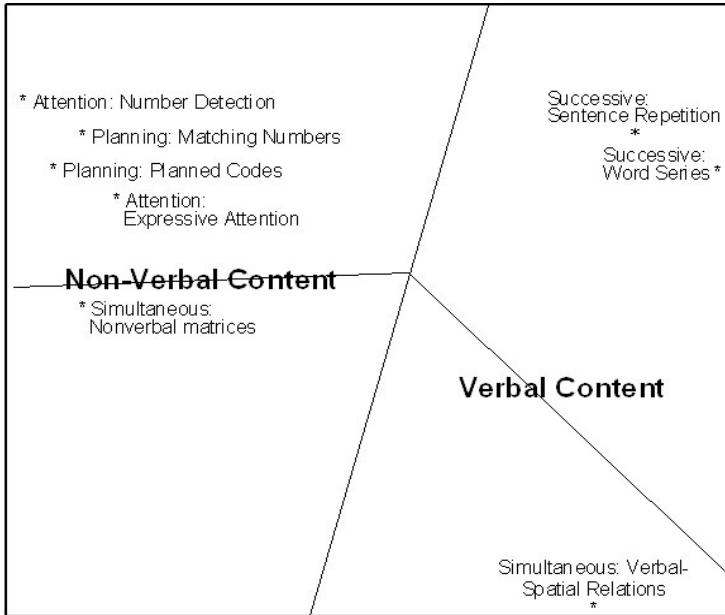
Fig. 2. SSA Map of the eight subtests of the Cognitive Assessment System (CAS) (2-D, coefficient of alienation .08).

4. Discussion

By observing the results obtained through CFA and SSA it can be seen that the hypotheses were basically supported by the empirical data. The type of unordered axial partitioning indicates that we cannot point out a subtest as more important than the others, they are all equally important for the structure in question, considering a non-hierarchical organization.

It is interesting also to point out that the constructs of planning and attention as described in the PASS theory of information processing are interdependent processes, questioning the separation of planning and attention processes. A three dimensional model (Kranzler et al. 2000) seems better than the previously established four-factor model (Naglieri & Das, 1997), implying the key focus is to treat planning and attention as a variation of speed.

We can question in such a way a four-factor model as less strong, suggesting that there is good reason to choose the three-factor model that combines attention with planning, that it is possible to be clearly confirmed in the SSA map.

In the end, facet analysis based on Intercorrelations among CAF items, allowed to reveal the underlying empirical structure of the PASS Theory confirming what found in CFA and and expanding our knowledge about the Cognitive Assessment System (CAS). Thus, notwithstanding there are some similarities between CFA and SSA as both as applied in order to explore the structure of items, nevertheless a facet approach using SSA allowed a deeper understanding of this structure, being more parsimonious and allowing to reach more holistic conclusion from the results.

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Appendix

Planning Scale.

<u>Matching Numbers</u> (MN) consists of four pages, each containing eight rows of six numbers per row. The child is instructed to underline the two numbers in each row that are the same. Numbers increase in length from one digit to seven digits across the four pages, with four rows for each digit length. Each item has a time limit. The subtest score is based on the combination of time and number correct for each page.

<u>Planned Codes</u> (PC) contains two pages, each with a distinct set of codes and arrangement of rows and columns. A legend at the top of each page shows how

letters correspond to simple codes (e. g. , A, B, C, and D correspond to OX, XX, OO, and XO, respectively). Each page contains seven rows and eight columns of letters without codes. The child is instructed to fill in the appropriate code in the empty box beneath each letter. On the first page, all the As appear in the first column, all the Bs in the second column, all the Cs in the third column, and so on. On the second page, letters are configured in a diagonal pattern. The child is permitted to complete each page in whatever fashion he or she wishes. The subtest score is based on the combination of time and number correct for each page.

Attention Scale.

Expressive Attention (EA) uses two different sets of items depending on the age of the child. Children 8 years and older are presented with three pages. On the first page, the child reads color words (i. e. , BLUE, YELLOW, GREEN, and RED) presented in quasi-random order. Next, the child names the colors of a series of rectangles (printed in blue, yellow, green, and red). Finally, the words BLUE, YELLOW, GREEN, and RED are printed in a different color than the colors the words name. The child is instructed to name the color ink the word is printed in rather than to read the word. Performance on the last page is used as the measure of attention. The subtest score is based on the combination of time and number correct.

Number Detection (ND) consists of pages of numbers that are printed in different formats. On each page, the child is required to find a particular stimulus (e. g. , the numbers 1, 2, and 3 printed in an open font) on a page containing many distractors (e. g. , the same numbers printed in a different font). There are 180 stimuli with 45 targets (25% targets) on the pages. The subtest score reflects the ratio of accuracy (total number correct minus the number of false detections) to total time for each item summed across the items.

Simultaneous Scale.

Nonverbal Matrices (NVM) is a 33-item subtest that uses shapes and geometric designs that are interrelated through spatial or logical organization. The child is required to decode the relationships among the parts of the item and choose

the best of six options to occupy a missing space in the grid. Each matrix item is scored as correct or incorrect. The subtest score is based on the total number of items correctly answered.

Verbal-Spatial Relations (VSR) consists of 27 items that require the comprehension of logical and grammatical descriptions of spatial relationships. The child is shown items containing six drawings and a printed question at the bottom of each page. The items involve both objects and shapes that are arranged in a specific spatial manner. For example, the item, "Which picture shows a circle to the left of a cross under a triangle above a square?" includes six drawings with various arrangements of geometric figures, only one of which matches the description. The examiner reads the question aloud, and the child is required to select the option that matches the verbal description. The child must indicate his or her answer within a 30-s time limit. The subtest score reflects the total number of items correctly answered within the time limit.

Successive Scale

Word Series (WS) requires the child to repeat words in the same order as stated by the examiner. The test consists of the following 9 single-syllable, high-frequency words: Book, Car, Cow, Dog, Girl, Key, Man, Shoe, Wall. The examiner reads 27 items to the child. Each series ranges in length from 2 to 9 words. Words are presented at the rate of 1 word per second. Items are scored as correct if the child reproduces the entire word series. The subtest score is based on the total number of items correctly repeated.

Sentence Repetition (SR) requires the child to repeat 20 sentences that are read aloud. Each sentence is composed of color words (e. g. , "The blue is yellowing"). The child is required to repeat each sentence exactly as presented. To help reduce the influence of simultaneous processing and accent the demands of the syntax of the sentence color words are used so that the sentences contain little semantic meaning. An item is scored as correct if the sentence is repeated exactly as presented. The subtest score reflects the total number of sentences repeated correctly.

Social competence and emotion comprehension: How are they related in children?

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Abstract: The developmental progression of emotional competence in childhood provides a robust evidence for its relation to social competence and important adjustment outcomes. This study aimed to analyze how this association is established in middle childhood. For this purpose, we tested 182 Portuguese children aged between 8 and 11 years, of 3rd and 4th grades, in public schools. Firstly, for assessing social competence we used an instrument directed for children using critical social situations within the relationships with peers in the school context - *Socially in Action-Peers* (SAp) (Rocha, Candeias & Lopes da Silva, 2012); children were assessed by three sources: themselves, their peers and their teacher. Secondly, we assessed children's emotion understanding, individually, with the *Test of Emotion Comprehension* (Pons & Harris, 2002; Pons, Harris & Rosnay, 2004). Relations between social competence levels (in a composite score and using self, peers and teachers' scores) and emotion comprehension components (comprehension of the recognition of emotions, based on facial expressions; external emotional causes; contribute of desire to emotion; emotions based on belief; memory influence under emotional state evaluation; possibility of emotion regulation; possibility of hiding an emotional state; having mixed emotions; contribution of morality to emotion

experience) were investigated by means of two SSA (Similarity Structure Analysis) - a Multidimensional Scaling procedure and the external variable as points technique. In the first structural analysis (SSA) we will consider self, peers and teachers' scores on Social Competence as content variables and TEC as external variable; in the second SSA we will consider TEC components as content variables and Social Competence in their different levels as external variable. The implications of these MDS procedures in order to better understand how social competence and emotion comprehension are related in children is discussed, as well as the repercussions of these findings for social competence and emotion understanding assessment and intervention in childhood is examined.

1. Introduction

Several theoretical and empirical evidences have underlined the connection between social competence and emotional competence in children (Alves, 2006; Denham, Blair, DeMulder, Levita, Sawyer, Auerbach-Major & Queenan, 2003; Halberstadt, Denham, & Dunsmore, 2001; Hubbard & Coie, 1994; Izard, Fine, Schultz, Mostow, Ackerman & Youngstrom, 2001; Machado, Veríssimo, Torres, Peceguina, Santos & Rolão, 2008; Mostow, Izard, Fine & Trentacosta, 2002; Santos, 2012; Saarni, 1999).

There is a large panoply of definitions of social competence, some of them are quite broad, others quite specific. In this article we adopt the model of social competence of Ford (1982; Tisak & Ford, 1983). For Ford (1982), social competence is defined by "*the attainment of relevant social goals in specified social contexts, using appropriate means and resulting in positive developmental outcomes*" (p. 323). According to the scope of this research, the goal is related to being able to act effectively in social challenging situations with other people, in this case with peers. Our focus in this paper is on children's adjustment with peers within the school context. Through relationships with peers, children have the opportunity to develop social skills relevant to their harmonious development.

Saarni's model of emotional competence considers that this competence is inextricable form social competence. Emotion understanding is one relevant domain of emotion competence, and is conceptualized as a children's general sociocognitive understanding of perspective taking, desire

beliefs, intentions understanding related to emotions in their selves and others (Harris, 1989; 2008). In order to have an understanding of emotions there are two essential aspects: awareness (manifested in different forms: reporting, anticipating, hiding or change the emotional state) and the identification and understanding of others' emotions. Harris (1989, 2008) proposes a number of types of consciousness: (a) about 1 year of age, children begin to recognize the emotional states that are directed, (b) by 3 years they begin to realize that people choose what they do according to their beliefs / desires, as well as begin to make sense of emotion (in self and others), (c) 4-6 years: understanding that emotional expression may not be a direct reflection of the state emotional (eg, are able to perceive the concealing of expressions), (d) from 6/7 years: the moral standards begin to be important in understanding that children have on emotion, (and) finally, later arises the understanding that is possible to modify the emotion, first by hiding the expression and then modifying the state itself.

The existence of a large panoply of definitions of emotion competence, in general, and understanding, in particular, has led to a lack of consensus and, consequently, to methodological limitations in research plans, and also to assessment and intervention in emotional competence. Several decades of research on emotional development has underlined the contribution of several domains to emotion understanding in childhood. Based on this research, Pons and colleagues (Pons & Harris, 2002; Pons, Harris & Rosnay, 2004) have proposed the *Test of Emotion Comprehension* (TEC) which assesses nine domains of emotion understanding, namely the comprehension of the recognition of emotions, based on facial expressions; external emotional causes; contribute of desire to emotion; emotions based on belief; memory influence under emotional state evaluation; possibility of regulation emotion; possibility of hiding an emotional state; having mixed emotions; contribution of morality to emotion experience. These 9 components have a developmental orientation, following 3 stages: one external phase (3-6 years old), one mental phase (5-9 years old) and on reflexive phase (8-11 years old).

In this study we intend to assess how social competence in children appears associated to the understanding of emotions. Thus, we expect that children with a higher level of understanding of emotions have also a higher level of social competence. Besides, we intend to explore how the different components of emotion understanding (assessed by TEC) are related to social competence (assessed by SAp, in general and by the 3 referred raters).

2. Method

2.1. Sample

Data was collected in three public elementary schools in a Portuguese city (Évora - 50.000 habitants). Students from 10 classes from 3rd and 4th grade (5 classes each grade) were invited to participate in this study. 88,5% obtained parental consent to participate. Students with severe education needs were excluded from sample.

The final sample is constituted of 182 children aged between 8 and 11 years (M = 8,81; SD = 0,77); 52,7% (n=96) are boys and 47,3% (n=86) are girls; 51,6% (n=94) are from 3rd grade and 48,4% (n=88) from 4th grade. 7 children (3,85%) are from other nationality other than Portuguese (e.g., from eastern Europe countries, German, Dutch, Brazilian), but all are fluent in Portuguese. Finally, regarding the schooling (number of years) of the children's mothers (which is considered a good index of socioeconomic status), 1,1% (n=2) are analphabets; 16,48% (n=30) have elementary school; 10,99% (n=20) have middle school; 32,97% (n=60) have secondary school; 36,81% (n=67) have higher education (8,96%, n= 6, of which have masters; and 2,99%, n=2, have PhD), and 2,2% (n=4) have not responded.

Considering that only 5 children have 11 years, they have been inserted on the group of 10 years.

2.2. Instruments

2.2.1. Test of Emotion Comprehension

The Test of Emotion Comprehension (TEC, Pons & Harris, 2000; Pons, Harris & Doudin, 2002; Pons, Lawson, Harris & de Rosnay, 2004) is divided into a sets of stories in an established order. The test evaluates the following components (corresponding to the theoretical dimensions of understanding of emotions): understanding of the (1) recognition of emotions based on facial expressions, (2) external causes of emotions (e.g., being sad when a pet dies), (3) assigning a desire as cause an emotion; (4) the role of beliefs in determining emotions, (5) the influence of memory in

circumstances of assessment of emotional states, (6) the ability to regulate emotions, (7) the ability to hide or conceal an emotion; (8) that a person can have mixed emotions (e.g., happiness and fear at the same time) in relation to a given situation, and (9) the role of morality in emotions.

There is a version for boys and girls, and it consists of a booklet of illustrations with a story that is read for each situation and in every sheet are presented four possible outcomes represented by emotional facial expressions (there five options: happy, sad, angry, afraid, OK). The children are asked to assign an emotion represented by a facial expression to the situation. The instrument is also available in computerized format, where questions and stories are narrated by a female voice. The scoring is made automatically by the computer application. In this study we used the computerized format, only the male version, since this is the only available up to now for the European Portuguese.

Children's responses are nonverbal, considering that cross-cultural studies establish that facial expressions related to situations are similar across cultures. This test has been used in many countries around the world, being translated into 15 languages, is now being adapted into Portuguese (Portugal and Brazil).

This test can be used with children aged 3 to 11 years. Each child can get a score between 0 and 9.

2.2.2. Socially in Action-Peers

The instrument consists of six critical hypothetical social situations (one of them is an example for training) that require a variety of behavioral, emotional and cognitive skills. This version *Socially in Action-Peers* (SAp) (Candeias & Almeida, 2005; Candeias, Rebocho, Pires, Franco, Barahona, Franco, Santo, Oliveira & Pereira, 2008; Candeias & Rocha, 2012) was prepared taking into account issues of social development in terms of social interaction with peers relevant for this stage of development (Denham, 2007; Dodge, McClasky & Feldman, 1985; Waters & Sroufe, 1983). In general terms, the SAp assesses social competence in children in critical social situations with peers in the school context, in intimate situations and informal: E. Spokesman situation (example); 1. Group work situation; 2. Integrating a new classmate

situation; 3. Leading a group situation; 4. Visiting a sick classmate situation, and 5. Conflict situation; all available on Appendix).

Each child was evaluated in each situation by the three sources in order to obtain a panoramic assessment. Firstly, the child makes a self-assessment of her perceived competence in each of the situations, using a Likert-type scale (bad -1, medium - 2 and good - 3). In other versions of the SAp children were also asked about the perceived difficulty of each situation, which has been eliminated in this version to facilitate the questions comprehensibility, since children tended to confuse performance to difficulty. Then, each child is asked to nominate three colleagues (boys or girls, without needing to rank them) in her class perceived as the most competent to resolve each situation. Finally, the teacher evaluates the performance of each child using the same scale as the one used in self-evaluation version. In the format of peer assessment, we used the method of positive nominations instead of the evaluation of all classmates, because we felt that in developmental terms it would be difficult for these children to do it in a discriminant way to all colleagues.

For the instrument's scoring, example situation is not considered in the calculation of scores, as long as it has been used in order to help children to get familiarized with the test and the answer format. Several scores may be obtained for each child: (1) scores per rater, which consists on the sum of the five situations made by each rater (self, peers and teachers); (2) scores by situation, which consists on the mean of three sources scores in each situation; (3) composite score of social competence: which consists on the global mean of the three sources in all situations. In the case of peer assessment we counted the number of nominations that each child had in each situation. Since the classes in which children were placed had different number of students, t scores were calculated for each situation raw result. Cumulatively, considering that this procedure was going to generate different magnitudes in inter-rater metrics, we also calculated t scores for the self and teacher's ratings.

Finally, and to increase the predictive ability of the instrument, since each rater has systematic biases in their assessment, as result of the perceived (ir)relevance of certain behavioral data and the same selective attention, and considering the recommendations of previous studies (Ford, 1982; Waters & Sroufe, 1982); we calculated the composite score of social competence. Thus, it is possible to have a composite vision and also a specific one according to the perspective of different social actors.

2.3. Procedure

Prior to data collection, authorization for this study was obtained from the Ethical Panel of the Portuguese Ministry of Education, the National Commission for Data Protection, the three schools' principals, and finally, permission from parents of each child.

Data collection took place between March and June 2012. The administration of these tools is part of a larger study that sought to examine the relationship between the understanding of emotions, social competence and emotion regulation in children.

Regarding the administration of TEC, it was done individually with each child in a quiet place, using a laptop computer. The instructions were explained to the child and were clarified their doubts. The stories of the instruments and their questions were in European Portuguese by a female voice. After each question, the child chose the correct answer, and automatically passed to the next story. The computer application automatically recorded and quoted the child's response, which were then exported to SPSS. The administration of TEC took about 15 to 20 minutes with each child. Scoring procedure on component IV (*belief*) was changed in order to make the results more similar to the original ones, the same way the Italian adaptation did (either answers happy or OK were considered correct). This decision has been made because about 30% of all children answered OK, which seems also a plausible answer to us do to the fact that is also possible in terms of content (it's possible for the rabbit to feel ok) and to the fact that the Portuguese word for OK ("bem") may induce an use as synonymous of *happy*.

The SAp was administered in group in the classroom in the presence of the class teacher. We explained the study purpose to the children, assuring data confidentiality and voluntary participation. The instructions and situations were read aloud by the researcher and the children accompanied the reading. Firstly, the children made their self-assessment, and then they did the nominations of peers for each situation, situation to situation sequentially. Finally, a form was distributed to the teacher with the same situations. The administration of this instrument took approximately 30 to 45 minutes per class. Scoring was done according to the procedure described above.

Finally, children's results were reported back to their parents who have expressed will to know about it.

Data analysis was performed on SPSS 20.0. Hundap was used for the the "External variables as points technique" in SSA.

3. Results and discussion

3.1. Traditional analysis

Several theoretical and empirical evidences have underlined the connection between social competence and emotional competence in children (Alves, 2006; Denham, Blair, DeMulder, Levita, Sawyer, Auerbach-Major & Queenan, 2003; Halberstadt, Denham, & Dunsmore, 2001; Hubbard & Coie, 1994; Izard, Fine, Schultz, Mostow, Ackerman & Youngstrom, 2001; Machado, Veríssimo, Torres, Peceguina, Santos & Rolão, 2008; Mostow, Izard, Fine & Trentacosta, 2002; Santos, 2012; Saarni, 1999).

Our results confirm that emotion understanding is significant and positively correlated to social competence (r = ,281; p<,001). Considering the several evaluators used in this instrument, peers' assessment seems to be the one which has an higher level of correspondence with emotion understanding level (r = ,309; p <,001), followed by self-evaluation (r = ,168; p<,023) and teachers (r = ,165; p<,026). All situations of SAp, except situation 5 (conflict resolution situation) have a significant positive correlation with TEC's overall result. Finally, considering TEC's components, only components IV (*belief*; rs =,246; p<,001), VII (*hiding/concealing emotion*; rs = ,190; p < ,010) and VIII (*mixed emotions*; rs = ,199; p < ,007) are significant and positively correlated to social competence composite score.

In our study, we've obtained similar results to those find by previous Portuguese studies, such as those of Alves (2006), Machado, Veríssimo, Torres, Peceguina, Santos and Rolão (2008), Santos (2012) and Silva (2013) who (the last two ones) also used TEC for assessing emotion understanding.

Using regression analysis, all regression coefficients are low, as it follows: emotion understanding as determining general the social competence (F(1,180)=15,39; p<,000; R2a=0,074), the self-evaluation on SAp (F(1,180)=5,22; p<,023; R2a=0,023), the peers' evaluation on SAp

(F(1,180)=19,026; p<,000; R2a=0,091) and the teacher's evaluation on SAp (F(1,180)=5,012; p<,026; R2a=0,022). On the other hand, using social competence as a predictor of emotion understanding components, it only predicts the following components: belief recoded (p<,001; R2a =,0055), mixed (p<,007; R2a =,034) e hiding (p<,010; R2a =,031)

If we only relied on this kind of traditional analysis, correlation and regression, the data analysis of the existing relations between social competence and emotion understanding would rest quite rudimentary, making us consider that the relationships were somewhat limited. The use of Similarity Structure Analysis appears to be a more suited tool to disclose the existing relationships.

3.2. Similarity Structure Analysis

In this section we present results concerning the relation between the Socially in Action-Peers items (5: self-evaluation; 5: peers' evaluation; and 5: teacher's evaluation of social competence) with TEC (high and low score) as external variable. For this analysis we relied on a multidimensional scaling approach using the SSA (Smallest Space Analysis - Guttman, 1965; or Similarity Structure Analysis - Borg & Lingoes, 1987) and the "External variables as points technique" developed by Cohen and Amar (2002). Table 2 presents the Monotonicity coefficient correlation matrix of the 15 items of the Socially in Action-Peers and the correlation matrix of these items with TEC (high and low score, using the median as the cut-off point). Figure 1 shows the SSA projection of the first two vectors of the three-dimensional space. The coefficient of alienation, which is the stress measure applied in SSA for assessing the goodness of fit was 0,073, indicating a good fit between the SSA solutions and the input correlation matrices. In this figure each point represents an aspect of the SAp items. In the same plot are inserted as external variable TEC.

A polar structure can be observed dividing the space according to the three types of sources of evaluation – self, peers and teacher. While in the left side of the plot are located the self-evaluation items, on the right side of the plot we observe the peers' evaluation items (Upper region) and Teacher's evaluation items (bottom part).

The "External variables as points technique" allow to establish a connection between emotional competence in children (TEC) and social competence (SAp). Firstly, all TEC low scores items are positioned on the left

side of the plot (especially in the bottom area). Secondly, all the TEC high scores items are situated on the middle side of the plot (especially in the bottom area). The two groups (high vs. low score on TEC) are quite distant. Furthermore, while the TEC low scores group are located in lower left side of the plot, the TEC high scores group are located in the central region of the polar structure indicating a significant positive correlation of the TEC high scores group with almost all SAp situations; the only exception is situation 5 (conflict resolution situation) which, when compared to the other type of situations, are always located more distant from the center of the polar structure.

The most related SAp situations with **TEC high** results are: peers' situations, followed by teacher's and self' situations. Considering peers' situations, situation 2 (integrating a new classmate) is the closest one to high results in TEC, followed by situation 1 (group work), 3 (team leader), and 4 (visiting a sick classmate), and the more distant one is situation 5 (conflict resolution), the same way as for self and teacher evaluations, in situation 5. Teacher's situations closest to TEC high results are situation 4, followed by 3, 2 and 1. Finally, the self-evaltuation situations closest to TEC high results are situations 4, followed by 2, 3 1 and 5, even though they are farther away from TEC high results then peers and teacher's evaluations, showing us that peers and teachers evaluations are more predictive of high results in TEC. Besides, situation 2 is the more predictive of TEC high results.

In respect to **TEC low** results and its relations with SAp situations, situation 1 and 5 (self) and situation 5 (teacher) are closer to TEC low results. On the other hand, situations 1 and 2 (peers) are farther away from TEC low results.

Table 1. Correlation matrix (Monotonicity Coefficient) of the Socially in Action-Peers items (5: self-evaluation; 5: peers' evaluation; and 5: teacher's evaluation of social competence)

SAp items	1	2	3	4	5	6	7	8	9	10	11	12	13	14
01 Self.1	100													
02 Self.2	21	100												
03 Self.3	51	31	100											
04 Self.4	48	49	50	100										
05 Self.5	27	8	33	46	100									
06 Peer.1	64	18	37	23	22	100								
07 Peer.2	34	34	24	23	19	69	100							
08 Peer.3	50	5	23	21	16	87	70	100						
09 Peer.4	28	24	19	28	26	67	79	77	100					
10 Peer.5	25	10	24	21	31	72	70	76	75	100				
11 Teach.1	57	22	34	31	-12	84	67	75	55	56	100			
12 Teach.2	29	6	11	6	-1	51	54	49	50	30	77	100		
13 Teach.3	53	24	33	28	11	78	59	71	52	44	91	77	100	
14 Teach.4	41	31	24	21	2	51	58	68	59	45	75	87	75	100
15 Teach.5	3	-5	-11	-11	1	41	45	53	57	47	57	60	45	57

Fig. 1. SSA projection of the Socially in Action-Peers items (5: self-evaluation; 5: peers' evaluation; and 5: teacher's evaluation of social competence) with TEC (high and low score) as external (e) variables (1x2, 3-D, coefficient of alienation .073).

In another MDS analysis we considered TEC components as content variables and Social Competence in their different levels as external variable. In Table 2 is presented the correlation matrix (Jaccard Coefficient) of the nine TEC components and the correlation matrix of these items with the Socially in Action-Peers items. Each SAp item was transformed in high and low score, using the median as the cut-off point. Figure 2 shows the SSA projection of the bidimensional space. The coefficient of alienation, which is the stress measure applied in SSA for assessing the goodness of fit was 0,066, indicating a good fit between the SSA solutions and the input correlation matrices. In this figure each point represents an aspect of the nine TEC components. In the same plot are inserted as external variable the Socially in Action-Peers items.

A polar structure can be observed dividing the space in three regions according to the structural organization pointed out by Pons, Harris and Rosnay (2004). In the right side of the plot are located the first group of components, which may be labeled as "**external**", being the easiest. It focuses on external aspects of emotions, including the recognition of facial expressions

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(Recognition), understanding of the impact of situational causes on emotions (Cause), and understanding of the impact of associated external events or reminders on emotions (Reminder).

In the bottom region of the plot, closer to the center, are located two components characterized by the understanding of the various mental aspects of emotion which may be labeled as "**mental**": the understanding of the role of beliefs (Belief) and the distinction between outwardly expressed and privately felt emotions (Hiding). The third mental component – understanding the role of desires (Desire) on emotions that should be located in this region together with desire and belief, is situated in the upper right part of the plot.

The last group of components which may be labeled as "**reflective**" is located in the left region. It focuses on children's understanding of the way by which an individual can think about a particular emotionally charged event from more than one perspective, including the appreciation of concurrent mixed feelings (Mixed), cognitive control strategies (Regulation), and the effect of rumination about an unacknowledged misdemeanor (Morality).

Furthermore, the "External variables as points technique" allows to establish the connection between emotional competence in children (TEC) and social competence (SAp situations). As it is possible to observe in the SSA plot, while all SAp low score items are situated in left-hand size of the map, all SAp high score items are located in in the next region to the right, higher up vertically in the space.

The most related TEC components with **SAp situations high** results are: Mixed (for all raters of SAp, especially for teacher and peers evaluations) and Hiding (for peers and teachers situations only). On the other hand, the closest components of TEC to **SAp situations low** results are: morality (self-evaluation situations) and regulation (for peers and for teacher). So, the first group is more predictive of TEC high results, and the last group more predictive of TEC low results.

Table 2. Correlation matrix (Jaccard Coefficient) of the nine TEC components

TEC (Components)	1. Recog.	2. Ext. Cause	3. Desire	4. Belief	5. Remin.	6. Regul.	7. Hiding	8. Mixed
1. Recognition	100							
2. External Cause	97	100						
3. Desire	76	75	100					
4. Belief	83	81	64	100				
5. Reminder	80	79	65	72	100			
6. Regulation	76	76	67	66	63	100		
7. Hiding	68	69	59	67	64	59	100	
8. Mixed	69	69	61	60	58	61	65	100
9. Morality	43	44	45	48	46	48	47	54

Note: Decimals were omitted

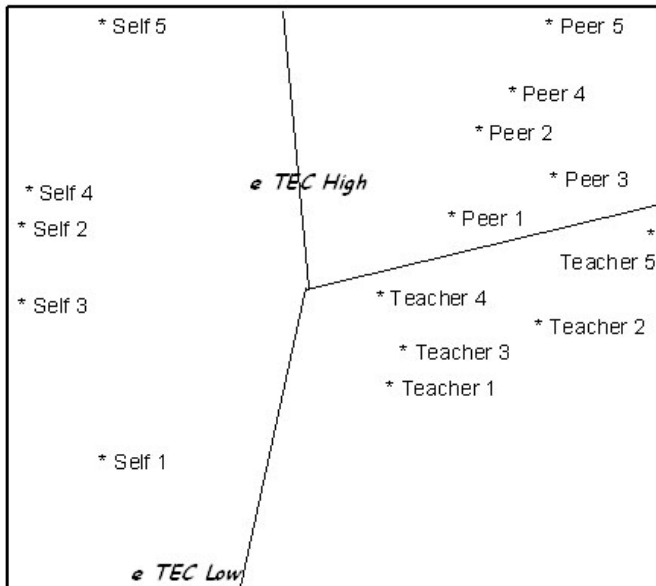**Fig. 2.** Two Dimensional SSA projection of the nine TEC components with the Socially in Action-Peers items (5: self-evaluation; 5: peers' evaluation; and 5: teacher's evaluation of social competences as external (e) variables (coefficient of alienation .066).

In sum, the reflexive (regulation, mixed and morality) and mentalist (belief, desire and hiding) facets of emotion understanding are the most related to social competence and, thereafter, the ones that are more able to differentiate children's level of social competence. External facet (recognition, causes and reminder) of emotion understanding has little relation to children's social competence at this age; it may be that in younger ages this facet to be relevant in predicting social competence, as Santos (2012) found out in a study with Portuguese preschool children (4-6 years), in which component II (causes) was the only one to be positive and significantly associated with peers acceptance.

According to these results, even though the English sample has a different age range (3-11 years) and ours has a narrower one (8-11 years), it would be feasible to propose a distinct model with a different distribution of components along the 3 facets of emotion understanding. This makes special sense according to the fact that 3 components (belief, hiding and mixed) are the most related to social competence in children and closer to the developmental level of our children. A previous Brazilian sample has found that TEC structure doesn't necessarily follow the initially proposed structure, having morality closer to external facet (Roazzi, Dias, Minervino, Roazzi & Pons, 2009).

Belief component of TEC is related to the understanding of the role of believes in determining and that requires the comprehension of false belief, which is considered a good indicator of perspective taking, useful in social competence. *Hiding/concealing* component of TEC is related to the understanding of the possibility that internal experience and external expression of emotion may not coincide; so this component may be positively related do social competence as far as for being socially accepted, sometimes, we should not be too much emotionally expressive. The component VIII (*mixed emotions*) is about the understanding that a person can present multiple or even contradictory emotional answers in relation to a determined situation. This component may be relevant in social behavior as long as it may allow children to have a more flexible recognition of other's emotions and behaviors, and therefore better able to adjust her behavior in social interaction.

4. Conclusion

Emotion understanding and social competence play a central role in the development of pathways to mental health, as well as in academic success during childhood. The understanding of these connections is crucial for informing assessment, intervention and research in these domains. The use of MDS and SSA, in particular, enable researchers to do a more comprehensive analysis of data. Unlike factor analysis, the dimensions work as a means to enable the verification of different projections of the total configuration, having theoretical considerations in mind in order to decide about the usefulness and appropriateness of a multidimensional solution. In sum, in this type of analysis, looking for facets distribution facilitate the laborious work of theory construction and modification.

The use of Socially in Action-Peers and Test of Emotion Comprehension for assessing social competence and emotion understanding, respectively, has shown that these instruments allow researchers to better understand these constructs and how they are intertwined. According to our results, emotion understanding in general is positive and significantly related to social competence. In particular, there are some facets of emotion understanding that are more able to predict social competence in the age range of our sample (8-11 years), which are Mixed and Hiding. *Hiding/concealing* component of TEC is related to the understanding of the possibility that internal experience and external expression of emotion may not coincide; so this component may be positively related do social competence as far as for being socially accepted, sometimes, we should not be too much emotionally expressive. The component VIII (*Mixed* emotions) is about the understanding that a person can present multiple or even contradictory emotional answers in relation to a determined situation. This component may be relevant in social behavior as long as it may allow children to have a more flexible recognition of other's emotions and behaviors, and therefore better able to adjust her behavior in social interaction.

In our study, we have obtained similar results to those find by previous Portuguese studies, such as those of Alves (2006), Machado, Veríssimo, Torres, Peceguina, Santos and Rolão (2008), Santos (2012) and Silva (2013) who (the last two ones) also used TEC for assessing emotion understanding.

Within the practical relevance of this study, it is interesting to re-emphasize the contribution of using multiple informants in the assessment of social competence, and its relation to emotion understanding. The collection of indices of these constructs allow practitioners to identify children at risk of social maladjustment, and based on the strengths and weaknesses will be possible, at a later stage, outline intervention plans according to the specific social skills and emotion understanding components to consider. Regarding TEC, it is also possible to compare child's actual level of emotion understanding development to what was expected for her age. Likewise, in the prevention context, SAp and TEC can be used as a control measures to use in pre-and post-intervention programs of social and emotional competences. Both the instruments are of easy and fast administration, children are amused to participate in its tasks.

This study has limitations; the most notable one is the sample size, which is small and unrepresentative. Besides, this study has a correlational design, which does not allow us to make inferences about causality. Another limitation is that we have not used another measure of social competence for external validation of the SAp. Finally our results point out that TEC needs, also, some revisions and adaptations that have been referred elsewhere (Rocha, Roazzi, Lopes da Silva, Candeias, Minervino, Roazzi & Pons, 2013). This way, in future studies, it should be used a larger sample and with a wider range of ages; to use another measure of social competence.

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Testing values structure
in different developmental groups

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Abstract: This study aimed at testing the value structure in three developmental groups: adolescents (12 to 18 years), young adults (19 to 34 years) and mature adults (35 to 65 years). It was a cross-sectional survey, counting with the participation of 36,845 people of all federative unities, with mean age of 28 years (sd = 12.62), equally distributed by sex, representing three sample groups: adolescents (n = 9,638), young adults (n = 16,520) and mature adults (n = 10,687). They answered the *Basic Values Survey* (BVS) and demographic questions (age and sex). Participants were approached in public locations, at work and at school class, the instructions were given on the questionnaire. The structure hypothesis was tested according to the model of the Functional Theory of Human Values, which assumes that values are organized in a 3X2 two-dimensional space, represented by the dimensions: type of orientation (represented by personal and social values localized at the ends and central values at the central position) and type of motivation (divided in materialistic and idealistic values, located in different places). Through confirmatory multidimensional scaling (MDS), adopting *Tucker's Phi* (φ) as an indicator of model fit, it was observed that the theoretical model was confirmed for the three groups (φ = .94 for the three groups). These results allow concluding that the structure hypothesis asserted by the Functionalist Theory is adequate independently of the level of development of the sample.

1. Introduction

Human values are guiding principles that transcend specific objects or situations (Gouveia, Fonseca, Milfont, & Fisher, 2011). They guide human actions and have influence in several contexts and situations, explaining the patterns that people follow to judge objects, their own actions and other people's actions (Maio, Hahn, Frost, & Cheung, 2009). For this reason, values are a central construct in Social Psychology, and have been studied through different perspectives, such as, Philosophy, Psychology, Sociology, Anthropology (Rokeach, 1981).

Values are acquired and internalized during childhood, concomitantly to the socialization process (Kohn, 1977; Hofstede, 2001; Rokeach, 1973). Accordingly, the value structure is initially undefined (Andrade, Camino, & Dias, 2008), which means that not all the dimensions underlying human values can be understood by children. Differentiation will occur as a function of cognitive maturity and, possibly, with the experience acquired in the socialization process (Bubeck & Bilsky, 2004).

For instance, Schwartz et al. (2001), using PVQ-29, observed in Uganda's girls aged from 13 to14 that the four higher order value types were differentiated, but values such as those of self-transcendence and conservation were not distinguished. The authors concluded that, at this age, value structure is rudimentary, less differentiated than adults. Considering this conclusion Bubeck and Bilsky (2004) carried out a study to examine value structure at an early age. They applied the PVQ-29 to a German sample with participants aging from 10 to 17 year old. The results partially corroborated Schwartz's theoretical structure, once universalism was not identified and other values were mixed (tradition, conformity, achievement, power, hedonism, stimulation, and self-direction). The authors also couldn't corroborate the hypothesis of progressive differentiation with age, the number of value types distinguished and misplaced values was almost the same for the three groups (10 to 12, 13 to 14 and 15 to 17 year old).

As Baltes, Lindenderger, and Staudinger (2006) have pointed out, researches on developmental stages like infancy and childhood, adulthood or old-age are frequently conducted independently from each other, which leads to little overlap in concepts, methodology and empirical data basis. In this sense, the current study contributes to the literature on values by examining

value structure across different developmental groups: adolescents (12 to 18 year), young adults (19 to 34 year) and mature adults (35 to 65 year). The division into these three groups was not arbitrary, but it was based on Erikson's (1959) theory.

Erikson (1959) assumed eight psychosocial stages of ego development. These stages comprehend the whole life cycle, since birth until the old-age. He assumes that the stages are genetically predetermined, and are cumulative, which leads to a nonlinear development. Erikson's theory seems adequate in explaining development in human values (Vione, 2012). Vione (2012) examined the extent and the direction of value change across the human life cycle, checking for age effects. Based on Erikson's (1963) and functional theory of human values, this author observed changes in values' priorities across different life stages, and that some subfunctions present nonlinear pattern of development. At next, we comment briefly on the stages that are focused in the present study.

Adolescence, according to Erikson (1963), starts at the age of 12 and ends at 18. He asserts that in this stage, named Identity vs. Role confusion, individuals start to show habilities and skills similar to adults, and must affirm their identity. Adulthood comprehends two stages in this theory: Intimacy vs. Isolation corresponding to young adulthood, and Generativity vs. Stagnation corresponding to middle adulthood. The first starts at the age of 19 and the second, approximately, at 35, ending by the age of 55. The stage Intimacy vs. Isolation requires to individuals to establish permanent relationships, and the stage Generativity vs. Stagnation implies to be creative, start a family and provide to future generations. Finally, the stage Ego integrity vs. Despair corresponds to late adulthood or old-age, and is featured as time for examination and reflection on life, making a final evaluation.

Considering the previously mentioned, this study aimed at testing the value structure in three developmental groups: adolescents (12 to 18 years), young adults (19 to 34 years) and mature adults (35 to 65 years). It was a cross-sectional design comprising all federative unities from Brazil, as demonstrated next, at the method section.

1.1 Functional Theory of Human Values

The functional theory has been developed in the last decade (Gouveia, 2003; Gouveia et al., 2011), it's considered integrative and parsimonious, being able to explain previous models, such as Inglehart's (1977) and Schwartz's (1992). The values are defined as orientations criteria that guide human actions and express their basic needs. This definition derives from two consensual functions found in the literature: values guide human actions (type of orientation; Rokeach, 1973; Schwartz, 1992) and express basic needs (type of motivator; Inglehart, 1977; Maslow, 1954).

The function to guide the behavior is called type of orientation, is divided in social, central and personal. People guided by personal values are self-centered and have an intrapersonal focus, while those guided by social values prioritize life in society and have interpersonal focus (Gouveia, 2003; Rokeach, 1973). Furthermore, central values are situated between social and personal values; they are the base that organizes other values, and are the polarization between the most basic needs (e.g., eating and drinking) and those of higher order (e.g., cognitive and aesthetic).

Accordingly to the second function, type of motivator, values express human needs with a materialist (pragmatic) or humanitarian (idealist) motivator (Inglehart, 1977). The emphasis in materialist values indicates an orientation to specific goals and normative rules. On the other hand, idealist values express a universal orientation, based in abstract principles and ideas.

The crossing of these two functions allows identifying a model of values 3 x 2 . When the two functions (dimensions) are crossed, they originate six subfunctions, represented in quadrants: social-materialist (normative subfunction), social idealist (interactive subfunction), central-materialist (existence subfunction), central-idealist (suprapersonal subfunction), personal-materialist (promotion subfunctional), and personal-idealist (excitement subfunctional). Figure 1 illustrates this structure.

		Values as guide principles of behavior		
		Personal Goals (by the individual himself)	*Central goals (the overall purpose of life)*	*Social goals (the individual in the community)*
Values as an expression of needs	*Idealistic needs (life as a source of opportunities)*	**Excitement** Emotion Sexuality Pleasure	**Suprapersonal** Beauty Knowledge Maturity	**Interactive** Affectivity Social support Belonging
	Materialistic needs (life as a source of threat)	**Promotion** Success Power Prestige	**Existence** Personal stability Health Survival	**Normative** Obedience Religiosity Tradition

Fig.1. Functions, subfunctions and specific values

This formulation corresponds to the structure hypothesis, which can be formally and statistically tested using multidimensional scaling. The values that correspond to the personal type of motivator appear in one side and those covering the social orientation appear in another; between both personal and social, are located the central values; individualistic and materialistic values occupy different regions in this space.

Besides the mentioned hypothesis, this theory also admits a content hypothesis. Specifically, it's assumed that the subfunctions, derived from values functions, are latent structures. Therefore, they must be represented by markers or specific values. The content of the values concerns the suitability of specific values to represent the functions and consequently the corresponding subfunctions. The list of values that represent this theory is not extensive, but they represent the most cited in the literature (Gouveia et al., 2011).

Gouveia and collaborators propose two other concepts that, while not contradictory, demands to consider different aspects in order to (a) understand the internal structure or system of values (congruence hypothesis) and (b) assess the pattern of association of values with other constructs (compatibility hypothesis) (Gouveia et al., 2011). This is another important difference between the functional theory and the Schwartz's (1992), who considers congruence and compatibility as equivalent concepts. In functionalist theory of human values

these concepts are different. Specifically, congruence is the internal consistency of the functional system of values, that is, how strong are the correlations between the subfunctions. Moreover, the compatibility refers to the correlation of values with external variables, corresponding to the patterns of relationship between values and antecedent and consequent variables.

1.1.1. Congruence hypothesis

Consistently with this theoretical model, which assumes the benign nature of human beings, and allows only positive values, it is estimated that the correlations between all values would be positive. However, the correlations might vary according to the degree of socio-cognitive maturity of individuals. Possibly, those who are more mature, also commonly older, will present higher degree of congruence; teenagers who are still defining their value system, have less congruence. Nevertheless, the pattern of congruence is not defined only by maturity, and it's important to know what the subfunctions share in regard to types of orientation and motivator.

The functional theory suggests three levels of congruence: low, moderate and high.

Low congruence: Correspond to subfunctions that have different orientation and motivator: promotion – interactive, and normative – excitement. The low congruence is attributed to the independence, but it doesn't express incompatibility of these subfunctions as self-guides.

Moderate congruence: It is characterized by values that have the same motivator, but different types of orientation; as in the pairs of subfunctions: promotion – normative, and excitement - interactive.

High congruence: Gathers the subfunctions that have the same orientation, but different motivator. These express the standard maximum congruence, being represented by the pairs: promotion – excitement, and normative - interactive.

The fact that the subfunctions existence and suprapersonal are not included in the congruence hypothesis is explained by Gouveia et al. (2011): since they may be the source or the base that originates other subfunctions, they present strong and positive correlations with all of them. Moreover, there is another aspect that justifies the exclusion of such subfunctions, namely, the fact

that the main theoretical difference in values is within the opposition between social and personal values (Gouveia et al., 2003; Rokeach, 1973) and not in the dichotomy of values materialist and idealist. The congruence hypothesis is tested by comparing the average correlations between the values that make each of the degrees of congruence.

This theory of values has ensured data from various contexts and participants, both in Brazil and other countries (e.g., Germany, Spain, France, Israel, Macedonia, Portugal), demonstrating adequacy for representing human values (Gouveia, 2012; Medeiros, 2011). Therefore, justify its use for the study described below.

2. Method

2.1. Participants

This study is part of a larger project of values and their correlates in Brazil (Gouveia et al., 2008, 2009, 2011). Values and demographic data were available for 36,845 participants from all five geographical regions in this country: North (6%), Northeast (57%), Center-West (7%), South (22%), and Southeast (22%). There were roughly equal number of male and female participants, with age ranging from 12 to 65 years old (m = 28.0, sd = 12.62).

2.2. Instrument

All participants received a booklet containing demographic questions and the *Basic Values Survey* (*BVS*; Gouveia, 2003). The BVS is composed by 18 items (e.g., *Affectivity***.** To have a deep and enduring affectionate relationship; to have somebody to share successes and failures; *Tradition***.** To follow the social norms of your country; to respect the traditions of your society). Respondents evaluate the extent to which each value is important as a guide principle in the person's life, being rated on 7-point scale, ranging from *1 = Not important* to *7 = Extremely important*.

2.3. Procedure

The questionnaires were applied in classes, companies, and public places during the period 2002 to 2010. All the instruments were self-administered, although a researcher was always present to answer questions and clarify how to proceed. All participants over 18 signed an informed consent form, whereas parents signed the consent form on behalf of their children under 18 years of age.

2.4. Data analysis

We performed a confirmatory multidimensional scaling (MDS) (PROXSCAL algorithm), using the software PASW (version 18). Initially, the answers to the 18 values were transformed in z scores, for then creating the distance matrix between them. Next, the spatial organization of values was defined accordingly to the Functional Theory, thus, the subfunctions assumed these parameters: type of orientation (excitement [1,0], promotion [1,0], existence [0,0], suprapersonal [0,0], interactive [-1,0] and normative [-1,0]); and type of motivator (excitement [0,5], promotion [-0.5], existence [-1,0], suprapersonal [1,0], interactive [0,5], and normative [-0,5]). Therefore, each value was forced to occupy one position in space. We assumed ordinal measurement, allowing break ties, admitting initial configuration of Torgerson. Tucker's Phi was used as a measure of model fit, accepting values equal or higher than .90 (van de Vijver & Leung, 1997).

3. Results

The structure hypothesis was tested according to the model of the Functional Theory of Human Values, which assumes that values are organized in a two-dimensional space, with a two facets duplex configuration: type of orientation (represented by personal and social values localized at the ends and central values at the central position) and type of motivator (divided in materialistic and idealistic values, located in different places).

Through confirmatory multidimensional scaling (MDS), adopting *Tucker's Phi* (φ) as an indicator of model fit, we tested separately the three developmental groups. Figure 2 shows the value's structure of the adolescents.

This structure present Tucker's Phi of .94, corroborating the six subfunctions organized in two dimensions.
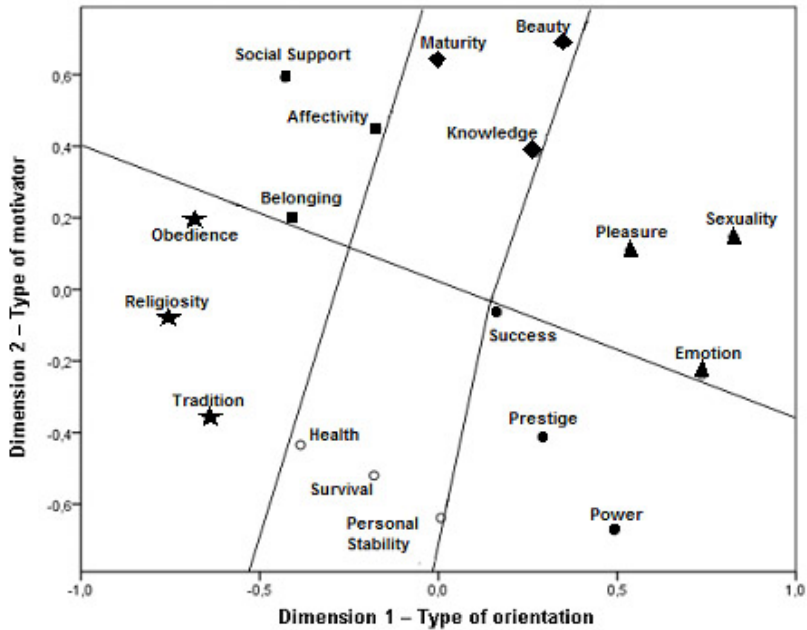
Fig. 2. Values' duplex structure in adolescents

Regarding the group of young adults, it also corroborated the values' structure proposed by the functional theory, and the Thucker's Phi was satisfactory ($\varphi = .94$). The configuration for this group can be observed in Figure 3.
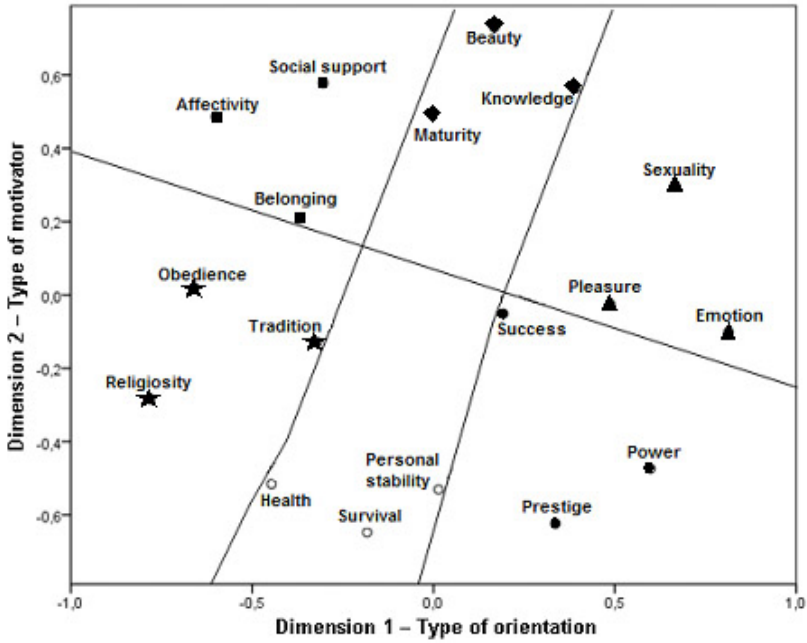
Fig. 3. Values' duplex structure in young adults

Finally, we tested the values' structure with the group of mature adults. It was observed that the theoretical model was corroborated ($\varphi = .94$). As it shows in Figure 4, it is possible to map the six values' subfunctions, and values are separated according to the type of orientation and type of motivation.
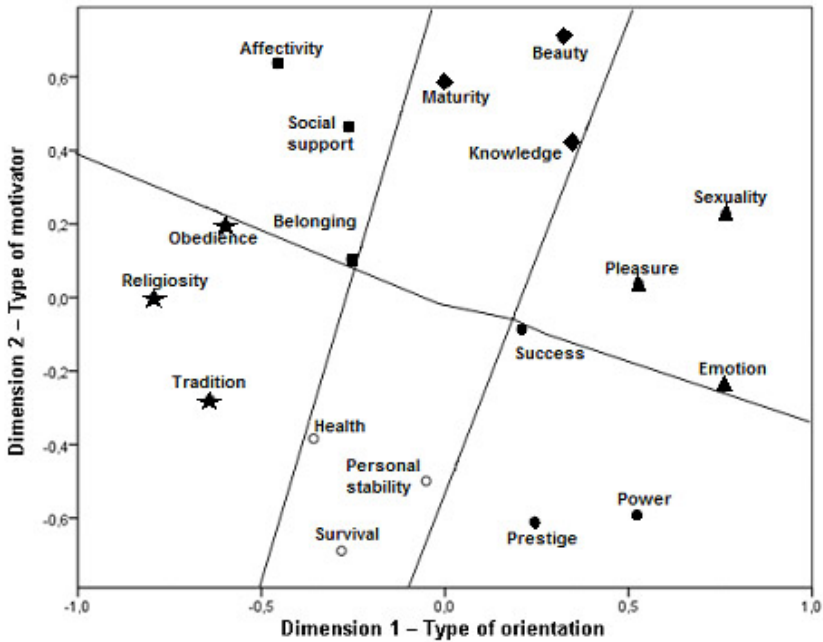
Fig. 4. Values' duplex structure in mature adults

In sum, it was observed that the theoretical model was confirmed for the three groups (φ = .94 for the three groups). These results allow concluding that values are separated according to the type of orientation and type of motivation, in a duplex structure, from the young age of 12 until the maturity, at 65 years.

4. Discussion

This study aimed at testing the value structure, through a cross-sectional design, in three developmental groups: adolescents (12 to 18 years), young adults (19 to 34 years) and mature adults (35 to 65 years). Thus, we adopted the Functional Theory of Human Values (Gouveia, 2003; Gouveia et al., 2011), which proposes a 3X2 structure.

According to the Functional Theory, values have two functions: type of orientation and type of motivator. The crossing of these two functions originate six

subfunctions, represented in quadrants: social-materialist (normative subfunction), social idealist (interactive subfunction), central-materialist (existence subfunction), central-idealist (suprapersonal subfunction), personal-materialist (promotion subfunctional), and personal-idealist (excitement subfunctional).

The structure hypothesis asserts that values corresponding to the personal type of motivator appear in one side and those covering the social orientation appear on the other; between both personal and social, are located the central values; and the type of motivator implies that individualistic and materialistic values occupy different regions in this space.

In order to verify the structure of values in the developmental groups, we carried out three separated confirmatory multidimensional scaling (MDS). The results showed that the structure hypothesis asserted by the Functional Theory is adequate independently of the level of development of the sample.

Similarly with the observed by Bubeck and Bilsky (2004), there was no significant difference in value structure between age/developmental groups. One could expect that values would differentiate more with age, but there was no support for that in the present study. Nevertheless, using the Functional Theory it was possible to identify all the six proposed subfunctions, while the model provided by Schwartz (1992) has faced several difficulties in finding the proposed structure (see also Schwartz et al., 2009). It would be important to check with younger samples, before the age of 10, trying to seek for evidences of when the value structure can be considered crystalized, once the present results and those offered by Bubeck and Bilsky (2004) cannot provide this information.

Another important comment on value development regards the matter of the congruence (Gouveia, 2012). Maybe the structure is not the best predictor of value development and it is better to expect higher congruence with maturity, as proposed by Gouveia (2012), but this aspect remains unchecked until the present.

In sum, the present study achieved its mains goal and contributes to the literature on values development, examining its structure across different developmental groups. These results allow concluding that the structure hypothesis asserted by the Functionalist Theory is adequate independently of the level of development of the sample.

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Functional theory of human values: Testing the structure hypothesis with a sample of children

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Abstract: Taking into account that values are formed since the first decade of life and affect young's behaviors, it seems that is utmost importance identify them in this developmental phase. Despite the fact there are several theories to explain human values, in which the better known are those from Milton Rokeach, Ronald Inglehart and Shalom Schwartz, most part of their studies counts with samples of adults and few of them take adolescents as focus of research. In this sense, this research aimed to verify the structural adequacy of *Functional Theory of Human Values* in a sample of children, specifically in context of Paraiba (Brazil). Sample was composed by 218 children with mean age of 11,2 years-old (sd = 1,06), and most were male (50,7%). These ones answered the *Children version of the Basic Values Survey* (BVS – C) and demographic questions as sex and age. The structure hypothesis of values was tested by confirmatory (Proxscal) multidimensional scaling (MDS), adopting *Phi* de *Tucker* (ϕ) as an indicator of model fit, that is assured with values from 0.90 or above. According to the results, the indicator fit was adequate ($\phi = 0.94$), confirming that children's values are structured in a two-dimensional (3 x 2) space as was theorized, and are divided into six subfunctions. We concluded that the Functional Theory provides a theoretical and empirical ground to study of children's values.

1. Introduction

Human values are studied from different perspectives. It is possible to find references about them in many knowledge fields, such as Philosophy, Anthropology, Sociology and Psychology. The studies about human values are considered extremely relevant due to the fact that they are constructs strongly associated to several social and psychological phenomena, such as explication of many attitudinal and behavioral variables (e.g. environmental, antisocial behavior, prejudice).

However, recognizes the contributions of authors such as Rokeach, Inglehart and Schwartz to understand human values, Gouveia (2003) developed the *Functional Theory of Human Values*. This theoretical model has been build on the almost last two decades and already counts with about 50.000 people from Brazil and another 20 countries, gathering results that prove its adequacy (Fischer, Milfont, & Gouveia, 2011; Gouveia, 2003; Gouveia et al., 2010, 2011). Nonetheless, highlights that this theory should not be understood as an opposite to the antecedent models, but it emerges as a more parsimonious, integrative and theoretically grounded model, including being able to explain previous models about values (Gouveia, et. al., 2011).

Gouveia et al. (2011) define values as orientations criteria that guide human actions and express their basic needs. From this definition derives two functions of values: the function of guide the behavior is called *type of orientation*, and the second one express human needs is defined as *type of motivator*.

Concerning the *type of orientation*, it is divided in three types: social, personal and central (Welzel & Inglehart, 2010). People guided by *personal* values are self-centered and have an intrapersonal focus, while those guided by social values prioritize life in society and have interpersonal focus (Gouveia, 2003). Moreover, *central* values are located between social and personal values; they serve to organize other values, and are the polarization between the most basic needs (e.g., eating and drinking) and those of higher order (e.g., cognitive and aesthetic).

Regarding to *type of motivator*, it is divided in *materialistic* and *idealistic*. The emphasis in materialist values indicates an orientation to specific goals and normative rules. On the other hand, idealist values express a universal orientation, based in abstract principles and ideas.

These two dimensions (type of orientation and motivator) form two principal axis (vertical – motivator – and horizontal – orientation), that when they are crossed originate six subfunction of values. Figure 1, provides the structure of values proposed by Gouveia and colegues (2003; 2010; 2011).

		Values as guide principles of behavior		
		Personal Goals (by the individual himself)	Central goals (the overall purpose of life)	Social goals (the individual in the community)
Values as an expression of needs	Idealistic needs (life as a source of opportunities)	**Excitement** Emotion Stimulation Pleasure	**Suprapersonal** Arts Knowledge Equality	**Interactive** Affectivity Social support Belonging
	Materialistic needs (life as a source of threat)	**Promotion** Success Power Prestige	**Existence** Personal stability Health Survival	**Normative** Obedience Religiosity Tradition

Fig. 1. Functions, subfunctions and specific values.

Individuals who endorse the *personal values* are self-centred or have intrapersonal aspects in focus. They are oriented to accomplishing their personal goals, guaranteeing benefits for themselves and establishing properly conditions to reach their aims.

Excitement subfunction (emotion, pleasure and *sexuality)*. It represents an idealistic motivator (humanitarian) with a personal orientation. The values that represent this subfunction contribute to a promotion of change and innovation in the structure of social organizations.

Promotion subfunction (success, power and *prestige)*. It portrays the materialistic type of motivator, while its type of orientation is personal. People guided by these values are focused on material achievements and give importance to hierarchy when based on a demonstration of personal competence.

People who emphasize social values have their focus on the society or interpersonal relationships. This value orientation is divided in two subfunction:

Normative subfuncion (obedience, religiousness and *tradition)*. It expresses a social orientation, focusing on social rules, and a materialistic

guiding principle, reflecting the importance of preserving one's culture and conventional norms. In general, elderly people are more likely to adopt this subfunction.

Interactive subfunction (affection, social support and *belonging).* It corresponds to an idealistic motivator, but has a social orientation. They represent the needs for belonging, love and affiliation, and it is essential for establishing and maintaining one's interpersonal relationships.

The *central* values are those which are compatible with both personal and social, placing between both. This values are reunited in the following subfunctions:

Existence subfunction. (personal stability, healthy and *survival).* Represents the most basic physiological needs (e.g., eating, drinking, sleeping), and the need for security.

Suprapersonal subfunction. (arts, knowledge and equality). It represents higher-order needs of aesthetic, cognition, and self-actualization. These values also refer to a human sense of beauty and intellect.

Thus, it seems that human values are extreme relevant for the development of individuals, regardless of their age. Then, considering that human values are formed within the first decade of life (Porfeli, 2007; Rokeach, 1973) influencing the behavior of young and their social adjustment (Santos, 2008) and psychosocial and situational as food choice (Monteiro, 2009), the attitudes toward money (Lauer-Leite, 2009), and preference for cartoons (Andrade, 2003), notes the relevance of identifying the values priorities at this stage of development.

In this direction, some researchers (Andrade, 2003; Doring, 2008; Galansky & Knafo, 2008; Lauer-Leite, 2009; Monteiro, 2009; Soares, 2013) has been dedicated to investigate how children's values are formed and what their relationship with some psychological constructs (e.g., preference for cartoon and bullying). Authors such Rokeach, Inglehart and Schwartz, conduct their research with samples, predominantly in adults, with some few groups of teenagers, not giving due attention to children's values. Thus, Kohn was identified with one of the authors who contributed substantially to this question, he has investigated how is the process of values transmission from parents to children, suggesting a two-factor model consisting of values: self-direction and conformity (Kohn, 1977). However, the evidence of his model is scarce regarding other cultural contexts.

In research conducted by Melech (2001), the aim was to identify which was the values structure of children and adolescents from Israel, with ages between ten and 17 years, based on the theory of values proposed by Schwartz (2005). According to the results, children aged ten feature ability to discriminate only some of ten motivational types of that theory (Schwartz, 2005), as well as, found differences as to gender, since the presence of diverse value patterns. Other researches with children that took in account the Schwartz's typology, could not identify a clear framework of values that reflects the theoretical model advocated by the author. As an example we have of Bubeck and Bilsky (2004), that using PVQ-29 (Portrait Value Questionnaire with 29 items) in a research with 601 children, aged 10 to 12 years, and did not achieve satisfactory results.

Due to the aforementioned, some factors may restrict the studies on children's values, especially the lack of specific instruments to measure values in that sample. In this direction, Gouveia, Milfont, Soares, Andrade e Lauer-Leite (2011) adapted the Basic Values Survey (QVB) to children's sample. These authors accomplished some modifications to consider the specificity of childish samples. Thus, the original measure had three items changed: *stimulation* (Doing different activities, avoiding stay quiet, searching new activities and situations to amuse myself) replaced value *sexuality* (Have sexual intercourse, have sexual pleasure); while *maturity* and beauty were replaced by equality and arts (Gouveia et al., 2011).

Certainly, the study performed by Andrade (2003) was one of the first studies in Brazil using the functional theory to understand children's values, beside the goal of know how they influence the preference for cartoons. Another study that used the children version of basic values survey (QVB-I) was carried on by Lauer-Leite (2009). This one aimed to know the axiological correlates of meaning of money for children. Data from both studies corroborate the structure of model proposed by Gouveia (2003).

The structure of functional theory of human values considering a sample o children was also tested by Monteiro (2009). The sample of this study was comprised by 250 children, with ages between 9 and 12 years. The author has verified the relationship between values priorities of children and their attitudes and behavior related to healthy and unhealthy food. As was observed in previous studies, Monteiro has corroborated the structure of values, composed by two dimensions, and six subfunctions, as functional theory suggest.

In summary, this framework about human values proposes two consensual functions of values: (1) values guide human actions (type of orientation), and (2) values give expression to human needs (type of motivator. The first functional dimension differentiates three types of value orientations (social, central, or personal), whereas the second functional dimension classifies values as either materialistic (pragmatic) or idealistic (abstract). A combination of these two functions yields six subfunctions of values: *excitement, promotion, existence, suprapersonal, interactive and normative.*

In face of the importance of this construct and the lack of studies in this developmental phase, the *Functional Theory of Human Values* considers a structure of children's values and has an instrument to assess them, which has validity and precision evidences demonstrated in Brazilian context. In this sense, this research aimed to verify the structural adequacy of *Functional Theory of Human Values* in a sample of children, specifically in context of Paraíba (Brazil).

2. Method

2.1. Participants

The sample comprised 218 students from capital of Paraiba, most of them were male (50,7%) and from public school (72,5%) with average age of 11,2 (SD= 1,06; range of 9 to 13 years). That was a non-probabilistic sample composed by students who were at the classroom on the day of data collection and agreed in offer their freely collaboration.

2.2. Instruments

Participants answered to demographic questions (sex, age and schooling level) and to *Children version* of the Basic Values Survey (BVS – C). This measure was adapted by Gouveia, et. al. (2011) and it is composed by 18 items, divided into six subfunctions, with three items each one (e.g. **Health.** *Not get sick. To be always excited, wishing to play. Avoiding things that bring harm to health;* **Arts.** *Attend to exhibition of paintings and sculptures, listen to music, go to the theater or movies. And learn to draw and paint.*). Respondents evaluate the extent to which each value is important as a guide principle in the

person's life, being rated on 5-point scale, ranging from 1 = *Not important* to 5 = *Extremely important.*

2.3. Procedure

Initially, we contacted with principals and coordinators of several schools, and scheduled some meetings in which we presented the aims of this research, and had asked for permission to carry research on. After their consent, the administration of the questionnaires was carried by five research assistants at classroom context, during the assigned schooling hours. The average time used to complete the questionnaire was 30 minutes. The students with 18 years or above it, were required to sign a statement of consent; and those ones who were younger than 18 years, were required to gather the sign from their parents or who was responsible for them at that moment.

2.4. Data analysis

Data were analyzed with SPSS software (18th version). Through it we calculate descriptive statistics and internal consistency (*Cronbach's Alpha*), besides the Confirmatory Multidimensional Scaling (MDS, with PROXSCAL algorithm). Primarily, we transformed the scores of values in z scores, thereafter the matrix of distances among them was created. In this direction, based on functional theory of values, the spatial organization was determined. A two-dimensional structure was imposed, where each value was forced to occupying a specific position in the space, since this is the expected theoretical and best empirical dimensionality of the value space (Fisher, Milfon, & Gouveia, 2011). Regarding the dimension type of orientation the following parameters were observed to each subfunction: *excitement* [1,0], *promotion* [1,0], *existence* [0,0], *suprapersonal* [0,0], *interactive* [-1,0] and *normative* [-1,0]; while as for the dimension type of motivator, the parameter assumed were: *excitement* [0,5], *promotion* [-0,5], *existence* [-1,0], *suprapersonal* [1,0], *interactive* [0,5] e *normative* [-0,5]. We assumed the ordinal level of measure, allowing the use of *break ties. Tucker's Phi* (ϕ) was adopted as an indicator of model fit, accepting values equal or higher than 0.90 (van de Vijver & Leung, 1997).

3. Results

Firstly, total mean scores were calculated for each subfunction, arranged in descending order: *existence (m* = 4.4, sd = 0.71), *interactive (m* = 4.3, sd = 0.75), *normative (m* = 4.2, sd = 0.83), *excitement (m* = 4.2, sd = 0.78), *suprapersonal (m* = 4.1, sd = 0.74) and *achievement (m* = 3.2, sd = 0.96) [Wilks' Lambda = 0.46, F (5, 213) = 50.459, p <0.001].

We intended to verify the internal consistency indexes from each subfunction (Cronbach's alpha), Composite Reliability (CR) e homogeneity (average inter-items correlation, $_{rm.i}$). The coeficients found were: *ecxitement* [α = 0,48, CR = 0,45 and $_{rm.i}$ = 0,24, ranging from 0,12 (emotion and pleasure) to 0,33 (stimulation and pleasure)], *promotion* [α = 0,55, CR = 0,48 and $_{rm.i}$ = 0,31, ranging from 0,23 (power and prestige) to 0,36 (power and succses)], *existence* [α = 0,48, CR = 0,39 and rm.i = 0,24 ranging from 0,21 (health and survival) to 0,27 (stability e health)], *suprapersonal* [α = 0,33, CR = 0,27 and $_{rm.i}$ = 0,15, ranging from 0,12 (equality and arts) to 0,19 (knowledge and arts)], *interactive* [α = 0,58, CR = 0,48 and $_{rm.i}$ = 0,31, ranging from 0,29 (belonging and affectivity) to 0,34 (belonging and social support)] and normative [α = 0,58, CR = 0,51 and rm.i = 0,33, ranging from 0,28 (religiosity e obedience) to 0,41 (obedience and tradition)]. All the inter-items correlation were significant (p < 0,05).

Regarding to the structure hypothesis, which describes the values structure, it was expected that they were organized in a two dimensional space, defined by dimensions: type of orientation (*personal, central and social*), and type of motivator (*materialistic and idealistic*). The results found are shown at the following figure 2.
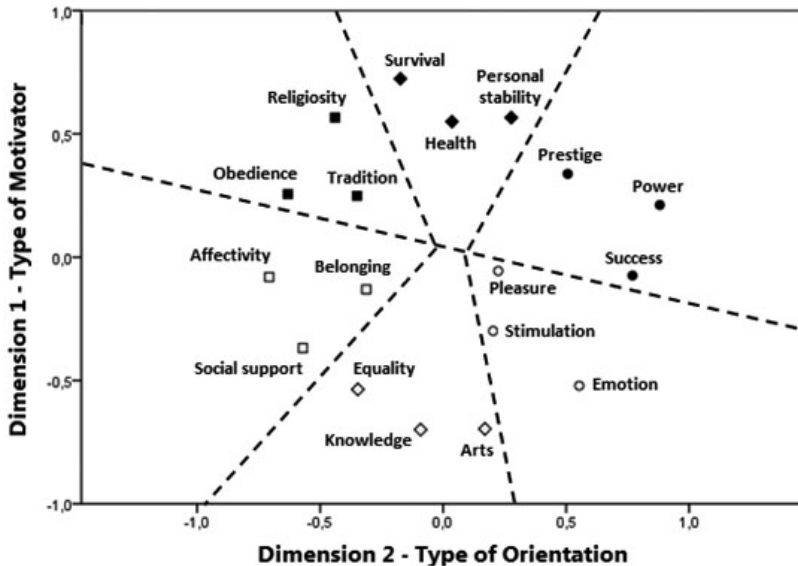
Fig. 2. Spatial representation of Basic Values - QVB-I

Analyzing the figure 2, it is clearly observed that values are grouped accordingly to their respective subfunction. Moreover, the model presented a Tucker's Phi equal to .94. Thus, we prove the adequacy of the theoretical model, once we found indexes consistent with literature about functional theory.

4. Discussion

Main goal of this study was test structure hypothesis derived from Functional Theory of Human Values. For that purpose, it took into account a sample of children from Paraíba. According to results, we considered that the aim was accomplished.

Gouveia and collaborators (2010) assume that values are organized in two subfunctions: type of orientation and type of motivator. The type of orientation can be personal, central or social, while the type of motivator can be materialist or humanitarian. The crossing of these two dimensions originates six value subfunctions, each with three specific markers. In the present study these were: excitement (emotion, stimulation and pleasure), promotion (success, power and

prestige), existence (personal stability, health and survival), suprapersonal (arts, kwnoledge and iquality), interactive (affectivity, social support and belonging) and normative (obedience, religiosity and tradition).

This organization allows to question about structure hypothesis of values, which takes in account that central values are placed between personal and social values, and these one emerge at opposite sides, where materialistic and idealistic values end occupying distinct places at the space. Thus, based on these findings, concluded that the structure hypothesis was corroborated in a sample composed by children from Paraiba. The six theoretized subfunctions were divided at a two-dimentional space (materialistic an idealistic values in different spaces) and social and personal values are located at the extremes while the central values were at the center of distribution.

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5 | Moral Values and Their Structure

Cross-cultural values structure:
Evidences of adequacy and equivalence

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Abstract: The present study aimed to test the value structure suggested by Gouveia (2012), and verify its equivalence between different cultures. The sample was composed by 4.890 participants from 12 countries: Germany (n = 156), Argentina (n = 406), Brazil (n = 1.235), Colombia (n = 230), Spain (n = 874), Philippines (n = 279), Honduras (n = 199), England (n = 298), Israel (n = 167), Mexico (n = 274), New Zealand (n = 257) and Peru (n = 615). They all answered the Basic Value Survey (BVS; Gouveia, 2003) in their native language, a 18 items instrument, answered in a 7 point scale, which evaluates the importance of each specific value as a guide-principle in one's life. In order to verify the theoretical structure, multidimensional scaling analysis (MDS) were conducted in all samples, adopting Tucker's Phi (ϕ) as the fit index of the model. The results were satisfactory in all countries ($\phi \geq 0,93$), showing adequate fit, which allows to conclude that human values can be represented in a two-dimensional space. Generalized Procrustes Analysis (GPA) were used to test the equivalence of the structures, which allowed proving that the structure was similar through the different countries (total adjustment greater than .90, average values of ϕ and *Raw Stress* of .94 and .11, respectively). It was concluded that Gouveia's theory gathers empirical evidences of its structural adequacy in several countries. Therefore, it can be properly used to understand human values and its correlates.

1. Introduction

The efforts to comprehend the structure of human values are not recent (Braithwaite & Law, 1985; Gouveia, 1998; Gouveia et al., 2011; Kohn, 1977; Rokeach, 1973; Schwartz, 1992). Specifically in the international context, some theoretical models have reunited evidences about this area, as described by Schwartz (1992). However, regarding the *Functional Theory of Human Values,* despite its efficacy to explain multiple psychosocial phenomena (Aquino, 2009; Cavalcanti, 2009; Coelho, 2009; Coelho Junior, 2001; Diniz, 2009; Medeiros, 2008; Pimentel, 2004; Santos, 2008; Vasconcelos, 2004) and its integrator and parsimonious characteristics, when compared to previous models (e. g. Inglehart, 1991; Schwartz, 1992), not much is known about its adequacy outside Brazil. More concretely, only a few studies could be found about this theory in other countries (Gouveia et al., 2011; Boer, 2009; Guerra, 2009).

First of all, it is important to list the characteristics of the Functional Theory. This is a recent theoretical model regarding human values, developed by Gouveia (1998, 2003, 2012), which intends to comprehend human values through a functional perspective. According to the literature, this model points out the values as (1) criterion of orientation which guides human actions and (2) cognitive expressions of one's basic needs (Gouveia, Fischer & Milfont, 2009; Gouveia et al., 2010). Thus, this definition is balanced by four basic theoretical suppositions:

(a) *The benevolent nature of human being.* In the Functional Theory, the man is seen as naturally good (Maslow, 1954), which implies in orientation guided by positive aspects of life. For this reason, only positive values are taken in consideration.

(b) *Motivational basis.* Human values can be thought as cognitive representations of individual needs (Maslow, 1954), social and institutional demands (Parsons, 1951; Tönnies, 1887/1979) that insinuate the restriction of personal impulses (Merton, 1949), ensuring a healthy and safe environment (Inglehart, 1977).

(c) *Terminal characters.* In Gouveia's model the human values take only the terminal aspect in consideration. This decision is justified

by the basis of parsimony, as Rokeach (1973) himself assumes that this aspect can be represented for about a dozen and a half of specific values. Besides, this would be more appropriated and coherent with the idea of human values being desirable goals.

(d) *Guiding human actions*. Human values are comprehended as individual guide-principals or general categories that lead to people behaviors, being culturally contextualized and transcending situations or objects (Gouveia, Milfont, Fischer & Santos, 2008).

As previously mentioned, according to the Functional Theory, human values are presented in two fundamental dimensions: type of orientation and type of motivator. While the first dimension is composed by three types of orientation (*personal*, *central* and *social*), the second one is composed by two types of motivator (*materialistic* and *idealistic*). When these two dimensions are combined and crossed in a two-dimensional space, they give origin to a structure mapped in a 3 (type of orientation: *personal*, *central* and *social*) x 2 (type of motivator: *materialistic* and *idealistic*) design, demonstrated by the Figure 1.

	Values as guide principles of behavior		
	Personal Goals (by the individual himself)	*Central goals (the overall purpose of life)*	*Social goals (the individual in community)*
Idealistic needs (life as a source of opportunities)	**Excitement** Emotion Sexuality Pleasure	**Suprapersonal** Beauty Knowledge Maturity	**Interactive** Affectivity Social support Belonging
Materialistic needs (life as a source of threat)	**Promotion** Success Power Prestige	**Existence** Personal stability Health Survival	**Normative** Obedience Religiosity Tradition

(Left vertical axis label: Values as an expression of needs)

Fig. 1. Functions, subfunctions and specific values.

According to this Figure, human values are organized in a two-dimensional space, in a duplex configuration with two facets: type of orientation (represented by personal and social values, localized at the ends, and central values at the central position) and type of motivation (divided in materialistic and idealistic values, located in different places). When combined and crossed, these two dimensions (type of orientation and type of motivator) give origin to six subfunctions in which the human values are organized: social-materialistic (*normative*), social-idealistic (*interactive*), central-materialistic (*existence*), central-idealistic (*suprapersonal*), personal-materialistic (*promotion*) and personal-idealistic (*excitement*). These six subfunctions are also equitably organized at the three orientation criteria: *social* (*interactive and normative*), *central* (*suprapersonal and existence*) and *personal* (*excitement and promotion*).

As previously mentioned, very few studies outside Brazil have been developed. More specifically, only three references could be found (Boer, 2009; Gouveia et al., 2010; Guerra, 2009) and only one of them focused on verifying the adequacy of this measure, with a sample of participants from Spain.

Furthermore, the present study aimed to reunite findings about human values, presenting evidences about the Functional Theory in twelve countries: Germany, Argentina, Brazil, Colombia, Spain, Filipinas, Honduras, England, Israel, Mexico, New Zealand and Peru. This was its main goal, willing to specifically test the structural hypothesis (central values locating in between personal and social values, which would locate in opposite sides, while idealistic and materialistic values would locate in different areas). The invariance of structure and content of human values were also tested through the countries.

2. Method

2.1. Participants

Data was collected on a sample composed by 4.990 people from twelve countries, with mean age of 24.2, most female (57.7%). All the samples were non probabilistic. The characteristics of each one of them are described next:

(1) *Germany*. 156 participants from general population; mean age of 22.6 years (*sd* = 6.27); most female (53.8%).

(2) *Argentina*. 406 participants from general population; mean age of 24.5 years (*sd* = 9.39); most female (66%).
(3) *Brazil*. 1.235 participants (56% of college students); mean age of 26 years (*sd* = 9.60); most female (59.4%).
(4) *Colombia*. 230 participants (56.5% of college students); mean age of 22.6 years (*sd* = 6.27); most female (53.8%).
(5) *Spain*. 874 college students; mean age of 19.4 years (*sd* = 11.53); most female (54.4%).
(6) *Filipinas*. 279 college students; mean age of 22.6 years (*sd* = 6.27); most female (53.8%).
(7) *Honduras*. 199 participants from general population; mean age of 27.1 years (*sd* = 10.26); equally distributed about the gender.
(8) *England*. 298 participants (76,2% of college students); mean age of 22.3 years (*sd* = 8.24); most female (73.2%).
(9) *Israel*. 167 college students; mean age of 23.1 years (*sd* = 2.07); most male (58.7%).
(10) *Mexico.* 274 participants (58% of college students); mean age of 28.1 years (*sd* = 10.62); equally distributed about the gender.
(11) *New Zealand.* 257 college students; mean age of 19.9 years (*sd* = 11.53); around ¾ of them were female.
(12) *Peru.* 615 participants (48.8% from general population); mean age of 28.2 years (*sd* = 11.20); most male (51.1%).

2.2. Measures

The data was obtained by multiple independent studies. However, even though there were more than one variable of interest in these studies, the only measure to be described is the one regarding human values, which is the main focus of the present study.

For measuring human values, the Basic Value Survey (BVS; Gouveia et al., 2008) was used. This scale is composed by 18 specific human values, and for each one of them, two descriptions are given. These descriptions aim to represent the inherent content of each one of the values. For example, health is described as "to look after your health at all times, not just when sick; not to be sick". This measure contemplates all of the six described subfunctions and

the 18 values are equitably distributed by them. For answering the Basic Value Survey, the participant must indicate the importance that each one of the human values have in his/her life, in a seven point scale, varying from 1 (Completely unimportant) to 7 (Of the utmost importance).

2.3. Procedures

Researchers from several different countries were invited to participate in a cross-cultural project about human values during the years 2007 to 2010. The data was collected in these countries in their native language, with patronized instructions on how to respond to the questionnaire. The application process occurred in classrooms (although the participants answered the paper sheet individually) and in public places, such as public squares. All of the participants were informed about the volunteer character of the study and also about its anonymity. Additionally, they were informed about the ethical processes in researches with human beings.

2.4. Data analysis

Two statistical softwares were used to analyze the data. PASW19 was used to calculate descriptive statistics and perform the confirmatory multidimensional scaling (Proxscal). In this case, previously to the elaboration of the Euclidian distance matrix, the values were transformed into z scores, admitting mean of 0 and standard deviation of 1. After this, the spatial organization of the human values was defined according to the Functional Theory, as the subfunctions assumed the following parameters for the dimension of type of orientation: *excitement* [1.0], *promotion* [1.0], *existence* [0.0], *suprapersonal* [0.0], *interactive* [-1.0] and *normative* [-1.0]. In the case of the dimension of type of motivator, the parameters assumed by the subfunctions were: *excitement* [0.5], *promotion* [-0.5], *existence* [-1.0], *suprapersonal* [1.0], *interactive* [0.5] and *normative* [-0.5]. Therefore, each one of the human values was forced to occupy one specific spot in space. The ordinal level was assumed, allowing tie breaks. Tucker's Phi (ϕ) was used as measure of the model's adequacy, accepting values from .90 or higher (Van de Vijver & Leung, 1997).

The GPA (*Generalized Procrustes Analysis*, version 2.5) was used to evaluate the reproductivity of the spatial structure of human values. This procedure is necessary when the goal is to consider multiple cultures (Schwartz & Sagiv, 1995). In this case, aiming to establish a parameter of comparison, an aggregated correlation matrix was calculated considering the twelve countries. This is the mean correlation matrix, calculated through specific matrixes by each country, assuring that all of them have equivalent scores (Fontaine & Fischer, no prelo; Muthén, 1994). Basing on this matrix, the spatial structure (MDS) was tested. However, a problem is that the coordinates of specific values (items) in this matrix and the coordinates of specific countries cannot be directly compared. Because of that, we aimed to transform these coordinates into comparable ones through GPA (Borg & Groenen, 1997; Commandeur, 1991; Commandeur, Kroonenberg & Dum III, 2004), which calculates the configurations in a way that they will correspond without affecting the relative distances between points (localization of values) inside each one of the spatial configurations. This statistical procedure allows the coordinates of specific values to become comparable. The similarity between the joint configuration and the specific ones from each country becomes an indicator of toughness and cross-cultural stability of the theorized structures of values; the S-stress of until .20 and the total fit equal or superior to .90 were considered proofs of the theoretical structure adequacy.

3. Results

The structural hypothesis indicated that the central values would occupy the middle of the spatial configuration; by their sides would be the personal and social values, while the idealistic and materialistic values would be located at different locations on the two-dimensional space. In each country, multidimensional scaling was performed, considering Tucke's Phi as equal or superior to .90. Results turned out to be satisfactory in all countries ($\phi \geq 0,93$), allowing us to affirm that human values are configured in a 3 x 2 dimensional space, as theorized. Next, are demonstrated the Figures 2 and 3, which represent the structure of values from Germany and Argentina.
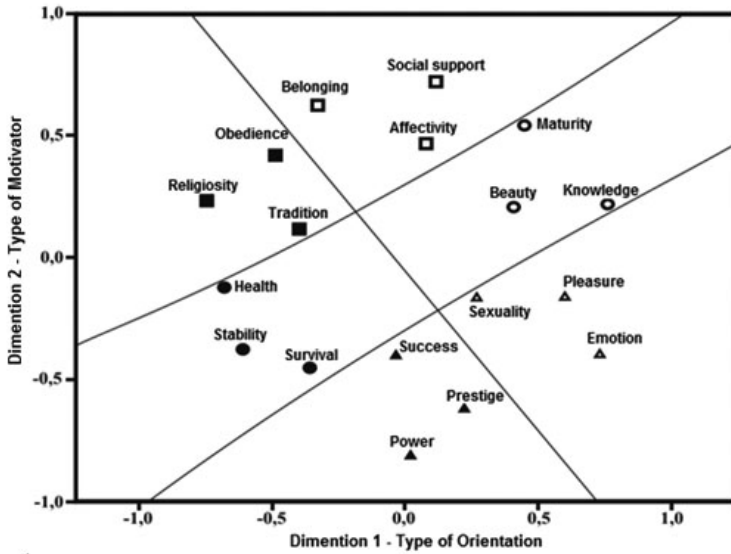
Fig.1. Spatial representation of human values from Germany.

It is possible to observe clearly that the theorized structure is found. In other words, social and personal values are separated by the central values and the materialistic and idealistic values are located at different spaces.
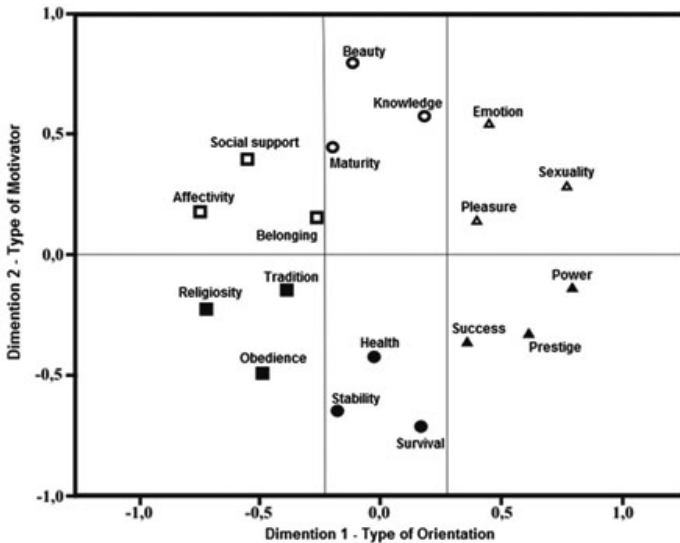
Fig. 3. Spatial representation of human values from Argentina.

In both figures, human values are presented according to the hypothesized structure, which clearly reproduces two theoretical dimensions. The adequacy of these spatial solutions was confirmed by Tucker's Phi (.94) in both countries.

GPA analyzes were used to test the equivalence of the structures. After GPA, the spatial coordinates were directly compared between the general aggregated configuration (pooled) and the specific configurations from each country. Similarity between these configurations suggests the stability of the structure, which was tested in the twelve cultures. The S-stress (raw stress) from the two-dimensional structure of the joint matrix was equal to .12, and presented Tucker's Phi equal to .94. This configuration was taken as reference and the results are reported in Table 1.

Table 1. GPA analysis to compare structures in the 12 countries.

Countries (n)	GPA		Tucker's Phi	S-stress
	Total Fit	Loss		
Germany (156)	0,943	0,057	0,942	0,111
Argentina (406)	0,940	0,061	0,941	0,112
Brazil (1.235)	0,917	0,083	0,940	0,115
Colombia (230)	0,923	0,078	0,943	0,110
Spain (874)	0,977	0,023	0,941	0,113
Filipinas (279)	0,961	0,039	0,941	0,113
Honduras (199)	0,919	0,081	0,937	0,121
England (298)	0,964	0,036	0,940	0,115
Israel (167)	0,922	0,078	0,945	0,106
Mexico (274)	0,927	0,073	0,938	0,118
New Zealand (257)	0,912	0,088	0,942	0,112
Peru (615)	0,912	0,088	0,938	0,119
Aggregated Matrix	—	—	0,937	0,120

According to the Table 1, the S-stress mean was equal to .113, with range varying from .106 (Israel) to .121 (Honduras). In the case of each one of the individual configurations, the mean correspondent value (Tucker's Phi) was equal to .94, ranging from .937 (Honduras) to .945 (Israel). It was also demonstrated that the mean of total fit scores was equal to .93, and all the countries presented scores superior to .90. The worst fit score was presented by Peru and New Zealand (.912 for both) and the best fit was presented by Spain (.977). In none of the cases the loss in the "superposition" (fit) of the aggregated configuration in relation to the specific configurations from the countries reached .10. Therefore, these are complementary evidences of the adequacy of the theoretical structure of values.

4. Discussion

Even though the main goal of the present study was reached, it still has its limitations. First of all, we cannot leave aside the matter of samples. Although they are predominantly large samples, they were not probabilistic ones, which prevents the elaboration of generalized results for other places or situations.

Another aspect that can generate biases is related to the fact that only one type of measure was taken, and it was a self-reported one. This method contains some disadvantages, such as the falsification of answers given to the questions, which makes the results a bit different from what they really should be (Cozby, 2003; Kohlsdorf & Costa Junior, 2009). Also, the results we can obtain when people answer according to what they think that other people would want them to answer are particularly worrying, and this can happen frequently in studies regarding human values (Schwartz, Verkasalo, Antonovsky, & Sagiv, 1997). By the way, an alternative to this problem would be to develop studies using *Implicit Association Test* (Karpinski & Steinman, 2006).

Despite the existence of some limitations, the results reported in this study seem to be plausible to the theoretical model in evidence. This study aimed to reunite evidences about the structure of values in several countries, according to the Functional Theory of Human Values. Thus, as previously explained, the model suggested by Gouveia (Gouveia, 2003; Gouveia et al., 2008; 2010) demonstrated adequacy, suggesting that it is plausible to think about values as being represented by six subfunctions, each one of them composed by three items, which are organized in a two-dimensional space, according to the two main identified functions: type of orientation (personal, central and social) and type of motivator (idealistic and materialistic).

Regardingthe structure of values, in theory the functions are organized in two-dimensional space, in a duplex configuration with two facets: type of orientation (represented by personal and social values localized at the ends and central values at the central position) and type of motivation (divided in materialistic and idealistic values, located in different places) (Gouveia, 2003; Gouveia et al., 2010; Rokeach, 1973). However, there is also a third class of values named by Gouveia as central values, which were demonstrated by all the samples to be localized at the center of the multidimensional space, organizing the other values. Maybe this aspect is a explanation of the fact that

suprapersonal and existence are the only subfunctions united in some countries, even though they are not easily differentiated from the others ones (Gouveia, 1998, 2003; Gouveia, Fischer & Milfont, 2009).

Finally, the observed results in this study were congruent to those ones reported by Gouveia et al. (2010), when only one country was considered: Spain. This fact seems to suggest that the Functional Theory of Human Values is able to give and important contribution to the study area of human values, since it integrates previous models (Inglehart, 1991; Schwartz, 1992), and is also more parsimonious than the others.

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Testing values structure in Paraíba: Evidences from the Functional Theory of Human Values

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Abstract: This study aimed to know the structural adequacy of the Functional Theory of Human Values (Gouveia, 2012) in the brazilian northeast region, specifically in the state of Paraíba. For this study, 12.706 people from general population of Paraíba participated, with mean age of 17 years (sd = 9.62), most female (58.5%). Participants answered the Basic Value Survey (BVS; Gouveia, 2003), an instrument composed by 18 items, answered in a 7 point scale (from 1 = *Completely Unimportant*, to 7 = *Of the utmost important*), that has two describers to represent the content of each value, and evaluate the importance of each specific value as a guide-principle in one's life. The structural hypothesis was tested, representing values in two dimensions: *type of orientation*, which predicts that central values are located between personal and social values; and *type of motivator*, asserting that idealistic and materialistic values occupy different spaces; the crossing of these dimensions originates the six theorized subfunctions. Such structure was tested through confirmatory multidimensional scaling (*Proxscal*), adopting Tucker's Phi (ϕ) as fit index of the model. Coherently with the theoretical model, the Tucker's Phi (ϕ) was .94, situated above the recommended value, and demonstrating satisfactory solution, which indicates that the six subfunctions can be represented in a two-dimensional space 3 (*type of orientation*) X 2 (*type of motivator*). Therefore, this study gathered empirical and theoretical evidences attesting the structural adequacy of the Functional Theory in the state of Paraíba.

1. The Functional Theory of Human Values

Conducting a systematic review about human values theoretical models, Gouveia (1998) identified some limitations about the definition of essence and nature of values. Thus, even recognizing the clear contribution of authors such as Rokeach (1973), Kohn (1977), Inglehart (1977, 1991) and Schwartz (1992), Gouveia (1998, 2003; Gouveia et al., 2008, 2009, 2010, 2011) developed the *Funcionalistic Theory of Human Values*. This new theoretical model, that nowadays already presents studies with about 50.000 people from Brazil and other 20 countries, demonstrates consistent results regarding its adequacy (Fischer, Milfont, & Gouveia, 2011; Gouveia, 2013; Gouveia et al., 2010, 2011; Lima, 2012; Medeiros, 2011; Vione, 2012; Souza, 2012).

Gouveia defines human values as (1) criterion of orientation which guides human actions and (2) cognitive expressions of one's basic needs (Gouveia et al., 2009, 2010). He also takes in consideration four theoretical assumptions:

(a) This theory assumes the *benevolent nature of human being*, as the man is designed as naturally good (Maslow, 1954). This statement implies in the search of positive aspects of life and for this reason only positive human values are taken in consideration.

(b) Human values have a *motivational basis* and therefore they can be thought as cognitive representations of individual needs (Maslow, 1954), social and institutional demands (Parsons, 1951; Tönnies, 1887/1979) that insinuate the restriction of personal impulses (Merton, 1949), ensuring a healthy and safe environment (Inglehart, 1977).

(c) Even though in literature we are able to find distinctions between instrumental and terminal values (Rokeach, 1973), in Gouveia's model the human values take only the terminal aspect. This decision is justified by the basis of parsimony, as Rokeach (1973) himself assumes that this aspect can be represented for about a dozen and a half of specific values. Besides, this would be more appropriated and coherent with the idea of human values being desirable goals.

(d) At last, the human values are comprehended as individual guide-principals or general categories that lead to people behaviors, being culturally contextualized and transcending situations or objects (Gouveia et al., 2008).

In harmony to these assumptions, Gouveia admits the following consensual characteristics for the definition of human values (Gouveia et al., 2009, 2010): a) they are concepts or categories b) about desirable states of existence, c) transcend specific situations, d) assume different levels of importance, e) guide the selection and evaluation of events and f) represent cognitively the human needs. Furthermore, these two last statements are considered as the two essential functions that highlight the Functional emphasis to approach human values.

1.1. Type of orientation: the guiding function to behavior

Regarding human values, the personal/social dichotomy is not recent (Tönnies, 1887/1979). However, it is more clearly defended by Rokeach (1973) and also considered important for the typology of individualism/collectivism (Hofstede, 1984; Triandis, 1995). Generally, it is estimated that people who are guided by *personal* values are egocentric and have intrapersonal focus, while the people who are guided by *social* values have an interpersonal focus or prioritize life in society (Gouveia, 2013). Therefore, Gouveia did not restricted the values to these two types of orientation, identifying and defending the existence of a third one, named as *central.* More concretely, in a revision of empirical studies about human values, this author observed that some values were not specifically personal or social, although congruent to both of them. These values were named as *central* because they are located between the other two types of orientation, being the structural basis of the other values (Gouveia, 2003).

It is important to distinguish what Gouveia calls of central values from what Schwartz (1992) calls mixed values. Gouveia et al. (2003) point to the comprehensiveness of these motivational types that include more than one idea, which justifies the name of mixed values. For example, *security* involves personal and social elements. Central values, presented in Gouveia's theory, demonstrate theoretical and empirical support. They are the basis from where the other human values are developed, representing cognitively the polarization of basic needs, such as eat, sleep and drink water, and other types of more advanced needs, such as esthetic and cognition (Gouveia et al., 2011).

In a few words, the type of orientation or the guiding function of human values is represented by three main criterions: *personal, central* and *social.*

Moreover, the second function regarding human values will be presented next. It is referred to the cognitive expression of human needs.

1.2. Type of motivator: the function to express human needs

Gouveia et al. (2009, 2010) affirm that it is possible to identify human values as being the cognitive representation of human needs (Maslow, 1954; Parsons, 1951). Inglehart (1977, 1991) was one of the authors that truly considered this function in his own theoretical model, suggesting the existence of two types of cultural values to represent them: basic needs (materialistic) and more advanced needs (post-materialistic). Gouveia (1998, 2003) used the concept of human needs from Maslow (1954) as one of his main references. Although his dissertation did not defended the hierarchy of needs, which estimates that a more advanced need will only be considered if a basic one is fulfilled, this author points out the thoughts of Maslow as extremely significant.

Keeping these theoretical bases in mind, Gouveia (2003) illustrates the existence of two types of motivators: *materialistic (pragmatics) or humanitarians (idealistic)* (Inglehart, 1977; Marks, 1997). The *materialistic or pragmatic* human values evidence practical ideas, thoughts about the present moment, immediate interests and observation of conducts that attend to recent cultural patterns. When people are guided by this type of motivator, it is expected that they show orientation to specific goals and normative rules (Gouveia et al., 2011). Therefore, humanitarian values represent universal orientation, based in principles and abstract ideas, without presenting immediate focus. The people who are guided by this type of motivator tend to have more maturity and be open-minded, enjoying the pleasure to simply exist and being opened to new possibilities and changes.

Then, in short terms, the second function of human values aims to cognitively express the human needs, corresponding to a value dimension named as type of motivator, which is divided into materialistic and humanitarian.

1.3. Human value's structure

As previously pointed out, according to the *Functional Theory*, the human values are presented in two different and essential categories, organized

in a two-dimensional space, in a duplex configuration with two facets: type of orientation (represented by personal and social values localized at the ends and central values at the central position) and type of motivator (divided in materialistic and idealistic values, located in different places). This structure can be represented in Figure 1.

		Values as guide principles of behavior		
		Personal Goals (by the individual himself)	Central goals (the overall purpose of life)	Social goals (the individual in community)
Values as an expression of needs	Idealistic needs (life as a source of opportunities)	**Excitement** Emotion Sexuality Pleasure	**Suprapersonal** Beauty Knowledge Maturity	**Interactive** Affectivity Social support Belonging
	Materialistic needs (life as a source of threat)	**Promotion** Success Power Prestige	**Existence** Personal stability Health Survival	**Normative** Obedience Religiosity Tradition

Fig. 1. Functions, subfunctions and specific values

According to this figure, two main facets are hypostatized from which the human values are structured. The horizontal axis corresponds to the function which guides human behavior (the type of orientation) and it is divided in three types (personal, central and social). The vertical axis defines the function of cognitively represent the human needs (type of motivator) and it is divided in two types (materialistic and idealistic). When combined and crossed, these two dimensions (type of orientation and type of motivator) origin six subfunctions in which the human values are organized: social-materialistic (*normative*), social-idealistic (*interactive*), central-materialistic (*existence*), central-idealistic (*suprapersonal*), personal-materialistic (*promotion*) and personal-idealistic (*excitement*). These six subfunctions are also equitably organized at the three orientation criteria: *social* (*interactive* and *normative*), *central* (*suprapersonal* and *existence*) and *personal* (*excitement* and *promotion*).

Therefore, as pointed out in the theoretical model, the six subfunctions can be structurally mapped in a 3 (type of orientation: personal, central and

social) x 2 (type of motivator: materialistic and idealistic) design. Moreover, it is suggested that the subfunctions located at the central type of orientation (*existence* and *suprapersonal*) indicate that this type of orientation can be considered as the main reference or main force to the other human values. This is suggested because this type of orientation highlights the polarization between basic (eat and drink) and advanced (esthetical and cognitive) needs.

In other words, the *Functional Theory of Human Values* (Gouveia, 2003; Gouveia et al., 2011) considers only terminal and positive values, coherently to the conceptions that point out the human values as desirable and the man as a benevolent human being. Furthermore, two main dimensions of human values are suggested, the type of orientation and type of motivator, that can be represented in a dimensional space. This formulation corresponds to the structural hypothesis, which is formal and can be statistically tested, for example, by multidimensional scaling.

Considering the given information, this study aims to know the structural adequacy of the Functional Theory (Gouveia, 2012), regarding Brazilian northeast, specifically the state of Paraíba.

2. Method

2.1. Participants

Data were collected on a sample of 12.706 people from general population of Paraíba. Participants' ages ranged from 8 to 86, with a mean of 20.10 (sd = 9.62) and most of them were female (58.5%).

2.2. Measures

The data was obtained by multiple independent studies. However, even though there were more than one variable of interest in these studies, the only measure to be described is the one regarding human values, which is the main focus of the present study.

For measuring human values, the Basic Value Survey (BVS; Gouveia et al., 2008) was used. This scale is composed by 18 specific human values, and for each one of them, two descriptions are given. These descriptions aim

to represent the inherent content of each one of the values. For example, *health* is described as "to look after your health at all times, not just when sick; not to be sick". This measure contemplates all of the six described subfunctions and the 18 values are equitably distributed by them. For answering the Basic Value Survey, the participant must indicate the importance that each one of the human values have in his/her life, in a seven point scale, varying from 1 (Completely unimportant) to 7 (Of the utmost importance).

2.3. Procedures

This study was primarily about the correlates of human values, being characterized as an ample project in which a team of contributors collected the data. The questionnaires were answered between the years of 2002 to 2010, individually and in groups, usually in collective contexts such as classrooms, companies and public squares. The questionnaire had all the information needed for the participant to understand its instructions, but one of the contributors was always around to explain any possible doubts. The participants were told that their answers would not be analyzed individually so that their confidentiality and anonymity were granted. Because of this, they were not asked to inform their names or any other aspect of their individual lives. However, people over 18 were required to sign a Statement of Consent, and the responsible people for the participants with less than 18 years were required to sign a similar Statement. The application process had the median duration of 20 to 30 minutes.

2.4. Data analysis

The statistical software PASW18 was used to analyze the data for descriptive analysis (mean, standard deviation), for the characterization of the sample, and also for multidimensional scaling (MDS, Proxcal analysis). At this point, the goal was to test the structural hypothesis. To this end, previously to the elaboration of the Euclidian distance matrix, the values were transformed into z scores. After this, the spatial organization of human values was defined according to the Functional Theory, assuming the following parameters for the dimension of type of orientation: *excitement* [1.0], *promotion* [1.0], *existence* [0.0], *suprapersonal* [0.0], *interactive* [-1.0] and *normative* [-1.0]. On the

other hand, regarding the dimension of type of motivator, the parameters were: *excitement* [0.5], *promotion* [-0.5], *existence* [-1.0], *suprapersonal* [1.0], *interactive* [0.5] and *normative* [-0.5]. Therefore, each one of the values was forced to occupy a specific position at space according to its belonging subfunction. The ordinal level was assumed, allowing tie breaks. Tucker's Phi (ϕ) was used as measure of the model's adequacy, accepting values from 0.90 or higher (Van de Vijver & Leung, 1997).

3. Results

Aiming to reach the main objective of this study, which was to test the structural hypothesis, a confirmatory multidimensional scaling (Proxcal) was executed, effecting the previously defined parameters. The main results of this analysis may be observed in the Figure 2.
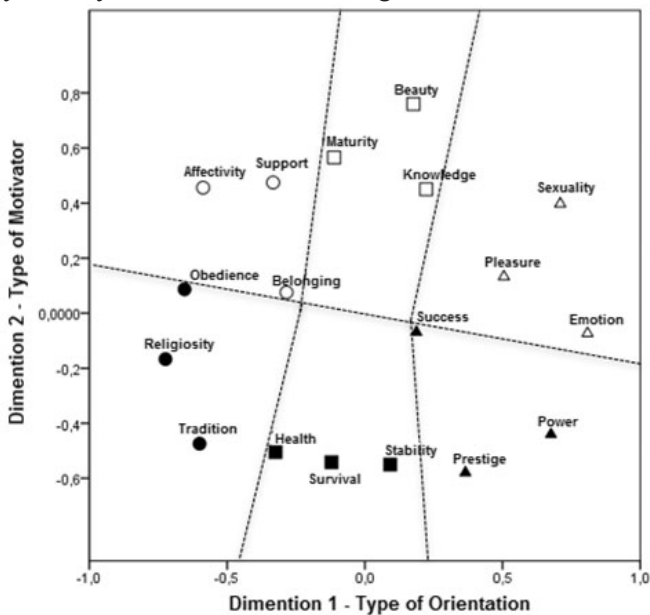
Fig. 2. Spatial representation of human values from Paraíba

As it is possible to observe in this Figure, the six subfunctions are represented in a two dimensional space, which demonstrate satisfactory

adequacy (Tucker's Phi = 0.94). Clearly, materialistic (closed pictures) and idealistic values (opened pictures) present themselves at different locations: social values (circles) are located at one side of the figure, while personal values (triangles) are located at the other side of the figure. Between them both, the central values are located, confirming the structural hypothesis.

4. Discussion

The main goal of this study was to verify de adequacy of the *Functional Theory of Human Values* (Gouveia et al., 2008, 2009, 2010) at Paraíba, testing specifically the structural hypothesis. It is believed that this aim was reached. The main results are discussed in the sequence.

First of all, it is impossible not to discuss about the sample bias. Although it was a large sample, it cannot be considered as representative of the population, so there must be a sequence to this study, amplifying the number of participants. Moreover, according to the authors of this theory (Gouveia, 2003; Gouveia et al., 2008 2009, 2010), human values are organized in two main functional dimensions: type of orientation (*personal*, *central* and *social)* and type of motivator (*materialistic* and *idealistic*), that origin six subfunctions. This seems to be a very complete theoretical model, but also very parsimonious, which allows the closure of lacunas that are present in other models (Rokeach, 1973; Inglehart, 1977; Schwartz, 1992).

The *structural hypothesis* indicated that central values would be located between personal and social values, and each of these ones would be located at opposite sides of the dimensional space. Moreover, materialistic and idealistic values would also occupy distinct positions in space. This hypothesis was confirmed through multidimensional scaling.

Type of orientation may be confused to the typology of values motivational types (Schwartz, 2005). However, Gouveia et al. (2011) indicate that central values cannot be confused to mixed values, because the first ones do not express multiple ideas (Schwartz & Boehnke, 2004).

Regarding the t*ype of motivator*, the similarity between it and the aspects of Inglehart's (Inglehart, 1977) theoretical model is suggested. However, there are also differences. While this author considers materialistic and post-materialistic values as extremes of the same cultural dimension, in

the Functional Theory materialistic and idealistic values are located at distinct dimensions in the individual level (Gouveia, 2003).

　　Concluding, according to the findings of the present study, the suggested theoretical model is considered as appropriated, at least at Paraíba, presenting evidences that support one of its hypothesis, the structural one. Therefore, it is necessary to search for more empirical support about this theory, developing other studies in different cultural contexts and countries.

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Deviant Value Structures – Random or Systematic?

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Abstract: Theory-based MDS analyses of values data from the European Social Survey (ESS, rounds 1 to 3) widely corroborate Schwartz´s structural model of human values (Bilsky, Janik & Schwartz, 2011). However, data of some countries showed deviations from the hypothesized value structure. We analyzed the values data of rounds 4 and 5 and focused on these countries. The results of our analyses are outlined, and recurring structural deviations are discussed.

1. Introduction

The European Social Survey (ESS) is a biennial, cross-sectional social survey which provides representative data about attitudes and values, beliefs, and behaviour patterns since 2002. Personal values are assessed by means of Schwartz's "Human Values Scale", a short version of the *Portrait Values Questionnaire* (PVQ21)[1]. The availability of representative values data from different countries enables researchers to test the cross-cultural stability of value structures as outlined in Schwartz's (1992) theory of human values (see Figure 1).

Multidimensional Scaling (MDS) of values data from rounds 1 to 3 widely corroborated Schwartz´s theory (Bilsky & Janik, 2010b; Bilsky et al., 2011), but data from some countries showed deviations from the hypothesized value structure. While possibly originating from random fluctuations, these deviations may also reflect methodological artefacts or culture-specific patterns when observed repeatedly.

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[1] http://www.europeansocialsurvey.org/index.php?option=com_content&view=article&id=65&Itemid=651

We now analysed the recently published data of rounds 4 and 5 and focused on five countries which exhibited recurrent deviations: Estonia, Hungary, Poland, Portugal and Sweden. In addition, we present information about those countries that participated in only one round before and in which deviations from structural expectations were found, too (Bilsky et al., 2011).

2. Method

2.1 Data

Data from ESS-rounds 4 and 5 were downloaded from the data archive of the European Social Survey[2], and survey data were cleaned by adopting the procedure described by Schwartz (2005). Next, Pearson correlation coefficients were computed from the absolute and unweighted scores for the 21 PVQ-items. Correlation matrices were computed separately per country and round, applying listwise deletion for missing cases. These correlation matrices provided the basis for our MDS analyses (Bilsky & Janik, 2010a,b).

Value types	Motivational goal
Universalism (UN)	Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature
Benevolence (BE)	Preservation and enhancement of the welfare of people with whom one is in frequent personal contact
Tradition (TR)	Respect, commitment, and acceptance of the customs and ideas that traditional culture or religion provide
Conformity (CO)	Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms
Security (SE)	Safety, harmony, and stability of society, of relationships, and of self
Power (PO)	Social status and prestige, control or dominance over people and resources
Achievement (AC)	Personal success through demonstrating competence according to social standards
Hedonism (HE)	Pleasure and sensuous gratification for oneself
Stimulation (ST)	Excitement, novelty, and challenge in life
Self-Direction (SD)	Independent thought and action—choosing, creating, exploring

Fig. 1. Structural relations among ten basic values (e.g. universalism), four higher-order values (e.g. self-transcendence) and their motivational goals (cf. Schwartz, 1992)

2.2. Data Analysis

2.2.1. Weak confirmatory MDS

We analysed the values data separately for country and round, using a *weak confirmatory ordinal MDS* (Borg & Staufenbiel, 2007) based on Schwartz's revised model of relations among basic values (value types). These relations are mapped onto nine sectors as depicted in Figure 1; one of them is further split into an inner and an outer part (see, Schwartz, 1992, for the rationale of this structure).

This model served as a template for specifying a *design matrix* (Table 1) which locates the ten basic values in two-dimensional space. From this design matrix a *starting-configuration* for the ordinal MDS is derived (Bilsky & Janik, 2010a; Bilsky et al., 2011). The starting-configuration is tailored to the respective values scale (here, to the PVQ21). It assigns identical coordinates to items that are indicators of the same basic value, as specified by the design matrix (Table1; Figure 2).

Using a theory-based starting-configuration reduces the danger of ending up in local minima and facilitates the interpretation of results (Borg & Groenen, 2005). It is preferable to a configuration that does not relate to the research question under study. However, this approach is not strictly confirmatory because it does not enforce the hypothesized regional solution onto the data (Bilsky et al., 2011).

Table 1. Design Matrix based on Schwartz's revised model (Bilsky & Janik, 2010a, p. 344)

Value Type	Type No.	Dimension 1	Dimension 2	Angle
UN	1	.34	.94	70
BE	2	.87	.50	30
TR	3	.98	−.17	350
CO	4	.49	−.09	350
SE	5	.64	−.77	310
PO	6	.00	−1.00	270
AC	7	−.64	−.77	230
HE	8	−.98	−.17	190
ST	9	−.87	.50	150
SD	0	−.34	.94	110

Notes: 1=Universalism(UN), 2=Benevolence(BE), 3=Tradition(TR), 4=Conformity(CO), 5=Security(SE), 6=Power(PO), 7=Achievement(AC), 8=Hedonism(HE), 9=Stimulation(ST), 0=Self-Direction(SD)
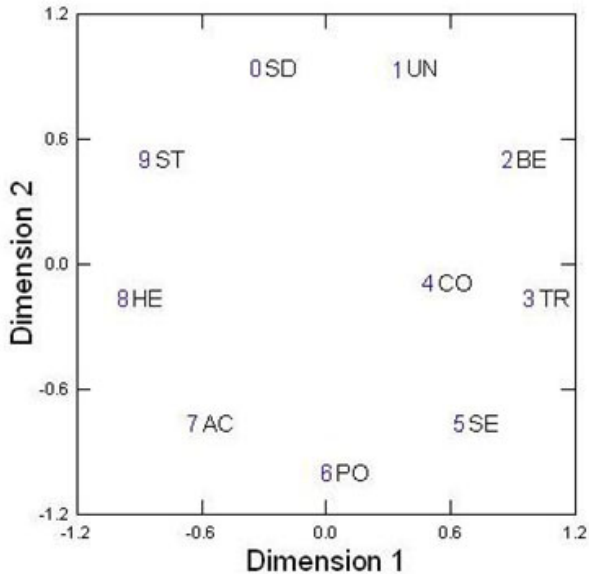
Fig. 2. Location of values according to a theory-based Design Matrix (Bilsky & Janik, 2010a, p. 344)

2.2.2. Generalized Procrustes Analysis (GPA)

MDS solutions cannot be compared easily because they may differ with respect to rotation, reflection, translation, and dilatation of the coordinate system. In addition, presenting a multitude of individual analyses complicates an overview of the structural similarities and differences.

Therefore, we subjected the individual configurations of rounds 1 to 5 to a Generalized Procrustes Analysis (GPA) with subsequent Principal Components Analysis (PCA) on the "consensus configuration" (i.e. the mean configuration computed from the individual configurations) in order to allow an optimal visualization in two dimensions. GPA was accomplished separately for Estonia, Hungary, Poland, Portugal, and Sweden. The program transforms all individual configurations at the same time so that configurations match as closely as possible (Borg & Groenen, 2005). To simplify an overview and facilitate a summary of our findings, we present the *consensus configurations* per country graphically.

2.2.3. Software

Computations of the weak confirmatory MDS were accomplished with SPSS-Proxscal (defaults for ties and iteration criteria: keepties; stress convergence=.0001, minimum stress=.0001, maximum iterations=100), using the starting configuration described before. The general procrustes analyses were realized by means of XLSTAT-GPA[3].

3. Results

The results of our *weak confirmatory MDS* are summarized in Table 2. Entries are restricted to those countries which showed at least one deviation from the hypothesized structure of basic values in rounds 1 to 5 (Italy was not included because it did not participate in rounds 4 or 5).[4]

Figure 3 presents the *mean configurations* for those countries which showed repeated deviations from the theoretical values structure in our past analyses (Bilsky et al., 2011). While Estonia participated only in rounds 2 to 5 of the European Social Survey, Hungary, Poland, Portugal, and Sweden participated in all five rounds.

4. Discussion

In the following discussion we first focus on the five countries that showed recurrent deviations from the hypothesized value structure in rounds 1 to 3. We then turn to those countries that participated in only one of the first three rounds and showed deviations from the expected structure, too (Bilsky et al., 2011). Finally, we comment on two general features of the values structure that deserve attention with respect to a possible refinement of the Theory of Universals in Values.

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[3] http://www.xlstat.com/en/learning-center/tutorials/generalized-procrustes-analysis-with-xlstat-mx.html

[4] A complete tabular summary for all countries can be requested from the first author on demand.

4.1. Recurrent deviations in former analyses

As regards the *Estonian* data, the individual analyses of rounds 4 and 5 did not confirm our former findings (Bilsky, Janik & Schwartz, 2011) that hedonism and stimulation values are mixed. Instead, both values could be separated as shown in Table 2. The mean (consensus) configuration shows, however, that the distinction between these values is all but clear when considering all rounds in which Estonia participated (Figure 3a). Furthermore, both the separate analyses of the Estonian data of rounds 2, 4, and 5 (Table 2), and the consensus configuration of all four rounds (Figure 3a) illustrate the difficulty to separate tradition and conformity. The mix of conformity and security values in the first two rounds of the *Swedish* data was not confirmed by the MDS analyses of rounds 3 to 5 (Table 2). Yet, the mean configuration of all five rounds points to the difficulties to separate these basic values in the Swedish samples (Figure 3e). Thus, the aforementioned analyses left some doubts about the discriminability of the adjacent values hedonism/stimulation, tradition/conformity, and conformity/security in Estonia and Sweden, respectively.

In contrast to these latter findings, stable values structures were found for the Hungarian and the Polish data across all five rounds. In the *Hungarian* and in the *Polish* samples universalism items were peripheral to benevolence in all five rounds (Table 2). This finding is supported by the consensus configurations of both countries (Figures 3b and 3c). We will get back to this finding later in this discussion. In the *Portuguese* data, security reversed with tradition and conformity in all five rounds (Table 2). This change of sequence is clearly mirrored in the mean configuration of all Portuguese rounds (Figure 3d). Whether this unique and stable pattern is culture-specific or just reflects semantic differences resulting from adapting the PVQ to the Portuguese language is still an open question.

4.2. Deviations in one-shot studies

Ten countries in the data set analysed by Bilsky et al. (2011) participated only in one of the first three rounds. In six of these one-shot studies minor deviations from the expected values structure had been found. In three of them these deviations could be replicated in rounds 4 and/or 5: In *Bulgaria* and

Romania universalism appeared again peripheral to benevolence, and in Latvia Hedonism and Stimulation could not be separated in rounds 3 and 4. This latter problem also occurred in rounds 4 and 5 of the *Cyprian* data set (Table 2).

4.3. General features and future directions

Aside from the particular deviations mentioned above, two general patterns deserve special attention.

The recurrent finding that *universalism* shows up *peripheral* to *benevolence* prompted us to screen all MDS plots of rounds 1 to 5 again. As can be easily verified for rounds 1 to 3, this pattern appears in the majority of MDS plots across all countries (see Bilsky & Janik, 2010b, for collection of all MDS plots). Inspection of the (unpublished) plots from rounds 4 and 5 confirms these findings.

As this structure looks similar to patterns found in our studies with older children (Bilsky, Niemann, Schmitz & Rose, 2005), we checked all MDS plots for a second pattern, too: *power peripheral to achievement.* Again, screening the results from rounds 1 to 5 revealed this pattern in the majority of MDS plots. Both deviations from Schwartz's structural model are integrated in Figure 4.

The above findings are a challenge to a circumplex model because they cannot be explained by only one (motivational) facet. In fact, *circumplex models neglect* one central feature to be found in many if not most scatterplots - *distance from the centre.* This feature, however, is important with respect to content and structure. Thus, Borg and Shye (1995) pointed to the fact that variables towards the centre of an MDS plot are likely to show higher mean intercorrelations with the other variables than variables towards the periphery. Focusing more on content, Dancer (1990, p. 372) stated that "variables represented by points in the innermost circle are more general in content than items represented by points in outer regions. Put another way, variables occupying positions in outer circles entail all that variables in inner circles entail, plus an additional level of complexity" (cf. Bilsky et al., 2005, pp. 246f.).

Table 2. Results of the Structural Analyses of ESS-Rounds 1-5

Country	ESS-round	Stress1	Distinct Regions	Sequence of Values	Deviations
Austria	1	.08	10	1,2,3,4,5,6,7,8,9,0	
	2	.09	10	1,2,3/4,5,6,7,8,9,0	
	3	.10	10	1,2,3,4/5,6,7,8,9,0	CO peripheral to SE
Bulgaria	3	.11	10	1/2,3/4,5,6,7,8,9,0	UN peripheral to BE
	4	.10	8	1/2,3/4,5,.6,7,[8+9],0	UN peripheral to BE; HE + ST mixed
	5	.10	10	1/2,3/4,5,.6,7,8,9,0	UN peripheral to BE
Croatia	4	.12	10	1,2,3/4,5,6,7,.8,9,0	
	5	.13	8	1/2,3/4,5,6,7,.[8+9],0	UN peripheral to BE; HE + ST mixed
Cyprus	3	.12	10	1/2,3/4/5,6,7,9,8,0	UN peripheral to BE; CO peripheral to SE; HE&ST reversed
	4	.11	6	[1+2],3/4,5,6,7,[8+9]0	UN + BE mixed; HE + ST mixed
	5	.11	8	1,2,3/4,5,6,7,[8+9],0	HE + ST mixed
Czech Republic	1	.11	8	[1+2],3/4,5,6,7,8/9,0	UN+BE mixed; HE peripheral to ST
	2	.10	8	1/2,3/4,5,6,7,[8+9],0	UN peripheral to BE; HE+ST mixed
	4	.11	6	[1+2],3/4,5,6,7,[8+9]0	UN + BE mixed; HE + ST mixed
	5	.10	8	1,2,3/4,5,6,7,[8+9],0	HE + ST mixed
Estonia	2	.12	6	2,1,[3+4],5,6,7,[8+9]0	UN&BE reversed; TR + CO mixed; HE + ST mixed
	3	.12	6	[1+2],3,4,5,6,7,[8+9]0	UN + BE mixed; HE + ST mixed
	4	.15	8	1/2,[3+4],5,6,7,8,9,0	TR + CO mixed
	5	.13	8	2,1,[3+4],5,6,7,8,9,0	UN&BE reversed; TR + CO mixed
Greece	1	.11	8	1,2,3,4,5,6,7,[8+9],0	HE+ST mixed; HE_10 between PO&AC
	2	.12	10	1,2,3/4,5,6,7,8,9,0	
	4	.12	10	1,2,3/4,5,6,7,8,9,0	
	5	.09	6	[1+2],3/4,5,6,7,[8+9]0	UN + BE mixed; HE + ST mixed
Hungary	1	.14	10	1/2,5,3/4,6,7,8,9,0	UN peripheral to BE; SE&TR/CO reversed
	2	.14	8	1/2,5,[3+4],6,8,7,9,0	UN peripheral to BE; TR + CO mixed; SE&TR+CO reversed; AC&HE reversed
	3	.16	8	1/2,3/4,5,6,7/8,9,0	UN peripheral to BE; AC peripheral to HE; CO_7 between SE&PO
	4	.14	10	1/2,.3/4,5,6,7,8,9,0	UN peripheral to BE
	5	.16	10	1/2,.3/4,5,6,7,8,9,0	UN peripheral to BE
Israel	1	.14	10	1,2,3/4,5,6,7,8,9,0	
	4	.15	10	1,2,3/4/5,6,7,8,9,0	TR/CO peripheral to SE
	5	.14	6	[1+2],5,[3+4],6,7,8,9,0	UN + BE mixed; TR + CO mixed; SE & TR + CO reversed
Latvia	3	.15	8	1/2,3/4,5,6,7,[8+9],0	UN peripheral to BE; HE + ST mixed
	4	.11	6	1,2,[3+4],5,6,7,[8+9]0	TR + CO mixed, HE + ST mixed
Poland	1	.11	10	1/2,3/4,5,6,7,8,9,0	UN peripheral to BE
	2	.11	10	1/2,3/4,5,6,7,8,9,0	UN peripheral to BE
	3	.11	10	1/2,3/4,5,6,7,8,9,0	UN peripheral to BE
	4	.11	10	1/2,3/4,5,6,7,.8,9,0	UN peripheral to BE
	5	.11	10	1/2,3/4,5,6,7,.8,9,0	UN peripheral to BE

Table 2 (continued)

Country	ESS-round	Stress1	Distinct Regions [b]	Sequence of Values [a]	Deviations
Portugal	1	.12	10	1,2,5,3/4,6,7,8/9,0	SE&TR/CO reversed; HE peripheral to ST
	2	.12	10	1,2,5,3,4,6,7,9/8,0	SE&TR, CO reversed; ST peripheral to HE
	3	.09	8	1,2,5,3/4,6,7,[8+9],0	SE and TR/CO reversed; HE+ST mixed
	4	.11	10	1,2,5,3/4,6,7,8,9,0	SE and TR, CO reversed
	5	.11	6	1,2,5,3/4,6,7,[8+9],0	SE & TR/CO reversed; HE + ST mixed
Romania	3	.14	10	1/2,3/4/5,6,7,8,9,0	UN peripheral to BE; TR/CO peripheral to SE
	4	.14	10	1/2,3/5/4,6,7,8,9,0	UN peripheral to BE, SE between TR/CO
Slovakia	2	.11	10	1,2,3/4,5,6,7,8,9,0	
	3	.12	8	[1+2],3/4,5,6,7,8,9,0	UN + BE mixed
	4	.09	6	[1+2],3/4,5,6,7,[8+9],0	UN + BE mixed, HE + ST mixed
	5	.08	8	1/2,3/4,5,6,7,[8+9],0	UN peripheral to BE; HE + ST mixed
Slovenia	1	.11	10	1,2,3/4,5,6,7,8,9,0	
	2	.13	6	1,2,[3+4],5,6,7,[8+9],0	TR + CO mixed; HE + ST mixed
	3	.12	10	1,2,3/4,5,6,7,8,9,0	
	4	.13	8	1,2,3/4,5,6,7,[8+9],0	HE + ST mixed
	5	.12	8	1/2,3/4,5,6,7,[8+9],0	UN peripheral to BE; HE + ST mixed
Sweden	1	.13	8	1,2,3,[4+5],6,7,8,9,0	CO + SE mixed
	2	.12	8	1,2,3,[4+5],6,7,8,9,0	CO + SE mixed
	3	.13	10	1,2,3/4,5,6,7,8,9,0	
	4	.14	10	1,2,3/4,5,6,7,8,9,0	
	5	.13	10	1,2,3/4,5,6,7,8,9,0	
Turkey	2	.14	10	1/2,3,5,4,6,7,8,9,0	UN peripheral to BE; CO&SE reversed
	4	.14	8	1,2 3,5/4 6,7,[8+9],0	SE peripheral to CO; HE + BE mixed

Notes: 1=Universalism(UN), 2=Benevolence(BE), 3=Tradition(TR), 4=Conformity(CO), 5=Security(SE), 6=Power(PO), 7=Achievement(AC), 8=Hedonism(HE), 9=Stimulation(ST), 0=Self-Direction(SD)
[a] x/y: x = peripheral position, y = central position
[b] [x+y]:x and y mixed
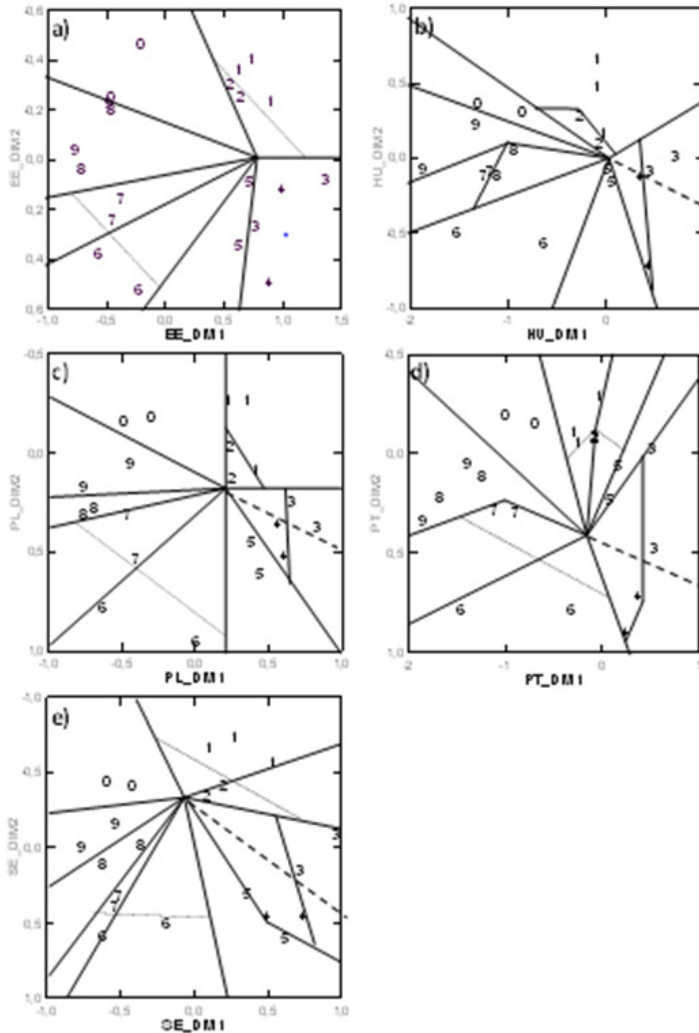
Fig. 3. Generalized Procrustes Analysis: Mean (consensus) configurations after PCA for. a) Estonia (rounds 2-5), b) Hungary (rounds 1-5), c) Poland (rounds 1-5), d) Portugal (rounds 1-5) and e) Sweden (rounds 1-5). Alternative splits for tradition and conformity according to the original (dashed line) and revised models (solid line; cf. Schwartz, 1992, p. 14 and p. 45).

Notes: 1=Universalism (UN), 2=Benevolence (BE), 3=Tradition (TR), 4=Conformity (CO), 5=Security (SE), 6=Power (PO), 7=Achievement (AC), 8=Hedonism (HE), 9=Stimulation (ST), 0=Self-Direction (SD)
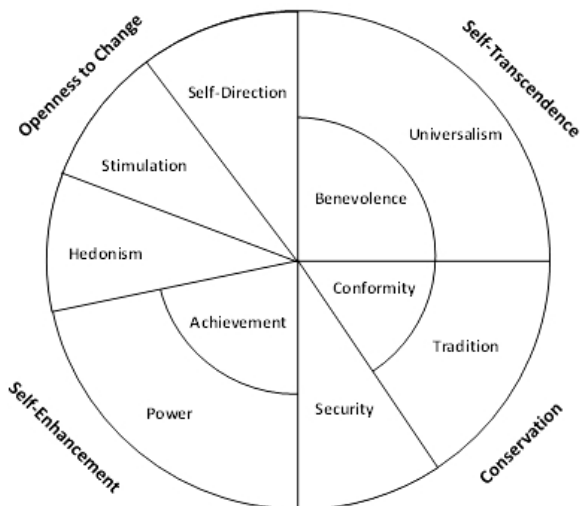
Fig. 4. Alternative model of relations among motivational value types

Of course, the deviations from Schwartz's structural model might be due to a "biased" selection of value items in the PVQ21 or to their limited number. This, however, could be easily checked by screening value configurations derived from other value scales, e.g., the PVQ40 or the Schwartz Value Survey (SVS).

Anyway, disentangling the complexity of value structures and clarifying inconsistent findings from past research would certainly profit from considering *additional facets* and from taking alternative and more complex value structures into consideration. Thus, Figure 4 would suggest looking for a *radex-structure* which results from the combination of an angular and a radial facet in a plane with one common centre (Borg & Shye, 1995). Alternatively, the combination of two facets could result in a *duplex-structure*, as discussed by Borg and Bilsky (2013) or indicated by Bilsky, Borg, Janik and Groenen (2013).

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Community, Autonomy, and Divinity Scale: Identifying Facets of Moral Codes

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Abstract: This study aimed at investigating the items of the Community, Autonomy, and Divinity Scale (CADS) to propose a short version based on Facet Theory and to identify its structural adequacy on a Brazilian sample. The 44 items of the original scale were subjected to a facet analysis, using the tool of a mapping sentence. Taking part in this research were 845 participants from general population (45% university students), mainly females (59%), with a mean age of 27.3 years (SD = 10.30). Participants answered a questionnaire composed by the CADS, the Basic Values Questionnaire (BVS-18), and sociodemographic questions. The mapping sentence tool indicated that the four proposed facets could be applied to all 44 items. Reliability analyses were performed and 14 items were excluded for presenting lower inter-item correlations. The final 30 selected items were tested based on the dimensions proposed theoretically: the ethics of community, the ethics of autonomy, and the ethics of divinity. This structure was tested by multidimensional scaling (*Proxscal*). The agreement was evaluated by means of the Tucker's Phi (ϕ) congruence coefficient. Coherently with the theoretical model, this index was above the recommend value (0.96), suggesting the six subfactors based on the authorities can be represented according to a two-dimensional 3 (dimension: community, autonomy, divinity) x 2 (authority: formal vs. informal). These results suggest empirical evidence to the structural adequacy of the CADS model to the Brazilian context.

1. Introduction

To define morality is not a simple task. There is no single definition of the term "morality" accepted by the majority of theorists (Sunar, 2002). In general, accounts of morality present it as a code of conduct that aims at distinguishing right and wrong actions or behaviors (Gert, 2005). For Sunar (2002), morality is a group of rules of conduct that is based on one's conscience or on one's sense of right and wrong. However, to this author, morality is not related to any type of right or wrong behavior, but to relations between people.

Mainstream psychological theories of morality have focused on the study of the development of moral judgment and moral reasoning. These theories usually suggest that the cognitive processes of evaluating and reflecting on all the information provided regarding an action, including its consequences, are the basis of moral judgment (Miller, 2001; Sunar, 2002). Although these models have dominated research on morality, criticisms have been made to each theoretical approach, as they rarely investigate the endorsement of moral values, but different moral authorities and judgments in different levels of development. Also, researchers suggest that perceptions of justice and fairness are culturally dependent (Shweder, Mahapatra & Miller, 1987; Zimba, 1994).

In terms of relevance, these different contents of the moral domain across cultures might help understanding cross-cultural issues, for example, the cultural shock or acculturative stress experienced by immigrants (Berry, Kim, Minde, & Mok, 1987). Additionally, recent studies have focused on understanding morality in in-group identification processes, emphasizing its importance to a positive evaluation of one's self and one's in-group (Leach, Ellemers, & Barreto, 2007; Roccas, Klar, & Liviatan, 2006).

Haidt, Koller, and Dias (1993) propose that new theoretical models of morality need to place less emphasis on the role of harm and consequences of actions. Instead, they need to emphasize the role of emotions and the role of culture. This proposal was chosen because it suggests a broader view of morality, focusing not only in the development of moral reasoning, but also in the expression of moral judgment and the importance of individual and cultural differences to morality.

In order to investigate these cultural differences, the study of moral codes or moral values might provide valuable information. To identify the

profile of a cultural community, a common research strategy is to investigate its individuals' shared values. People's value hierarchies have been consistently studied in psychology because they reflect the principles and beliefs favored by their cultural community and embodied in their cultural practices (Wan, Chiu, Peng, & Tam, 2007).

Moral values, or standards, are defined "as conceptions of the 'good/bad', 'right/wrong', or 'obligatory/voluntary' that influence choice in human action" (Edwards, 1987, p. 123). As human values, they are also considered guidelines or principles in people's lives (Maio & Olson, 1998), and are also associated to one's culture (Schwartz, 1994; Shweder, 2003). The main difference between personal values and moral values is that the former are personal guidelines endorsed by individuals and reinforced by culture, related to many types of behaviors, whereas the latter are requirements imposed by other individuals or the society in general, that emphasize the regulation of interpersonal relationships. An individual may endorse a personal value without behaving accordingly; however, society expects an individual to act accordingly to moral values and norms.

Shweder (2003a) emphasizes the diversity of moral values (or moral goods) privileged in a cultural community, such as "autonomy, justice, harm avoidance, loyalty, benevolence, piety, duty, respect, gratitude, sympathy, chastity, purity, sanctity, and others" (p. 37). Shweder, Much, Mahapatra and Park (1997) proposed these moral values cluster into three ethics: moral codes or orientations used to guide an individual's conception of right and wrong. As proposed by Shweder, the three ethics can coexist as generally accepted values in the same culture, but with varying degrees of emphasis. These different discourses can be based on institutions of moral authority (e.g., the church, God, the family, or the self) or on different contents (e.g., valuing tradition, conformity to social norms, or freedom of choice). Also, the moral codes do not have a developmental sequence, but can be equally endorsed in any stage of life as they do not categorize individuals into high or low levels of moral reasoning (Jensen, 1998).

Ethics of Community. This code emphasizes a moral based on loyalty, duty, honor, respect, self-control, obedience to authority, and actions that are consistent with one's gender, social position, age or any other element of social roles. Basic sources of moral authority are the society as a whole and the family, as the most important in-group. The moral discourse of the ethics of community

emphasizes group membership (e.g., family, nation), role related obligations, duties, social order and social traditions (Jensen, 1995).

Ethics of Autonomy. This code defines the individual as the basic source of moral authority, restricted only by personal preferences and by the limitations imposed by other people's rights (Arnett, Ramos, & Jensen, 2001). Moral concepts center on equality of rights between individuals, independence, freedom of choice, personal well-being, needs, and desires (Jensen, 2004). For the ethics of autonomy, the central object of value is the individual. The moral discourse of autonomy is based on possible harm, fairness, rights and justice, and it is reflected on the legal system (Haidt et al., 1993).

Ethics of Divinity. The ethics of divinity expresses the important return of religiosity and spirituality to the moral domain. For some people, their moral concerns may be entirely related to their religious faith (Jensen, 2008). Religious and spiritual systems are important to around 90% of the world population, and their main function is to guide the individual towards the values they should strive for, and provide them with psychological (e.g., faith, devotion) and behavioral (e.g., rituals) strategies to reaching these goals (Emmons, 2005; Shah, 2004). The moral discourse under the ethics of divinity emphasizes duties and obligations to a divinity, the authority of a god, spiritual entity or natural order, spiritual rewards or punishments (Jensen, 1995), following rules and traditions based on religious texts and authorities, and the search for meaning and connectedness. Faithfulness and humility towards God are important virtues (Shweder et al., 1997).

Guerra and Giner-Sorolla (2010) proposed a valid measure to investigate these moral codes. As measured by the Community, Autonomy, and Divinity Scale (CADS), each moral code is divided in two subscales, emphasizing different moral authorities. The ethics of community is divided into an emphasis on social rules (e.g., *It is socially accepted*) and on family (e.g., *The family considers it unacceptable*) as sources of moral authority. The ethics of autonomy emphasizes the moral authority of one's own conscience (positive rights: e.g., *It expresses someone's autonomy*), and the moral authority of other people's rights (negative rights: e.g., *It restricts individual's rights*). Finally, the ethics of divinity emphasizes religious rules (e.g., *It is God's will*) and nature (e.g., *It is unnatural*) as moral authorities.

2. Method

2.1. Participants

Taking part in this research were 845 participants from general population (45% university students), mainly females (59%), with a mean age of 27.3 years (SD = 10.30). In relation to religion, participants declared to be mainly Catholics (48%), with a moderate to high level of religiosity (M = 2.50; SD = 1.14).

2.2. Instruments

Participants answered a questionnaire composed by the CADS and sociodemographic questions.

Community, Autonomy, and Divinity Scale (CADS). Developed by Guerra and Giner-Sorolla (2010), this scale is composed by 44 items, divided in two subscales: morally right (22 items) and morally wrong (22 items). Participants are requested to read each item and indicate with what frequency the items justify someone's action as right or wrong, by completing the question "*An action or behavior is morally right/wrong if…*" using a Likert-type scale (ranging from 1 – *Never* to 7 - *Always*). Previous research has shown that these items are subdivided in three main second-order factors: *Community*, which emphasizes moral norms and values based on social and family rules; *Autonomy*, which suggests that people should do as they please, expressing their positive rights, but only if their actions do not harm anyone, expressing negative rights; and *Divinity*, which emphasizes moral norms and values based on religious rules and on natural law.

2.3. Procedures

The mapping sentence tool was used to guide the process of analyzing each CADS item, based on Shweder's et al. (1997) theoretical proposal. This mapping sentence consists of 4 facets (presented in Table 1) and it allows a systematic evaluation of each item's content.

The moral judgment of the action was labeled as right (j1) or wrong (j1). Frequency includes seven categories regarding the frequency of use of each item based on a specific moral authority, which could be the society (a1), the family (a2), the individual (a3), religion (a4), or nature (a5). This judgment was applied in relation to a moral object it uses: rules and laws (o1), traditions (o2), one's desire (o3), one's faith (o4), individual rights (o5), and other (o6). For this facet, the category 'other' was included, because the proposed categories are not expected to be exhaustive when characterizing this facet.

Table 1. CADS mapping sentence

For an action to be considered morally…	it has to be used…	with/by…	in relation to…
[Judgement]	[Frequency]	[Authority]	[Object]
Right (j1) Wrong (j2)	Never (f1) Almost never (f2) Rarely (f3) Sometimes (f4) Often (f5) Almost always (f6) Always (f7)	Society (a1) Family (a2) Individual (a3) Religion (a4) Nature (a5)	Rules and laws (o1) Traditions (o2) Desire (o3) Faith (o4) Rights (o5) Other (o6)

All analysed items were included in a questionnaire that contained the complete CADS (see complete CADS in Appendix) and sociodemographic questions (age, sex, religion, level of religiosity). The questionnaire was posted on-line and the link to the website was distributed in social networks, e-mails and universities.

3. Results and Discussion

After detailed analysis, the mapping sentence was applied to all 44 items of the original scale. In order to propose a shorter version of the scale, reliability items were performed for the items in each moral dimension (Community, Autonomy, or Divinity). Cronbach's Alphas for the three moral

codes in both complete and shorter version are presented in Table 2.

A total of 14 items were excluded for presenting low inter-item and low item-total correlations, and the final CADS-Short presents 30 items.

Table 2. Cronbach's alpha for the CADS and CADSS by moral code

	Community		Autonomy		Divinity	
	CADS	CADSS	CADS	CADSS	CADS	CADSS
Number of items	15	10	10	9	18	11
Cronbach's alpha	.86	.83	.77	.77	.91	.85

Note. CADS = complete original scale with 44 items; CADSS = shorter version with 30 items.

The final 30 selected items were tested based on the theoretically proposed dimensions: the ethics of community (used to judge actions based on social and family authority); the ethics of autonomy (used to judge actions based on the authority of one's individual positive and negative rights); and the ethics of divinity (used to judge actions based on the natural and religious authority).

The proposed six-dimensional structure was tested by multidimensional scaling *(Proxscal)*. From raw data, Euclidean distances were created by transforming the data in z scores. The spatial structure was defined according to the CADS theory, with each dimension forced to occupy a specific position. The fit of the structure to the data was evaluated by means of the Tucker's Phi (φ) congruence coefficient.

Figure 1 clearly presents the six subscales organized according to the type of moral code (community, autonomy, or divinity) on a clear circular structure.
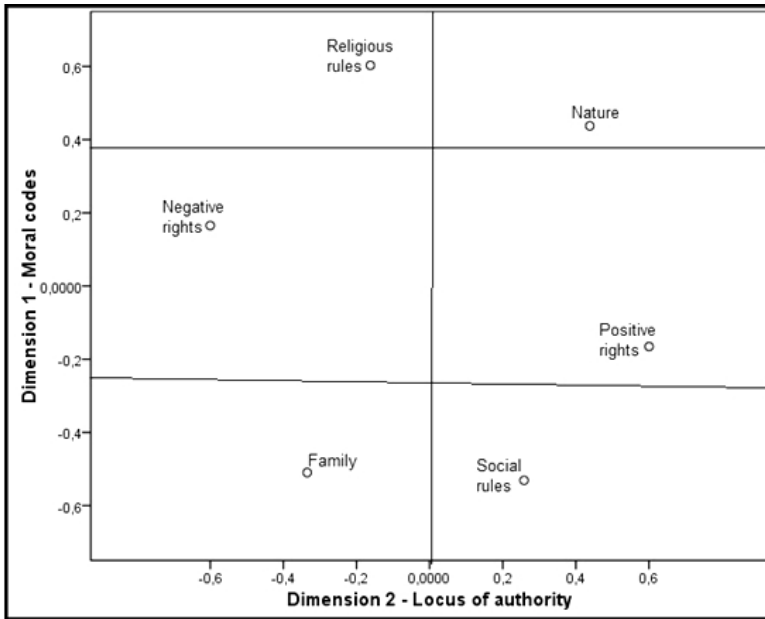
Fig.1. Spatial representation of moral codes

Coherently with the theoretical model, Tucker's Phi was above the recommend value (0.96), indicating fit to the data. These results suggest that moral values can be organized according to their content (moral code: community, autonomy, divinity), corroborating previous analyses of this scale (Guerra & Giner-Sorolla, 2010). However, regarding the *locus* of the authority, expected results were observed for the ethics of autonomy and the ethics of divinity, but not for the ethics of community. Family and social rules subscales were presented on inverted positions to those expected. Further analyses are necessary to investigate this spatial presentation and the meaning attributed by the participants to the data.

Even though the structure adequacy proposed was only partially corroborated, the CADSS can be considered a parsimonious instrument, suggesting an empirical evidence of its validity on the Brazilian context. Although this instrument presents favorable evidence of adequate psychometric parameters, more research is necessary to test it in different samples. Also, a further reduction would be necessary as a 30-item instrument may still be considered large and difficult to introduce in many research studies.

In addition, we verified the association among the six moral codes proposed, as well as their association with the participants' level of religiosity, age, and gender. Correlational analyses suggested significant and positive correlations among the six moral codes, varying between 0.14 ($p < 0.01$; for *Religious rules* and *Positive rights*) and 0.65 ($p < 0.01$; for *Social rules* and *Family*). Participants' level of religiosity was directly associated with *Religious rules* ($r = 0.35$; $p < 0.01$) and with *Nature* ($r = 0.16$; $p < 0.01$), both subscales of the Divinity dimension, which corroborates previous research (Guerra & Giner-Sorolla, 2010). Participants' age was also directly correlated with *Social rules* ($r = 0.15$; $p < 0.01$), *Negative rights* ($r = 0.16$; $p < 0.01$), and *Nature* ($r = 0.25$; $p < 0.01$), but negatively correlated with *Religious rules* ($r = -0.11$; $p < 0.05$). These results suggest that older participants tend to use more frequently concerns for other people's rights, nature and social norms to justify actions as right or wrong when compared to younger participants. These findings corroborate the increase in community endorsement as people age suggested by Jensen (2008).

Table 3. Gender differences in moral codes

Moral codes	Groups				t test		
	Female		Male				
	M	SD	M	SD	t	df	p
COMMUNITY	4.55	0.83	4.40	0.72	1.676	374	.09
Social rules	4.56	0.83	4.38	0.77	2.130	374	.03
Family	4.51	1.02	4.46	0.89	0.44	374	.66
AUTONOMY	4.96	0.83	4.91	0.85	0.59	374	.55
Positive rights	4.78	0.93	4.74	0.83	0.39	374	.69
Negative rights	5.14	1.12	5.07	1.36	0.58	372	.56
DIVINITY	4.84	1.22	4.77	1.21	0.52	374	.60
Religious rules	4.87	1.43	4.77	1.47	0.60	374	.55
Family	4.76	1.22	4.76	1.25	0.02	374	.98

T tests were conducted in order to investigate moral codes scores variation according to the participants' gender (see Table 3). A significant result was observed only for social rules, with female participants presenting higher endorsement of this moral code. These results are in accordance with previous research (Guerra & Giner-Sorolla, 2010), suggesting there is no great difference between men and women regarding moral codes' endorsement.

Future studies would need to investigate different types of scale validity as well as moral codes association with different constructs, such as honor concerns or human values. Further investigation is also suggested regarding the moral codes association with participants' age, in order to identify possible changes in moral codes endorsement based on generational and developmental changes (Jensen, 2008).

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Appendix

The Community, Autonomy, and Divinity Scale (CADS)

Source: Guerra, V. & Giner-Sorolla, R. (2010). The Community, Autonomy, and Divinity Scale (CADS): A new tool for the cross-cultural study of morality. *Journal of Cross-Cultural Psychology, 41*, 35-50.

INSTRUCTIONS: With what frequency the phrases below justify someone's action as right? Using the 7-point rating scale, please rate the frequency to which every justification for acts presented below are RIGHT according to your judgement.

1	2	3	4	5	6	7
Never	Almost never	Rarely	Sometimes	Often	Almost always	Always

An action/behavior is right if…

_____...it is a religious tradition.
_____...by doing it, the person gains respect from the family.*
_____...it follows nature's law.*
_____...it is a customary practice of the community.
_____...it allows a person to defend herself/himself.

_____...it expresses someone's autonomy.*
_____...it is socially accepted.
_____...it is God's will.*
_____...by doing it, the person gains respect from society.
_____...it is socially approved.*
_____...it respects the natural order.*
_____...it respects family traditions.*
_____...it is in accordance with the scriptures.*
_____...it expresses personal choice and liberty.*
_____...it respects someone's privacy.*
_____...it is in accordance with religious authority.*
_____...it follows the rules of one's social group.
_____...people will gain God's approval from it.
_____...it is in accordance with true faith.
_____...it is accepted by the family.*
_____...people respect the social order.
_____...it protects someone's interests and needs.*

In the next section, the sentences cover what YOU would consider a morally
       WRONG action or behaviour.

An action/behavior is wrong if…
_____...it opposes religious authority.
_____...it pollutes the spirit.*
_____...it is against the scriptures.
_____...it is degrading to the soul.
_____...it is unnatural.*
_____...it brings disorder to society.
_____...it is socially condemned.*
_____...it is against true faith.*
_____...the family considers it unacceptable.*
_____...it restricts the individual's rights.*
_____...it is against the rules of one's social group.*
_____...society considers it unacceptable.*
_____...it opposes the rules of society.*
_____...it is against God's will.*

_____...it restricts the freedom of choice of a person.*
_____...it opposes the beliefs of the family.*
_____...it is against the natural order.*
_____...it restricts someone's privacy.*
_____...it restricts personal choice and liberty.*
_____...it is considered a sin.
_____...it restricts the possibility of a person to defend herself/himself.*
_____...it is against nature's law.*

Note. * CADSS items.

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Testing the Structure of the Acceptance of Rape Myths Short Scale in Brazil

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Abstract: Rape myths consist in stereotyped and/or false beliefs about rape victims, as well as the offenders, that create certain hostility towards the victims. The scarcity of information about the theme in Brazil motivated this research, which aimed to propose a short version of the Rape Myths Acceptance Scale based on Facet Theory, identifying its adequacy to a Brazilian context. The validated version of the scale, composed by 34 items, was subjected to a facet analysis, aiming to evaluate the adequacy of each item to a mapping sentence. Taking part in this research were 281 undergraduate Law students, mainly females (57.6%), with a mean age of 23.6 years (SD = 3.78). Participants answered a questionnaire composed by the Rape Myths Acceptance Scale and sociodemographic questions. Based on the mapping sentence analysis, two items were excluded from all further analyses, as they were not mapped adequately to the sentence. After reliability analyses were performed, the final 20 selected items were tested through multidimensional scaling (*Proxscal*), based on the four empirical dimensions observed in Brazil (rape as an unimportant event; rape as a female excuse; women's responsibility; men's responsibility) and on two theoretical perceptions of these dimensions (perceptions on the rape; perceptions on who is responsible for the rape). Tucker's Phi (ϕ) congruence coefficient was used to evaluate the adequacy of the proposed structure to the data. This coefficient presented an adequate value (0.99), suggesting the data is coherent with the proposed two-dimensional model, emphasizing its adequacy to the Brazilian context.

1. Introduction

Sexual violence refers to any type of non-consented sexual activity, representing an important problem to public health and the legal system (Resende, Urzedo, Oliveira, Segundo & Jorge, 2011). Existing in many forms, (e.g., rape, seduction, sexual harassment), one of the main characteristics of sexual violence is the power inequality between the individuals involved (Motta, 2006).

In Brazil, the Health Ministry informed that 5,312 cases of sexual violence were registered in the country in the first semester of 2012 (Ministério da Saúde, 2012). Consequences of this type of violence are both physical and psychological, and they include: genital and body lesions, headaches, asthma, depression, panic syndrome and drug use, among others (Faúndes, Rosas, Bedone & Orozco, 2006). Victims usually feel embarrassed and guilty, and silence regarding the subject. Due to this fact, the World Health Organization estimates the number of rapes is larger than the reported 2 to 5% of crimes around the world (Villela & Lago, 2007).

When perceiving sexual violence as a type of gender violence (Pinto, Meneghel & Marques, 2007), research studies should discuss the construction of sex differences and its consequences to the occurrence of sex crimes. According to Porter (1992), rape may be understood as part of a patriarchal and sexist culture that emphasizes male force and superiority and condemns female sexuality.

The legal system, in general, treats victims and aggressors of sex crimes according to their social behavior and according to the beliefs and expectations of those involved. Defined as a complex set of beliefs that blame the victim, absolve the offender and minimize or justify aggression against women (Payne, Lonsway & Fitzgerald, 1999), rape myths serve to sustain and perpetuate such kind of violence. Research studies about sexual violence have, over the years, drawn more attention to the gravity and importance of this matter leading researchers to question what the factors involved in this theme are (Burt, 1980; Peterson & Muehlenhard, 2004).

Cultural attributions related to sexuality transform victims in defendants, suggesting women 'tease' men with their beauty and sensuality. Considering this behavior suggests that they want sex, men could lose control.

The theory of rape myths (Burt, 1980) suggest that these myths are related to gender stereotypes, distrust between genders, acceptance of interpersonal violence, and beliefs and attitudes that serve to deny or justify masculine sexual aggression towards women (Payne et al., 1999).

It is particularly important to discuss these cultural influences regarding gender stereotypes in the legal system. When observing the dynamics of judicial decisions in cases of sexual crimes, contradictory movements are perceived: although the system is built on an ideal of justice and impartiality, practical examples suggest that it helps perpetuating symbolic violence against women (Coulouris, 2004).

In order to evaluate the acceptance of rape myths, Payne et al. (1999) developed the Illinois Rape Myths Acceptance Scale (IRMA). This instrument is composed by 45 items that emphasize seven dimensions of rape myths:

a) *She asked for it.* This dimension suggests that the woman requested the violence when using short or revealing clothes, for example;
b) *It wasn't really rape.* This dimension suggests the act was consensual and that an adult woman could defend herself from an attack;
c) *He didn't mean to.* Suggests the men's aggression was unintentional and that it happened due to the existence of a male 'instinct' that would be responsible for his lack of control;
d) *She wanted it.* Items in this dimension emphasize that women desire rape as a sexual fantasy;
e) *She lied.* These items suggest the woman claims to have been raped as a vengeance towards a partner;
f) *Rape is a trivial event.* The aggression is not important and woman tend to overreact regarding its consequences;
g) *Rape is a deviant event.* Finally, these items suggest that this type of aggression rarely happens and that it would never be conducted by partners or friends of the victim.

This instrument was translated and validated to a Brazilian context by Scarpati, Guerra and Bonfim Duarte (2012). In this study, from the total of 45 items, 34 were considered acceptable in terms of presenting adequate parameters. The originally proposed seven dimensions were not observed in this context. Instead, four main factors were proposed:

a) *Blaming women*. This dimension consisted of 7 items that emphasize the victims responsibility for the crime (ex.: *When women go around wearing low-cut tops or short skirts, they're just asking for trouble*);
b) *Minimizing gravity*. This dimension consisted of 9 items suggesting that rape was not an important issue (ex.: *A rape probably didn't happen if the woman has no bruises or marks*);
c) *Rape as an excuse*. Consisting of 9 items suggesting that rape is used as an excuse to justify a consented sexual relation (ex.: *Many women secretly desire to be raped*);
d) *Male instinct*. Consisting of 9 items suggesting that for men raping is a natural reaction to sexual stimulation (ex.: *Rapists are usually sexually frustrated individuals*).

All the studies conducted have provided greater visibility to the issue, however, there are still many gaps in the literature on the subject, especially in relation to cultural aspects that support the discourses of victims' accountability, trivialization and perpetuation of violence, by legal professionals. The scarcity of information about the theme in Brazil motivated the present research, which aimed to propose a short version of the IRMA based on Facet Theory, identifying its adequacy to a Brazilian context.

2. Method

2.1. Participants

Taking part in this research were 281 undergraduate Law students, mainly females (57.6%), with a mean age of 23.6 years (SD = 3.78). They were mainly single (89%) and Catholics (53%), with a moderate level of religiosity (M = 3.09; SD = 1.25; range from 1 to 5).

2.2. Instruments

Participants answered a questionnaire composed by the Rape Myths Acceptance Scale and sociodemographic questions (sex, age, relationship status, religion, and level of religiosity).

The *Illinois Rape Myth Acceptance Scale* (IRMA), as previously described, should be answered using a five-point Likert scale, ranging from 1 (disagree) to 5 (agree).

2.3. Procedures

The mapping sentence tool was used to guide the process of analyzing each IRMA item, based on Payne et al. (1999) theoretical proposal. This mapping sentence consists of 4 facets (presented in Table 1) and it allows a systematic evaluation of each item's content.

The focus of the item was defined as the women (f1), the men (f2) or the rape in itself f3). Sense emphasizes the perception of the object or the means to the outcome and it was defined as the women asking for it (s1), the men being teased (s2), or the rape not being an issue (s3). Consequences to the perception are defined as the woman is to blame (o1), the man losing control (o2) or the rape happening (o3) for specific reasons, such as women wanting sex (m1), men acting by their instinct (m2) or other (m3). For this facet, the category 'other' was included because the proposed categories are not expected to be exhaustive when characterizing this facet.

Table 1. IRMA mapping sentence

When the focus is on…	*which is perceived as…*	*Consequences are that he/she/it…*	*For that reason*
[Focus]	[Sense]	[Outcomes]	[Motive]
Women (f1)	Asking for it (s1)	Is to blame (o1)	Wants sex (m1)
Men (f2)	Being teased (s2)	Loose control (o2)	Is instinctive (m2)
Rape (f3)	Not an issue (s3)	It happens (o3)	Other (m3)

After the mapping sentence analysis, all remaining items were included in a questionnaire that contained the validated IRMA and sociodemographic questions (age, sex, religion, level of religiosity).

Law students were contacted in their universities and invited to take part in the study. The questionnaire was administered in a collective classroom environment, but answered individually.

3. Results and Discussion

After detailed analysis, the mapping sentence was applied to 32 of the total of 34 items of the validated scale. The two excluded items did not map adequately to the sentence. Reliability analyses were performed and the strongest five items for each theoretical dimension were maintained in order to propose a short version of the IRMA.

The final 20 selected items were tested through multidimensional scaling (Proxscal), based on the four empirical dimensions observed in Brazil (rape as an unimportant event; rape as an excuse; women's responsibility; men's responsibility) and on two theoretical perceptions of these dimensions (perceptions on the rape; perceptions on who is responsible for the rape). Tucker's Phi (ϕ) congruence coefficient was used to evaluate the adequacy of the proposed structure to the data. This coefficient presented an adequate value (0.99), suggesting the data is coherent with the proposed two-dimensional model, emphasizing its adequacy to the Brazilian context.

Cronbach's Alphas for the four dimensions in both complete and short versions of the scale are presented in Table 2.

Table 2. Cronbach's alpha for the IRMA and IRMA-Short

	Female responsibility		Rape as not important		Male instinct		Rape as an excuse	
	Full	Short	Full	Short	Full	Short	Full	Short
Number of items	7	5	9	5	9	5	9	5
Cronbach's alpha	.74	.73	.69	.58	.69	.64	.64	.51

Note. IRMA-Full= complete original scale with 34 items; IRMA-Short = short version with 20 items.

Reliability indexes suggest that dimensions only the factors regarding female responsibility and male instinct could be considered reliable. More research is needed in relation to the conceptions of rape as an unimportant issue or an excuse.

It was proposed that these four factors could be organized according to two dimensions: perceptions on the rape in itself (excuse or not important) and perceptions on who is responsible for the rape (the aggressor or the victim).

This structure was tested by multidimensional scaling (*Proxscal*). The agreement was evaluated by means of the Tucker's Phi (ϕ) congruence coefficient. Figure 1 clearly presents the four factors organized according to the four empirical factors.
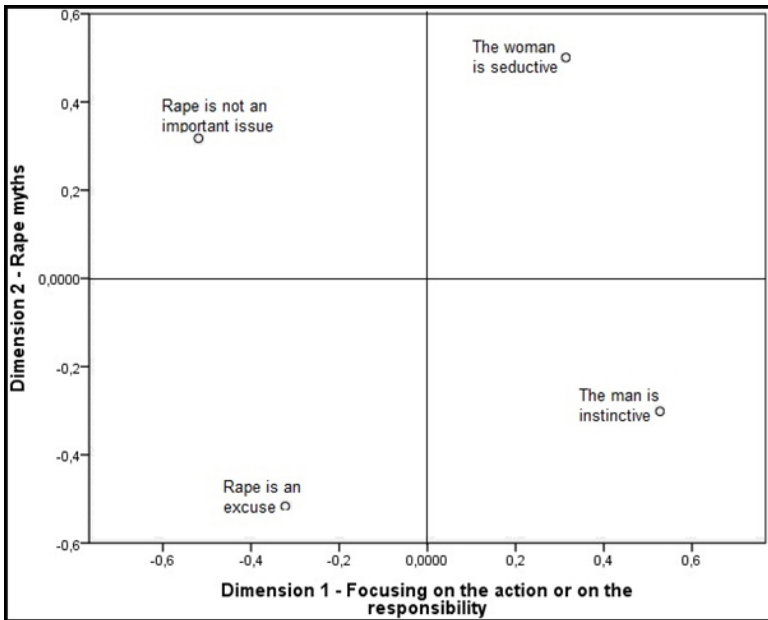
Fig. 1. Spatial representation of moral codes

Coherently with the theoretical model, Tucker's Phi was above the recommend value (0.99), indicating fit to the data. These results suggest that rape myths can be organized according to their content (blaming women, men's instinct, rape as not important, rape is an excuse). Regarding the focus on the action or on the responsible for the action, results were presented according to expected, with two rape myths organized in the left side of the graphic (rape as not important and rape as an excuse), and the other two organized in the right side of the graphic (male or female responsibility). Further analyses are needed to investigate this spatial presentation and the meaning attributed by the participants to the data.

Even though the structure adequacy proposed was corroborated, the IRMA-Short needs further investigation in order to improve its psychometric parameters in the Brazilian context.

In addition, we verified the association among the four facets of rape myths, as well as their association with the participants' level of religiosity and gender. Correlational analyses suggested significant and positive correlations among the four facets, varying between 0.26 ($p < 0.01$; for *Male instinct* and *Rape as not important)* and 0.41 ($p < 0.01$; for *Rape as not important* and *Rape as an excuse*). Regarding the level of religiosity, only one positive correlation was observed with *Female responsibility* ($r = 0.14$, $p < 0.05$).

Table 3. Gender differences in rape myths

| Facets | Groups | | | | t test | | |
| | Female | | Male | | | | |
	M	SD	M	SD	t	df	p
1. FR	2.14	0.88	2.20	0.88	0.56	276	,58
2. RNI	1.37	0.39	1.58	0.56	3.60	276	,00
3. RAE	2.09	0.66	2.43	0.76	3.99	276	,00
4. MI	1.85	0.88	2.20	1.07	2.95	276	,01

Note: FR = Female responsibility; RNI = Rape as not important; RAE = Rape as na excuse; MI = Male instinct.

T tests were conducted in order to investigate rape myth scores variation according to the participants' gender (see Table 3). Results suggested that male participants tend to present higher endorsement of the myths that suggest that rape is an unimportant issue or an excuse that women use. Men also tend to endorse the idea that it is difficult for men to control themselves. No significant difference was observed between men and women regarding the level of female responsibility on the violence. These results corroborate previous studies (Burt, 1980; Lonsway & Fitzgerald, 1994), suggesting that men tend to agree more with rape myths.

Future studies would need to investigate different types of scale validity as well as rape myths association with different constructs, such as honor concerns or human values. Also, due to the low general endorsement of the complete scale, proposing an implicit measure of rape myth acceptance should also be considered, in order to control the influence of the explicit content of the attitudes.

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Evaluating the Honor Scale as an Instrument for Exploring the Role of the Culture of Honor in the Propensity Towards Homicide in Northeastern Brazil: SSA vs. Factor Analysis

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Abstract: The Theory of the Culture of Honor states that, in certain societies, "honor" is the central aspect of a man's life, and violence is a sanctioned or even required form of conflict resolution (Reed, 1982; Cohen & Nisbett, 1996, 1997; Cohen, 1996, 1998), there being evidence that this might be the best explanation for the exceptionally high rates of homicide in Northeastern Brazil (Souza, Roazzi & Souza, 2011). The present study aimed to evaluate the validity of the "Honor Scale", developed by Rodriquez-Mosquera, Fischer, Manstead, and Zaalber (2008), as an instrument in the exploration of the propensity for homicide in a sample of 587 adults from Recife, Pernambuco, Brazil. A SSA analysis of the scale using Facet Theory produced a scalogram with a polar structure with four distinct facets of honor (Masculine, Feminine, Family, and Integrity), as predicted by the creators of the instrument, whereas a factor analysis failed to do the same. Using the items of the scale that were statistically associated to the personal experience with victims or authors homicides, an index created that showed not only a stronger association with the experience with homicides than any individual item, but also negative associations with the penalties that one would assign to someone who committed homicides. Thus, the Honor Scale appears to be helpful in predicting the experience with homicides and the tolerance for that type of crime, with SSA and facet theory succeeding in the validation such a useful psychometric tool when factor analysis was not.

1. Introduction

Homicide is defined as the killing of one human being by another. It is an omnipresent phenomenon in human history and geography, and one that has been criminalized since the rise of the first civilizations. It is possibly the most severe expression of interpersonal conflict, and, to this date, a social problem of global concern (Souza, Roazzi & Souza, 2011; National Geographic, 2012).

Among the many existing theories in criminology, one that is aimed specifically towards explaining the propensity to criminal homicide is the Culture of Honor, proposed originally by Reed (1982) and further developed by Cohen and Nisbett (1996, 1997), and Cohen (1996, 1998). The basic idea underlying this framework is that, in certain societies, a specific notion of "honor" is the central aspect of a man's life, and extreme violence, to the point of killing, is a sanctioned or even required form of conflict resolution, therefore, wherever one finds the predominance of such a culture, one is bound to find high rates of homicide.

Brazil is one of the countries with the largest number of homicides in the World, as well as in the number of homicides per 100 thousand inhabitants (UNODC, 2011; National Geographic, 2012). Within that country, the Northeastearn Region stands out as having the highest rates (Nóbrega, 2009; Nóbrega Júnior, 2009; UNODC, 2011). It has been suggested that such the Culture of Honor might be the best explanation for the high rates of homicide in Northeastern Brazil (Alencar, 2006; Magalhães, 2009), and, indeed, in a study testing the power of various criminological models in differentiating between murderers and non-murderers in a mixed sample of Brazilian men from that Region, such theory was the only one to emerge as a viable predictor (Souza, Roazzzi & Souza, 2011).

Recently, new instruments have been produced to measure different aspects of the Culture of Honor (Guerra, 2008; Guerra & Giner-Sorolla, 2010), one of them being the Honor Scale (Rodriquez Mosquera, Fischer, Manstead & Zaalber, 2008), which is based on the extent to which one feels bothered by different forms of threat to one's "honor". Such a test has been validated in the context of eight different countries, including Brazil, but only in a relatively limited manner (Guerra, Giner-Sorolla, Vasilijevic, 2012).

Given the empirical success of the theory of the Culture of Honor, it would seem that the Honor Scale is an instrument with a potential to be

useful for the evaluation of the propensity towards homicide by detecting a basic attitude towards threats to one's "honor". To evaluate this, one must first determine whether, within the context of a place with a traditionally high level of the culture in question, the Honor Scale displays psychometric signs of internal consistency. Then, it is necessary to determine if there is some link between the level of Culture of Honor as measured by the Honor Scale and the occurrence of homicides. Finally, one must see if the results on the Honor Scale are associated to an individual's level of acceptance or tolerance regarding the act of homicide.

2. The Theory of the Culture of Honor

The theory of the Culture of Honor was initially proposed by John Shelton Reed as a means to explain the fact that, in the late 1800's and early 1900's, some counties in Southern USA had a very high rate of homicides, whilst other counties, sometimes very nearby, did not (Reed, 1982). Based on historical records, he observed that, in most of these crimes, victim and killer knew each other previously and both of them understood the reasons for it. Reed also noticed that the communities with the highest historical rates of homicide tended to be those where herding was the main productive activity, as opposed to agriculture. From this he hypothesized that, while in agricultural societies cooperation is a necessity and interpersonal threats to one's livelihood is relatively low, in societies located in highlands, where the soil is dry and herding is the main source of resources, individual herders are more isolated from each other, and subject to a significant risk of losing their herds to some rival or foe. The rationale is that crops require a significant amount of collective work to be planted, tended, and harvested, plus being relatively difficult to steal in relevant amounts, whereas herds could be looked after by one individual, perhaps with some help from the immediate family, and could be stolen in their entirety overnight by an equally small number of people. Given the absence of government to enforce property rights of herd animals in such remote places, an individual had to project the image of being strong, potentially dangerous, and willing to react violently to threats, in order to avoid becoming a target. This means having to always be assertive, aggressive, and defend one's own standing against any type of challenge. For various biological, evolutionary,

and sociocultural reasons, this role traditionally falls upon the adult males. Thus, a Culture of Honor emerges where a man's reputation is the central point of his work and self-esteem, being it imperative for him to guard it, at all costs, against any possible contention.

In the late 1990's, Richard Nisbett and Dov Cohen not only analyzed social data on homicides that seemed to confirm the theory proposed by Reed (1982), but also did a series of well-designed studies in experimental social psychology where they compared young men from Southern USA (traditionally with high levels of the Culture of Honor) to those of Northern USA (considered to have low levels of the Culture of Honor) in regards to their propensity towards aggression and violence in response to insults or outrage (Cohen & Nisbett, 1996, 1997; Cohen, 1996, 1998). By employing actors and building specific scenarios of interaction, their investigations showed that, though both Southerners and Northerners were able to respond with violence, the Southern men were significantly more prone to do so, as well as to support the principle of using violence to correct a wrongdoing, the use of corporal punishment, reduced regulation of gun ownership, and so forth. They also found that such a pattern of behavior was something that occurred even in societies where the historical conditions that favor the emergence of the Culture of Honor had significantly changed during the last century or more, indicating the existence of strong sociocultural mechanisms through which such a culture, once existing, is transmitted from one generation to the next by means of tradition.

3. Culture of Honor and Homicide in the Brazilian Northeast

Northeastern Brazil, a region where the geography is that of dry and hot highlands, with a history of herding as one of the main productive activities, seems like an ideal place to test the framework suggested by Reed (1982) and expanded by Cohen and Nisbett (1996, 1997) and Cohen (1996, 1998). Indeed, there have been studies suggesting that a Culture of Honor might be the best explanation for the high rates of homicide recorded in the area (Alencar, 2006; Magalhães, 2009; Souza, Roazzi & Souza, 2011).

Alencar (2006) interviewed a group of 20 men in Northeastern Brazil that had been convicted for homicide and asked them about the motives for

their crime. The group of males aged between 20 and 49 years not only reported revenge for humiliation, threats, and/or aggression as their main reasons to kill, but also expressed the belief that, under the circumstances, their actions were morally justified.

Magalhães (2009) analyzes the influence of "shame" in criminally violent behavior in the Brazilian Northeast. His conclusion was that, in the region in question, dishonor, that is, the loss of social standing and reputation, is not acceptable at all for a man under any circumstances, especially when brought about by others. When faced with such a perspective, the only accepted form of avoiding such a shame is to retaliate the offense with severe and symbolic violence, or, preferably, with death. Such a reaction not only removes the negative shadow that was cast upon the individual when he was subject to the dishonor, but also puts him under a favorable light in the eyes of the community.

Souza, Roazzi, and Souza (2011) tested the efficacy of theories based on socioeconomic frustration, rationality of the decision-making processes, emotional attachment, testosterone, moral development, moral values, and the Culture of Honor in identifying murder convicts within a mixed sample of men from the Brazilian Northeast. A total of 160 adult males (57 convicted for homicide, 63 with other convictions, and 40 without criminal conviction) were submitted to a questionnaire, various psychological tests, and right-hand digit ratio measurements (to measure testosterone levels). Analysis of the data obtained produced findings indicating that, at least for the study population: (a) homicide is a unique type of crime that doesn't stem from violence or criminality in general, with violent crimes being more closely associated to non-violent crimes than to homicides; (b) there is usually no characteristic profile for a killer in terms of socioeconomic frustration, decision-making process, attachment, moral values, moral development, or testosterone; (c) the main reason for a homicide is the occurrence of an honor-related motivation, with the motivation for material gain being associated with other crimes (both types of motivation shown to be mutually exclusive); and (d) logistic regression models using both honor-related and material gain motivations as predictive variables are capable of correctly identifying more than 80% of the killers in a mixed sample of individuals. Such findings force one to discard all of the theories being tested, save only for the Culture of Honor, which is therefore considered as an effective model to explain homicide in the sample studied.

4. The Honor Scale

Rodriquez Mosquera, Fischer, Manstead, and Zaalber (2008) developed an instrument, called the Honor Scale, that is specifically designed to measure the Culture of Honor at an individual level. It is based on the assessment of the degree to which threats to one's honor translate into negative feelings of shame capable of unleashing responses of disapproval, withdrawal, or attack. It is comprised of 25 questions asking how bad one would feel about oneself, on a Likert scale of one to nine, if confronted with a given situation where one's reputation was under menace. The arithmetic mean of the answers to all the questions generates a general score. Also, subgroups of such questions are combined into four sets from which means are calculated for the intensity of the response to threats to each of the four subtypes of "honor" or reputation, these being:

- Masculine Honor: Having authority over one's family, supporting one's family, standing up for oneself, and being sexually active and experienced;
- Feminine Honor: Dressing in a modest, non-provocative, manner, and being sexually chaste outside of marriage;

- Family Honor: The good standing of one's relatives, and the personal maintenance and defense of such a social standing before the community;

- Integrity: Honesty, trustworthiness, reliability, morality, and adherence to one's own principles.

The Honor Scale has been validated in various countries, including Brazil, but only to a limited extent, and its usefulness in helping understand criminal homicide has yet to be determined (Guerra, Giner-Sorolla, Vasilijevic, 2012).

5. Study Goals

The present paper aims to validate the structure of the Honor Scale (Rodriquez Mosquera, Fischer, Manstead & Zaalber, 2008) within the context of the Brazilian Northeast by means of traditional One-Way Joining Tree Factor Analysis (Hair, Black, Babib, & Anderson, 2009) and SSA and Facet Theory (Guttman and Greenbaum, 1998; Levy, 2005; Hair, Black, Babib, & Anderson, 2009). It also aims to confirm the usefulness of such instrument by exploring the relationship between different aspects of "honor", as measured by the Honor Scale, and personal experience with homicides, as well as with attitudes towards homicide.

6. Method

6.1. Participants

A total of 587 adolescent and adult men and women from the Metropolitan Area of Recife, Pernambuco, Brazil, with a distribution age, sex, and education similar to those of the official census (IBGE, 2010).

6.2. Instruments

- Questionnaire addressing the individual's:
  - o Detailed sociodemographic data (sex, age, income, marital status, education, income, religion);
  - o Relationship with information and communication technologies (access, use, and experience);
  - o Relative importance assigned to religion, personal will, law, family, and tradition;
  - o Penalty believed to be deserved by someone who commits various types of crime under different circumstances;
  - o Personal knowledge of any specific victims (close or not) or authors of criminal homicide.

- The 25-item Honor Scale (Rodriquez Mosquera, Fischer, Manstead & Zaalber, 2008).

6.3. Procedures

A total of 77 undergraduate students, 61 majoring in business administration and 16 in psychology, from the Federal University of Pernambuco, were trained in the application of the instruments and the recording of the answers, and then instructed to approach potential subjects in the streets of the Metropolitan Area of Recife, taking care to collect data from equal amounts of men and women, those aged 30 or more or below 30, and those with fundamental education or more and those with less education, which is equivalent to the profile for the state of Pernambuco according to official census (IBGE, 2010).

6.4. Analysis

6.4.1 Validating the Structure of the Honor Scale

If, in the context of the present study, the Honor Scale is able to measure four distinct types of honor so as to allow for the calculation of indexes for Family Honor, Integrity, Feminine Honor, and Masculinity in the way pointed out by its authors, then one would expect to find a certain type of result in the application of multivariate techniques to the data regarding the 25 items on that instrument. In a Factor Analysis, one should find four separate factors, one for each type of honor, each comprised of the items predicted to be a measure of that type of honor. In a SSA analysis, one should find a scalogram where the items can be seen to organize themselves into four clearly defined facets, each corresponding to a type of honor.

6.4.2. Experience With Homicide

In regards to direct experience with homicide, other than one being the victim or author of such a crime his or herself, one may: (a) have lived in the same residence as a victim, (b) personally know a victim which did not reside in the same household as oneself, and (c) personally know the author of a homicide. If one codes such options with a one or a zero for, respectively, a "yes" or "no", the sum of such answers will constitute an index ranging from a minimum of 0 to a maximum of 3 that can be called Experience with Homicides.

6.4.3. Assessing the Link Between Culture of Honor and Experience with Homicide

Based on the notion that a high level of the Culture of Honor is endemic to certain geographical locations, the assumption is that such locations are prone to a higher homicide rate, thus, those with a high level of internalization of the Culture of Honor would be more exposed to the occurrence of such a crime around them. Therefore, it is to be expected that one will find significant correlations between some of the measures of the Culture of Honor and the Experience with Homicides.

7. Results

7.1. Description of the Sample

A total of 587 individuals, 286 (48.7%) male and 301 (51.3%) female, with a mean age of 34.2 years (SD=11.36), ranging individually from 13.1 to 82.1 years. Approximately 41.9% had up to an elementary school level of education, 35.3% high school, 16.0% a higher education degree, and 6.8% a graduate degree (specialization, master's, or doctorate). In terms of religion, roughly 51.6% were Catholic, 27.3% Protestant, 4.4% Spiritualists, 6.1% other faiths, 8.0% agnostic, and 2.6% atheists. Approximately 50.3% were single, 36.5% married, 8.5% under cohabitation, 2.6% divorced, and 2.2% widowed.

7.2. Reliability Analysis

For the sample in the current study, the Cronbach alpha scores for the indexes regarding the four types of honor foreseen by the Honor Scale were of .72 for Family Honor, .76 for Integrity, .79 for Feminine Honor, and .72 for Masculine Honor. The overall Culture of Honor index had a Cronbach alpha score of .85.

7.3. Factor Analysis

Running a Principal Components, Varimax Normalized, Factor Analysis, of the 25 items of the Honor Scale, a total of six factors were found

in accordance to Kaiser criterion, the sixth one having an eigenvalue of 1.02 and the sum of all factors explaining 57.7% of the total variance. Table 1 shows factor loadings, with the items shown grouped according to the type of honor they are intended to measure according to Rodriquez Mosquera, Fischer, Manstead, and Zaalber (2008).

Some of the factors found seem to correspond to the four types of honor predicted on the Honor Scale. Specifically, factor 1 seems to correspond to Integrity, factor 2 to Feminine Honor, and factor 5 to Family Honor. Masculine Honor does not correspond to a single factor, but rather to a combination of factors 3 and 4. The organization of items into factors and types of honor is, however, far from perfect.

7.4. SSA and Facets

Figure 1 shows an SSA for the 25 items of the Honor Scale using as the amalgamation scheme Ward's method and 1-Pearson r as the distance metric.

The items of the Honor Scale are clearly distributed along a radex pattern resulting from the combination of three polar facets, corresponding to Masculine Honor, Feminine Honor, and Integrity, plus a modular one with Family Honor at the center. The match between the facets and the four types of honor is near perfect.

Table 1. Factor Analysis (Principal components, Varimax Normalized) for the items of the Honor Scale. Values equal to or greater than .30 are highlighted.

Type of Honor	Item	Factor					
		1	2	3	4	5	6
Family	T01	0.09	0.15	0.07	0.10	**0.75**	0.00
	T07	0.16	0.03	-0.14	**0.38**	**0.64**	0.11
	T13	**0.40**	-0.05	0.05	**0.32**	**0.49**	-0.18
	T19	0.13	0.16	0.23	0.07	**0.62**	-0.03
	T22	**0.40**	-0.01	0.18	**0.32**	**0.40**	0.01
Integrity	T02	**0.48**	0.23	0.01	-0.24	**0.35**	0.22
	T06	**0.50**	0.17	-0.02	0.01	0.26	**0.42**
	T10	**0.51**	0.03	-0.03	0.22	0.23	**0.34**
	T14	**0.71**	0.07	0.00	0.13	0.05	-0.09
	T18	**0.72**	0.08	0.02	0.28	0.01	0.05
	T20	**0.74**	0.03	0.12	0.00	0.22	0.02
	T24	**0.61**	0.30	-0.07	0.18	0.03	-0.09
Feminine	T03	0.11	**0.75**	-0.03	-0.01	0.10	0.19
	T05	-0.06	**0.65**	-0.05	0.02	0.05	**-0.33**
	T09	0.14	**0.73**	-0.01	0.09	0.05	-0.11
	T12	0.17	**0.39**	0.23	0.05	0.27	**-0.58**
	T16	0.18	**0.73**	-0.07	0.06	0.07	0.25
	T23	0.07	**0.78**	-0.06	0.03	0.08	-0.07
Masculine	T04	0.07	0.17	**0.42**	**0.32**	0.12	**0.36**
	T08	0.00	0.09	0.24	**0.71**	0.25	0.12
	T11	0.03	-0.17	**0.84**	0.06	0.07	-0.08
	T15	0.22	0.08	0.24	**0.63**	0.29	0.01
	T17	**0.30**	0.03	-0.01	**0.71**	-0.01	-0.06
	T21	-0.03	-0.08	**0.84**	0.14	0.08	-0.04
	T25	**0.49**	0.04	-0.04	**0.47**	0.25	-0.04
Variance Explained		14%	12%	8%	9%	9%	4%
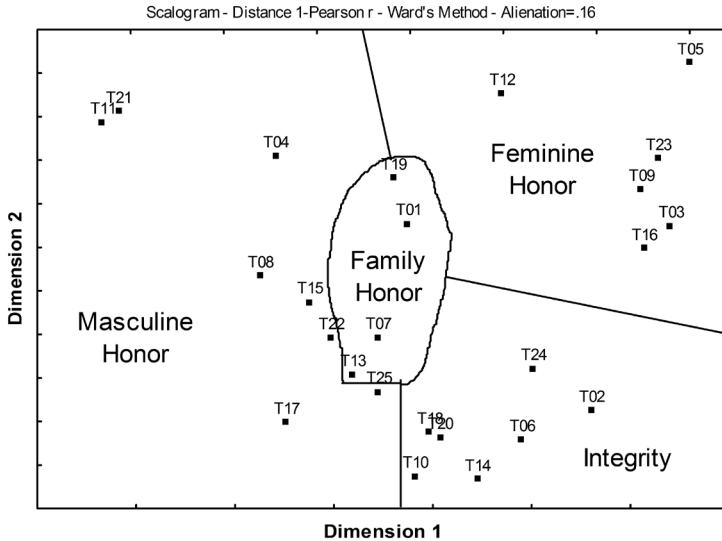
Fig. 1: Scalogram and facets for the 25 items of the Honor Scale.

7.5. Experience with Homicide

For the sample in the present study, the mean value of the Experience with Homicide was of 1.1 (SD=.94), with 32.4% having a "0", 30.8% a "1", 29.8% having a "2", and 7.0% a "3". Roughly 12.3% had lived with someone who became victim of a homicide, 52.5% personally knew a victim of homicide but did not live with them, and 46.7% personally knew the author of a homicide.

7.6. Honor Scale and the Experience with Homicide

Table 2 shows the Spearman correlation between indexes from the Honor Scale and the experience with homicide.

Masculine Honor seems to be positively associated to the experience with homicides, while Integrity is negatively associated, though not to all the associations with the items in either category are statistically significant. One of the items from Family Honor was positively associated to the experience with homicides (item T07).

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Table 2. Spearman correlations between items of the Honor Scale and the index of experience with homicide.

Type	Item		Correlation	
			Rho	p
Family Honor	T01	…your family had a bad reputation?	-0.02	0.66
	T07	… you did something to damage your family's reputation?	0.06	0.16
	T13	**… you were unable to defend your family's reputation?**	**0.08**	**0.04**
	T19	… your sister or mother had the reputation of sleeping around?	0.04	0.30
	T22	… you let other people insult your family?	0.00	1.00
Integrity	**T02**	**… you betrayed other people?**	**-0.09**	**0.03**
	T06	**… you were not loyal to your own values and principles?**	**-0.10**	**0.02**
	T10	… you had the reputation of being dishonest with others?	-0.01	0.87
	T14	… you were hypocritical?	-0.06	0.16
	T18	… you did not keep your word?	-0.05	0.26
	T20	… you had the reputation of being someone who is not to be trusted?	0.02	0.66
	T24	…you lied to others?	-0.05	0.23
Feminine Honor	T03	… you were known as someone who has had many different sexual partners?	-0.02	0.55
	T05	… you had sexual relations before marriage?	-0.01	0.89
	T09	… you change boyfriend/girlfriend often?	-0.01	0.74
	T12	… you wore provocative clothes?	0.06	0.18
	T16	… you were known as someone whom it is easy to sleep with?	0.01	0.75
	T23	… you slept with someone without starting a serious relationship with that person?	-0.04	0.39
Masculine Honor	**T04**	**...you did not defend yourself when insulted by others?**	**0.12**	**<.01**
	T08	**… you were known as someone who lacks authority over your own family?**	**0.12**	**<.01**
	T11	**… you had not yet had a sexual relationship?**	**0.09**	**0.03**
	T15	**… you lack authority over your own family?**	**0.08**	**0.05**
	T17	…you were unable to support your own family economically?	0.06	0.17
	T21	**…you had the reputation of being someone without sexual experience?**	**0.12**	**<.01**
	T25	… you were known as someone who cannot support a family?	0.04	0.30
Indexes		Family	0.01	0.8
		Integrity	**-0.09**	**0.02**
		Feminine Honor	0.00	0.98
		Masculine Honor	**0.14**	**<.01**
		Culture of Honor	0.03	0.41

One can take the average of all the items positively associated to the Experience with Homicide, the average of the reverse scoring of all the items that are negatively associated to it, and then take the average of these two

averages in order to form an index of what may be called "Homicidal Honor", i.e., a subtype of honor that tends to increase the Experience with Homicide. In the current study, the Cronbach alpha score for the Homicidal Honor index was of .58, with the average value of the index being 4.34 (SD=1.084), ranging from 1.67 to 8.58.

The Spearman correlation between Homicidal Honor and the Experience with Homicide was positive and statistically significant (Spearman Rho=.18, p<.01). The average Experience with Homicide for those with a Homicidal Honor in the range of 0.00-3.00 was of 0.77 (SD=0.807; n=69), for those in the range of 3.01-6.00 was 1.14 (SD=0.944; n=486), and for those in the range of 6.01-9.00 was 1.47 (SD=1.016; n=32).

7.7. Homicidal Honor and Penalty Given to Crimes

Table 3 shows the Spearman Correlations between Homicidal Honor and the years of penalty believed to be deserved by someone who commits various types of crime under different circumstances.

Table 3. Spearman correlations between Homicidal Honor and the years of penalty assigned to someone who committed various types of crime.

Type of Crime	Correlations w/ Homicidal Honor	
	Rho	p
Man who insulted or disrespected another man	-0.01	0.72
Man who committed fraud in the bank where he worked so as to steal money	-0.03	0.54
Man who committed armed robbery	0.04	0.29
Man who raped a modestly dressed woman who rejected him	-0.07	0.09
Man who raped a provocatively dressed woman who allured him	**-0.16**	**<.01**
Man who killed a wife that cheated on him with another lover	**-0.20**	**<.01**
Man who killed the lover with whom his wife was cheating on him	**-0.22**	**<.01**
Man who killed another man who insulted or disrespected him	**-0.18**	**<.01**
Man who killed another man to steal money	**-0.09**	**0.04**
Man who killed another man in a fight	**-0.18**	**<.01**
A bandit who killed another bandit for money or power	**-0.17**	**<.01**

The Homicidal Honor index presented a negative correlation with the number of years assigned to all modalities of homicide, as well as to penalty given to rape of a "provocatively dressed woman", and, marginally, to the one given to a "modestly dressed woman".

It is interesting to note that the Homicidal Index showed a negative and statistically significant correlation with the importance given to the law as a "moral compass" (Spearman Rho=-.09, p=.04), but no significant correlation to other "compasses" such as religion (Spearman Rho=-.02, p=.63), personal will (Spearman Rho=.06, p=.16), tradition (Spearman Rho=-.01, p=.88), and family (Spearman Rho=.04, p=.39).

8. Discussion

8.1. Validating the Honor Scale: Item Analysis, Factor Analysis, and. SSA

The findings of the Item Analysis indicate that the Honor Scale as a whole, as well as the indexes for Family Honor, Integrity, Feminine Honor, and Masculine Honor, are all very much internally consistent. That, along with the very obvious face validity, suggests that this is indeed a valid instrument for the measurement of the Culture of Honor and its subtypes.

The results of the Factor Analysis, however, do not show such a compelling evidence in favor of the structure with four components as proposed by Rodriquez Mosquera, Fischer, Manstead, and Zaalber (2008). First, there are six factors instead of four. Second, one can make an argument for Family Honor, Integrity, and Feminine Honor as factors, but even so there is significant overlap with other factors. Finally, in regards to Masculine Honor, there are possibly two factors involved instead of just one.

The SSA, on the other hand, produced a scalogram with a distribution of variables that can be easily divided into four facets in a radix pattern consistent with Family Honor, Integrity, Feminine Honor, and Masculine Honor as defined by Rodriquez Mosquera, Fischer, Manstead, and Zaalber (2008). This is quite consistent with the results of the Item Analysis. It also reveals a structure where Family Honor seems to be the central point of the Culture of Honor, with the remaining types being hierarchically beneath it.

It appears that the Honor Scale is indeed both internally consistent and organized in the form of a quadruple structure, as shown by the Item Analysis and the faceted SSA scalogram, though it simply did not emerge as such in the Factor Analysis.

8.2. Honor Scale and Experience with Homicide

The Experience with Homicide was shown to increase with most of the items regarding Masculine Honor and decrease with two of the items related to Integrity, plus increasing in accordance with one of the elements of Family Honor. Also, the Homicidal Honor index calculated from those items presented a positive and significant correlation with the Experience with Homicides. This confirms the prediction that the Culture of Honor, because it is linked both to a specific location and to an increased incidence of homicides, is associated to the Experience with Homicides.

8.3. Homicidal Honor and Attitude Towards Homicide

Homicidal Honor was shown to be negatively associated to the penalty assigned to all types of homicide, as well as with rape. In other words, the stronger the type of honor most associated to the Experience with Homicide, the lower the number of years of prison one tended to designate for someone committing a homicide or rape. This is evidence that certain aspects of the Culture of Honor are indeed associated to a greater tolerance to homicide, and also to rape. There was also evidence that this Homicidal Honor is negatively correlated to the importance assigned to the law as a "moral compass", which one can assume to imply that this honor is related to an increased propensity towards crime.

9. Conclusions

The present paper aimed to evaluate the Honor Scale, developed by Rodriquez Mosquera, Fischer, Manstead, and Zaalber (2008), as a valid measure of the Culture of Honor and as a useful instrument to explore the role of such a culture in the predisposition towards criminal homicide. For that purpose, a

relatively large sample of adults from the Brazilian Northeast was submitted to the Honor Scale, and also to other forms measuring sociodemographic situation, attitudes towards different types of crime, contact with authors and/or victims of homicide, etc.

The findings of the investigation provided evidence that the Honor Scale is indeed a coherent instrument with a structure that can be divided into four separate subtypes corresponding to Family Honor, Integrity, Feminine Honor, and Masculine Honor, though such structure was much more clearly shown by means of SSA and Facet Theory than by means of a Factor Analysis. A Homicidal Honor index produced from items of the Honor Scale showed associations to a greater tolerance for homicides and rape, as well as to a lesser regard for the law. Though statistically significant, such associations were relatively weak, but that can be explained by Homicidal Honor being only one of multiple elements involved in the crimes in question.

All things considered, one concludes from the present study that:

- The Honor Scale seems to be a valid instrument for the measurement of the Culture of Honor in the context of the Brazilian Northeast;

- SSA and Facet Theory appear to comprise a much better way of assessing and validating the structure of a psychometric instrument than traditional Factor Analysis;

- From the Honor Scale, one can calculate a Homicidal Honor Index that is useful to predict attitudes towards homicide, rape, and crime, it also being predictive of one's experience with author and/or victims of homicide.

Future investigations should theoretically and empirically explore the possibility that a subtype of the Culture of Honor, the Homicidal Honor, may have an important role in understanding homicide and related crimes.

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Basic Values, Moral Compasses, Prejudice, and Attitudes Towards Homicide in the Brazilian Northeast

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Abstract: In the Brazilian Northeast, there is a traditionally high rate of homicides that can be explained by cultural elements (Souza, Roazzi & Souza, 2011). This involves a combination of beliefs and notions of desireability with implications for attitudes and behavior, in other words, moral values (Schwartz & Bilsky, 1987). Gouveia (1998, 2003) produced the Basic Values Questionnaire (BVQ) that measures moral values according to a six-fold structure, with studies showing that some of these elements are positively or negatively associated to antisocial and delictive behaviors (Formiga & Gouveia, 2005; Formiga, 2006). The present study aimed to empirically verify whether the structure of items on the BVQ conforms to the typology proposed by Gouveia (2003) and to identify the relationship between moral values, sources of moral guidelines, experience with homicide, and attitudes towards homicide. For that purpose, a total of 530 adult men from Recife, Pernambuco, Brazil, were submitted to the BVQ and to an especially prepared questionnaire including items regarding sociodemographic data, the importance assigned to different "moral compasses", experience with homicide, and the penalty one would assign to homicide committed under various circumstances. The data obtained was analyzed by means of SSA and Facet Theory, with results showing that the items of the QVB displayed a structure fairly consistent with the expectations from Gouveia (2003), as well as providing a rich ,visual multidimensional, view of the organization of the psychosocial elements involved in homicide.

1. Introduction

Homicide is perhaps the most severe expression of interpersonal conflict, and a social problem of global concern (Souza, Roazzi & Souza, 2011; UNODC, 2011; National Geographic, 2012). This is particularly true in Brazil, particularly in the Northeast Region, where this type of crime has one of the highest rates in the World (Alencar, 2006; Magalhães, 2009; Nóbrega, 2009; Nóbrega Júnior, 2009).

Human values can be defined as a lasting belief in a specific mode of behavior or final state of existence that is personally or socially preferable to its opposite (Rokeach, 1973). They can be understood as being prescriptive or proscriptive beliefs, i.e. guidelines, that allow one to judge objects or actions as desireable or undesireable, commendable or reproachable (Schwartz & Bilsky, 1987; Schwartz, 1992; Schwartz, 2005; Santos, Guerra, Gouveia & Souza, 2012).

Gouveia (1998, 2003) proposed a model for human values based on their function, considering them to be criteria and guidelines that orient an individual's actions, as well as expressions of his or her basic needs. In this view, values can be classified according to three types of orientation (social, central, or personal) and two types of goal (materialistic or idealist). It was within this framework that the Basic Values Questionnaire (BVQ) was created to evaluate human values, being the instrument successfully used in various empirical studies, including those on criminality (Formiga & Gouveia, 2005; Fomiga, 2006; Santos, Guerra, Gouveia & Souza, 2012).

Gouveia (1998, 2003) has proposed that the tendency towards antisocial and delictive behavior can be explained by means of specific moral values. In particular, a predominance of personal values (individual interests and advantages) over social values (interpersonal orientation and a focus on others) or central ones (interests between the individual and the collective) would make one more prone to criminality, including violent crimes. Empirical evidence for this hypothesis has been produced in the context adolescents in the Brazilian Northeast (Gouveia & Formiga, 2005; Fomiga, 2006).

It would seem that, in the scientific explanation of criminal homicide, particularly in the context of Northeastern Brazil, basic human values, as described by Gouveia (1998, 2003) and measured by the BVQ, emerge as potentially powerful elements. In order to test such an assumption, one must

first assess the internal consistency of the instrument when applied to a group of Brazilian Northeasterners. Then, one has evaluate the associations between the results of the BVQ and the experience with authors and/or victims of homicide, an individual's level of acceptance or tolerance regarding the act of homicide, and other homicide-related events.

2. The Functionalist Theory of Human Values

The Functionalist Theory of Human Values was initially proposed by Gouveia (1998, 2003, 2009), integrating elements from previous models (Inglehart, 1977; Schwartz & Bilsky, 1987; Schwartz, 1992; Schwartz, 2005) in a coherent and synthetic form. In it, there are four main assumptions, namely: (i) human beings have a benevolent or positive nature; (ii) values are individual guiding principles, general patterns of orientation for behavior; (iii) values have a motivational basis; (iv) because they are relatively few and easy to conceptualize, only terminal values are worth considering. These tenets translate into a clear definition of values as being:

a) Concepts or categories;
b) Desirable states of existence;
c) Transcendent to specific situations;
d) Of varying degrees of importance;
e) Guides in the evaluation or selection of behaviors and events;
f) Cognitive representations of human needs.

The functions of values are defined as being the psychological roles that values fulfill by guiding behaviors and cognitively representing human needs (Gouveia, 2009).

In terms of guiding behaviors, values can be seen as orienting individuals towards a more *Social* (interpersonal focus and/or emphasis on society) or *Personal* (intrapersonal focus and/or emphasis on oneself). Between these two extremes there is a third category, which is not fully social or personal, but rather the basis of these two, which one can call *Central*. Regarding the representation of needs, one can discern values that are *Materialist* (practical ideas, specific goals, and normative rules) or *Humanitarian* (general abstract ideas and principles), which correspond to types of motivation (Gouveia, 2003, 2009).

According to the model in question, the dimensions of behavior orientation and type of motivation arrange themselves into six combinations, called subfunctions, within which there are three kinds of value, producing a typology of 18 values, as shown in Table 1 (Gouveia, 2009)

Table 1. The typology of human values according to functionalist theory (Gouveia, 2009).

	Orientation				
	Social	Central	Personal		
Subfunction	*Interactional*	*Suprapersonal*	*Experimentation*		
Values	Affection	Beauty	Emotion	**Humanitarian**	
	Acquaintanceship	Knowledge	Pleasure		
	Social Support	Maturity	Sexuality		**Motivation**
Subfunction	*Normative*	*Existence*	*Realization*		
Values	Obedience	Health	Power	**Materialist**	
	Religiousness	Stability	Prestige		
	Tradition	Survival	Success		

The BVQ is an instrument created to evaluate all of the 18 values established by the Functionalist Theory (Gouveia, 1998, 2003). It has been predicted to have a duplex axial structure when studied by means of Facet Theory and SSA (Shye & Elizur, 1994), an expectation that has been empirically corroborated by Gouveia et al (2008).

By definition, one expects moral values to be at least part of the explanation for numerous types of attitudes and behavior, including antisocial actions, crimes, and homicide, which implies that the BVQ should be a useful instrument in the investigation of such phenomena.

3. Human Values, Antisocial Behavior, Crimes, and Homicide

3.1. Moral Values, Antisocial Behavior, and Crimes

The Functionalist Theory and the BVQ has been successfully applied to the understanding of criminality and antisocial behavior in the context on

Northeastern Brazil (Formiga & Gouveia, 2005; Fomiga, 2006; Santos, Guerra, Gouveia & Souza, 2012).

Formiga and Gouveia (2005) studied a total of 710 young men and women from both public and private schools in João Pessoa, Paraíba, Northeastern Brazil, aged between 15 e 22 years, with regard to their scores on the BVQ and also to their levels of antisocial and delictive behavior. Antisocial behavior was defined as being that which challenges social order and norms but does not constitute a criminal offense, such as littering or ringing a person's doorbell and running away before it can be answeres. Delictive behavior was defined as that which is outside of the law and harmful to an individual or to society as whole, as is the case of stealing from an automobile or threatening someone into giving money.

The results from Formiga and Gouveia (2005) showed that Social values were negatively correlated to both antisocial and delictive behaviors, the same happening with Central values. Personal values, on the other hand, showed a positive correlation with such behaviors. This is consistent with the theoretical expectations that an orientation towards others, which is the essence of the Social values and can be seen as partially present in the Central values, are, by definition, antagonistic to such behaviors. Personal values, on the other hand, were positively correlated to antisocial and delictive behaviors, which is also consistent with the theoretical expectations from Formiga and Gouveia (2005), given that it is to be expected that an emphasis on individual interests, rather than on those of others, would be one of the driving forces towards things like misdemeanor and crimes.

Formiga (2006) replicated the study of Formiga and Gouveia (2005) with a sample of 650 young men and women from both public and private schools in João Pessoa, Paraíba, Northeastern Brazil, and Palmas, Tocantins, Northern Brazil, aged between 15 e 22 years. His findings regarding the correlations between moral values and antisocial and/or delictive behaviors were very close to those of the previous study.

Using a simplified form of Structural Equation Modeling based on the correlation matrix of the BVQ and Antisocial/Delictive Behavior scores, plus some theoretical reasoning, Formiga builds a case for the interpretation of the results of the study as providing evidence for a causal relationship between these two sets of variables (Formiga, 2006).

The findings from Formiga and Gouveia (2005) and Formiga (2006) all point towards a role for the Functional Theory of Human Values in the explanation of antisocial behavior and crimes, particularly in Northeastern Brazil.

3.2. Moral Values, Culture of Honor, and Homicides

It relatively easy to reason that, if moral values as measured by the BVQ have shown to be associated to antisocial and delictive behaviors (Formiga and Gouveia, 2005; Formiga, 2006) then they will likely be associated to homicide, which is perhaps the most extreme form of such behaviors. However, findings from Souza, Roazzi, and Souza (2011) regarding the role of several models, including the Functionalist Theory of Moral Values, in the prediction of homicide, failed to produce evidence of a direct link between moral values and this type of crime. This apparent paradox requires an explanation.

Souza, Roazzi, and Souza (2011) studied the factors underlying the commitment of criminal homicide using a broad approach, encompassing theories based on socioeconomic frustration, decision-making processes, emotional attachment, testosterone, and moral development, as well as moral values (Gouveia, 1998, 2003, 2009) and the culture of honor (Reed, 1982; Cohen and Nisbett, 1996). By investigating a total of 160 adult men from Northeastern Brazil (57 convicted of homicide, 63 with other convictions, and 40 without criminal record), they were able to find evidence only in favor of honor as a means of distinguishing between those that had or not committed homicide. *Prima faciem*, this seems to rule out human values as an explanation, however, the situation is more complex than that.

The Theory of the Culture of Honor, as expounded by Reed (1982), Cohen and Nisbett (1996, 1997), and Cohen (1996, 1998), states that, in certain societies, a high propensity towards homicide comes from considering one's honor and reputation as the main focus of one's life, something to be defended to the point of lethal violence. This constitutes a lasting belief in a specific mode of behavior or final state of existence, something in complete agreement with the definition from Rokeach (1973) of what a value is, therefore, making it logically impossible to theorize about a culture of honor without direct reference human values.

The results from Souza, Roazzi, and Souza (2011) show the absence of a direct association between the results on the BVQ and the existence of a criminal conviction for homicide, but this does not eliminate the possibility of indirect associations resulting from a more complex mechanism. It would seem very likely that the propensity towards homicide that occurs as a consequence of the culture of honor is the result of the impacts of such a culture on one's emotional system (dynamics of shame, anger, and aggressiveness), personal experiences (history of honor-related homicides in a given location in time and space), and social expectations (fierce and violent defense of one's honor). The internalization of the culture of honor at an individual level, however, would be dependent on several psychological and cultural elements from which one would be hard pressed to exclude moral values. Thus, it is quite possible to not find an association between moral values and the committing of a homicide and, yet, such values still be a crucial element in the explanation of this type of behavior.

4. Study Goals

The present paper aims to validate the structure of the BVQ (Gouveia, 1998, 2003, 2009) within the context of adult males in the Brazilian Northeast by means of SSA and Facet Theory (Shye & Elizur, 1994; Guttman and Greenbaum, 1998; Levy, 2005; Hair, Black, Babib, & Anderson, 2009). It also seeks to explore the relationship between different aspects of human values, as measured by the BVQ, and the value given to different sources of moral guidelines, attitudes towards homicide, and personal experience with homicides, thereby confirming the usefulness of such an instrument in the investigation of the mechanisms involved in this type of crime.

5. Method

5.1. Participants

A total of 530 adult men from the Metropolitan Area of Recife, Pernambuco, Brazil, with age, sex, and education similar to those of that location according to figures from official sources (IBGE, 2010).

5.2. Instruments

- Questionnaire addressing the individual's:

    o Detailed sociodemographic data (sex, age, income, marital status, education, income, religion);
    o Relationship with information and communication technologies (access, use, and experience);
    o Relative importance assigned to different "Moral Compasses" (Religion, Own Will, Law, Family, and Tradition);
    o Penalty believed to be deserved by someone who commits homicide under different circumstances;
    o Personal knowledge of any specific victims (close or not) or authors of criminal homicide.

- The 18-item Basic Values Questionnaire (Gouveia, 1998, 2003, 2009).

5.3. Procedures

A total of 68 undergraduate students from a private higher education institution in Recife, Pernambuco, Brazil, majoring in social services, were trained in the application of the instruments and the recording of the answers, and then instructed to approach potential subjects in the streets of the Metropolitan Area of Recife, taking care to collect data from equal amounts of men and women, those aged 30 or more or below 30, those with fundamental education or more and those with less education, which is equivalent to the profile for the state of Pernambuco according to official figures (IBGE, 2010).

5.4. Analysis

5.4.1. Validating the Structure of the BVQ

The BVQ is predicted to measure three types of values as to orientation (Social, Central, and Personal), three types of motivation (Humanitarian and

Materialist), and six types of subfunctions (Interactional, Suprapersonal, Experimentation, Normative, Existence, and Realization). Thus, one would expect to find a high level of reliability for the indexes in question as measured by Item Analysis (Cronbach Alpha), as well as a SSA scalogram with a duplex axial pattern.

5.4.2. Experience With Homicide

In regards to direct experience with homicide, besides being the victim or author of such a crime his or herself, one may: (a) have lived in the same residence as a victim, (b) personally know a victim which did not reside in the same household as oneself, and (c) personally know the author of a homicide. If one codes such options with a one or a zero for, respectively, a "yes" or "no", the sum of such answers will constitute an ordinal index ranging from a minimum of 0 to a maximum of 3 that can be called Experience with Homicides.

5.4.3. Assessing the Link Between Moral Values, Culture of Honor, and Homicide

Based on the notion that a high level of the Culture of Honor is endemic to certain geographical locations, the assumption is that such locations are prone to a higher homicide rate, thus, those with a high level of internalization of the Culture of Honor would be more exposed to the occurrence of such a crime around them. If moral values are somehow involved in the internalization of the Culture of Honor, than one might find significant correlations between some of the measures of the moral values and the Experience with Homicides.

Another, more direct, form of assessing the possible role of moral values in the propensity towards homicide is to evaluate the correlation between the scores calculated by the BVQ and attitudes towards homicides under various circumstances in terms of the number of years of penalty one would assign to the author of such acts.

6. Results

6.1. Description of the Sample

A total of 530 male individuals, with a mean age of 36.2 years (SD=12.00), ranging individually from 18.1 to 78.1 years. Approximately 26.8% had up to an elementary school level of education, 45.6% high school, 21,6% a higher education degree, and 6.0% a graduate degree (specialization, master's, or doctorate). In terms of religion, roughly 52.5% were Catholic, 25.0% Protestant, 7.7% Spiritualists, 12.4% other faiths, 1.3% agnostic, and 1.1% atheists. Approximately 41.7% were single, 43.2% married, 7.7% under cohabitation, 5.6% divorced, and 1.9% widowed.

6.2. Reliability Analysis

For the sample studied, the Cronbach Alpha scores obtained for the indexes calculated from the BVQ are .66 for Social values, .62 for Central values, .59 for Personal values, .56 for Humanitarian values, and .61 for Materialist values. The indexes for the six subfunctions have only three items each, which makes it counterproductive to assess their levels of Cronbach Alpha.

6.3. SSA

Figure 1 shows the scalogram for the SSA of the items of the BVQ using 1-Pearson r as the distance metric and Ward's Method as the amalgamation schedule.
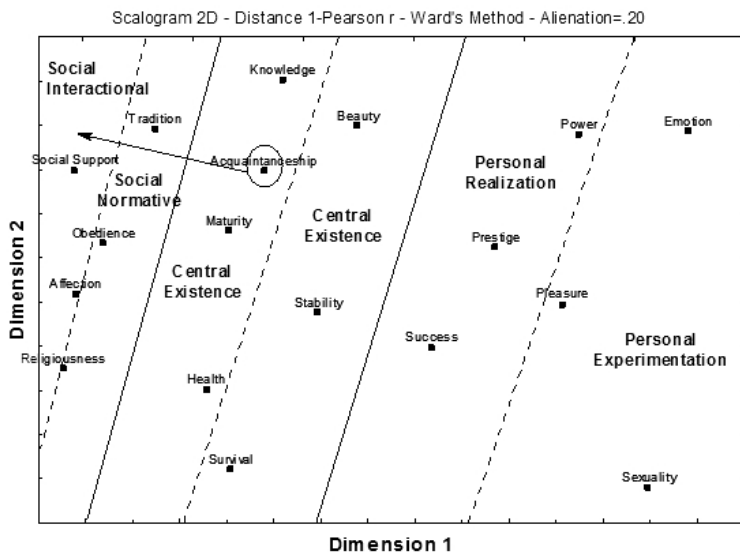
Fig. 1. Scalogram and facets for the SSA of the items of the BVQ.

The scalogram in Figure 1 shows an axial pattern with three regions corresponding to the Social, Central, and Personal orientations, each one of those subdivided into two regions corresponding to subfunctions. The only exception to the correspondence between items, subfunctions, and orientations foreseen in the Functionalist Theory was Acquaintanceship, which was located in the region for the Existence subfunction (Central orientation) instead of in the one for the Interactive subfunction (Social orientation).

6.4. Human Values vs. Moral Compasses

Table 2 shows the Spearman correlations between the indexes calculated from the BVQ and the Moral Compasses studied.

Personal values were positively correlated to Own Will, Central values were positively correlated to Law and Tradition, and Social Values were positively correlated to Law, Religion, and Tradition.

Humanitarian values were positively correlated to Law and Family, while the Materialist ones were positively correlated to Law, Religion, Own Will, and Tradition.

The Experimentation subfunction was negatively correlated to Religion and positively associated to Own Will, Realization was positively correlated to Own Will, Existence was positively correlated to Law and Tradition, Suprapersonal was positively correlated to Law, Interactional was positively correlated to Law, Religion, and Tradition, and Normative was also positively correlated to Law, Religion, and Tradition.

Table 2. Spearman correlations between the indexes from the BVQ and the importance given to Moral Compasses.

Index		Law		Religion		Own Will		Tradition		Family	
		Rho	p	Rho	p	Rho	p	Rho	p	Rho	p
Orientation	Personal	0.05	0.27	-0.07	0.10	**0.13**	**<.01**	0.02	0.66	0.07	0.13
	Central	**0.10**	**0.02**	0.01	0.74	0.06	0.20	**0.10**	**0.03**	0.07	0.12
	Social	**0.13**	**<.01**	**0.19**	**<.01**	0.02	0.66	**0.14**	**<.01**	0.05	0.25
Motivation	Humanitarian	**0.12**	**0.01**	0.01	0.89	0.06	0.19	0.07	0.12	**0.09**	**0.03**
	Materialist	**0.10**	**0.02**	**0.10**	**0.02**	**0.10**	**0.02**	**0.14**	**<.01**	0.06	0.17
Subfunction	Experimentation	0.02	0.60	**-0.09**	**0.04**	**0.11**	**0.01**	-0.05	0.21	0.06	0.17
	Realization	0.06	0.15	-0.01	0.86	**0.11**	**0.01**	0.08	0.07	0.03	0.44
	Existence	**0.09**	**0.03**	0.04	0.33	0.07	0.09	**0.09**	**0.05**	0.03	0.50
	Suprapersonal	**0.09**	**0.03**	-0.01	0.89	0.03	0.45	0.07	0.11	0.06	0.15
	Interactional	**0.14**	**<.01**	**0.15**	**<.01**	-0.02	0.60	**0.11**	**0.01**	0.05	0.24
	Normative	**0.09**	**0.05**	**0.18**	**<.01**	0.04	0.36	**0.14**	**<.01**	0.04	0.33

6.5. Human Values vs. Attitudes Towards Crimes

Table 3 displays the Spearman correlations between the indexes calculated from the BVQ and the number of years of penalty one would assign to the author of homicides under different circumstances, as well as with the Experience with Homicide.

Table 3. Spearman correlations between the indexes from the BVQ and the Experience w/ Homicide and the average penalty assigned to homicides under various conditions.

Index		Experience w/ Homicide		Average Penalty	
		Rho	p	Rho	p
Orientation	Personal	**0.14**	**<.01**	-0.04	0.35
	Central	0.06	0.20	**0.08**	**0.05**
	Social	0.06	0.15	**0.13**	**<.01**
Motivation	Humanitarian	**0.12**	**<.01**	**0.12**	**<.01**
	Materialist	0.08	0.07	0.02	0.70
Subfunction	Experimentation	**0.17**	**<.01**	-0.03	0.53
	Realization	0.06	0.17	-0.03	0.49
	Existence	0.05	0.22	0.02	0.67
	Suprapersonal	0.05	0.25	**0.11**	**0.01**
	Interactional	0.05	0.21	**0.17**	**<.01**
	Normative	0.05	0.25	0.05	0.27

Personal values were positively correlated to Experience with Homicide, while Central and Social values were positively correlated to the average penalty believed to be deserved by those who authored homicides. Humanitarian values were positively correlated to both Experience with Homicide and the average penalty assigned to homicides. The Experimentation subfunction was positively correlated to Experience with Homicide, while the Suprapersonal and Interactional subfunctions were positively correlated to the penalty assigned to authors of homicide.

6.6. Human Values, Moral Compasses, Experience with Homicide, and Penalty for Homicide

Figure 2 displays SSA of the subfunctions calculated from the BVQ, the importance given to Moral Compasses, Experience with Homicide, and Penalty

for Homicide, along with Honor Bias (the mean reduction in penalty assigned when a homicide is motivated by honor – insult and jealousy) using 1-Pearson r as the distance metric and Ward's Method as the amalgamation schedule.

Figure 2 shows an axial structure where one can see a "spectrum" or "gradient" ranging from Disapproval of Homicides (Penalty Given to Homicides) to Interaction with Homicides (Experience with Homicide). Between these extremes are three subfacets:

- <u>Mores and Collective Norms</u>: A mixture of Social values (Normative and Interactional) and Moral Compasses of a more collective nature (Religion and Family), being close to Disapproval of Homicides;

- <u>Personal Standing and Individual Norms</u>: A mixture of Personal values (Realization and Experimentation), Moral Compasses relating to directives for individual behavior (Tradition and Own Will), and Honor Bias, being close to Interaction with Homicides;

- <u>Cental Values</u>: The sum of the subfunctions Existence and Suprapersonal.

6.7. Consistency of the BVQ

The Reliability Analysis for the main scores obtained from the BVQ produced Cronbach Alpha values ranging from .56 to .66, which is reasonable for indexes that containing only six or nine variables each, making these results evidence in favor of their consistency.

The SSA of the 18 items of the BVQ produced an axial structure where one can easily devise three facets and six subfacets corresponding almost exactly to the three orientation (Social, Central, and Personal) and six subfunctions (Interactional, Suprapersonal, Experimentation, Normative, Existence, and Realization), the only exception being Acquaintaceship located within Existence subfunction instead of within Interaction. The pattern did not form a duplex , for there was no second axial pattern dividing the Humanitarian and Materialist items accross all orientations, though each type of orientation seems to be divided into two subfacets that correspond to the Humanitarian and Materialist values.
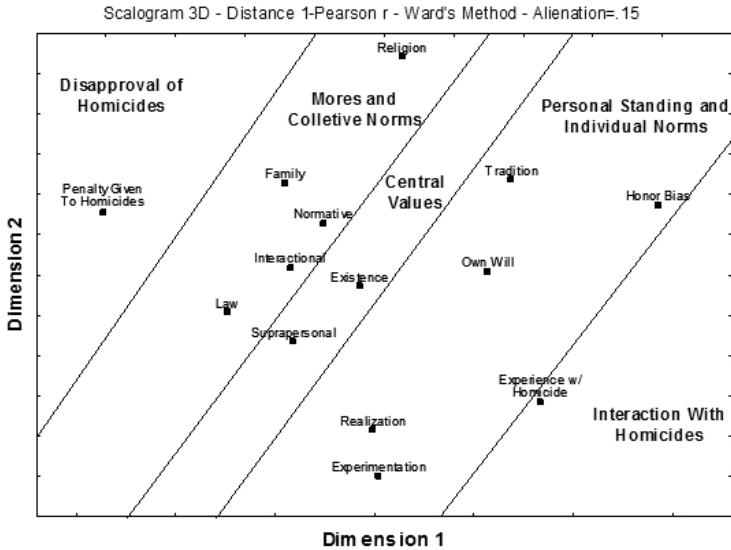
Fig. 2. SSA of Human Values, Moral Compasses, Experience w/ Homicide, and Penalty for Homicide.

7. Discussion

It appears that, within the context of the sample studied in the present investigation, the organization of human values into three orientations is strongly corroborated by the statistical findings, just as indicated by Gouveia (1998, 2003, 2009). The division into two types of motivation, on the other hand, seems to be confirmed, but not as a dimension independent from orientation, but rather as one that is subordinate to it.

7.1. Human Values and Moral Compasses

By definition, Personal values involve a focus on oneself, therefore, it is only natural that they be associated to valuing one's Own Will. Social and Central values, on the other hand, have both transpersonal elements, making it logical that they both be associated to Law and Tradition. Religion tends to be a collectively organized, especially in Northeastern Brazil, therefore justifying an association with Social Values.

Materialist values are defined as being normative, thus, it is to be expected that they correlate with valuing Religion, but they are also defined as being pragmatic, which would make them also related to valuing one's Own Will and Tradition. Humanitarian values, in turn, are about abstract ideals, which tend to be transmitted largely by early childhood experiences, thereby making them related to valuing Family. Regarding the value assigned to the Law, there are abstract notions of justice and order, normative elements of legislation, and pragmatic aspects of guiding behavior, making it relate to both Humanitarian and Materialist values.

These findings confirm the predictions from Gouveia (1998, 2003, 2009) as to the role of the human values identified in the typology of the Functionalist Theory.

7.2. Human Values and Homicide

The findings obtained in the present study indicate that Personal values are associated to a greater contact with homicide, while Central and Social values seem to point towards a stronger condemnation of homicide. Humanitarian values, in turn, correlated with both Experience with Homicide and Penalty Given to Homicide, which can be explained by the fact that such values encompass Social, Central, and Personal values. This is in full agreement with the definitions from Gouveia (1998, 2003, 2009), as well as with the results from Formiga and Gouveia (2005) and Formiga (2006).

7.3. The Psychological and Sociocultural Elements of Homicide

The multidimensal analysis of the structure of the associations between Human Values, Moral Compasses, Honor Bias, Experience with Homicide, and Penalty for Homicide provided a facet structure that shows Personal values and cultural elements regarding one's individual standing in a community as being related to a greater degree of interaction with homicides. Social values, on the other hand, along with collective tenets, have been shown to be related to a greater condemnation of homicides. Central values were situated between those two extremes. This provides a view of the relationship between sociocultural elements and criminal homicide that is not only in alignment with

the definitions from Gouveia (1998, 2003, 2009) regarding Human Values, but it also reiterates the findings from Formiga and Gouveia (2005) and Formiga (2006) as to the role of such values in antisocial and delictive behavior, as well as to the results from Souza, Roazzi, and Souza (2011) regarding the elements involved in criminal homicide within the context of the Brazilian Northeast, particularly the Culture of Honor.

8. Conclusions

The present paper aimed to use SSA and Facet Theory to, within the context of adult males from Northeastern Brazil, validate the Functionalist Theory of Human Values and the BVQ, as well as to explore the usefulness of such a framework in the understanding of the psychological and sociocultural elements involved in the phenomenon of criminal homicide in that region. For that purpose, a fairly large number of adult men from Recife, Pernambuco, Brazil, were submitted to the BVQ and to an especially prepared questionnaire including items regarding sociodemographic data, the importance assigned to different "moral compasses", experience with homicide, and the penalty one would assign to homicide committed under various circumstances.

The findings from this investigation produced evidence that:

- The BVQ presents a structure that is reasonably in agreement with the predictions from its creator, though it was observed that the dimension of motivation is likely not independent of orientation, but rather hierarchically inferior to it;

- The indexes calculated by the BVQ are associated to the value given to Moral Compasses in ways that are in accordance with the definitions of the Functionalist Theory of Human Values;

- The results on the BVQ are statistically associated to both Experience with Homicide and the Penalty Given to Homicides;

- Taken into consideration along with Moral Compasses, Honor Bias, Experience with Homicide, and Penalty for Homicides, the results of

the BVQ allow for an increased understanding of the psychological and sociocultural elements involved in criminal homicide.

One concludes, therefore, that the Functionalist Theory of Human Values and the BVQ from Gouveia (1998, 2003, 2009) are valid and reliable elements in the scientific explanation of criminal homicide in Northeastern Brazil and similar sociocultural contexts.

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Patients with Eating Disorders: The Structure of Comorbidity and Psychopathological Symptoms

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Abstract: Until now, studies concerning the morbidities and psychopathological behaviors associated with eating disorders (ED) have considered each subtype of such disorders separately, with the investigation of the differences between them being very much neglected. Furthermore, no study has ever applied techniques such as Multidimensional Scalogram Analysis -an iterative HOMALS algorithm which represents a modernized version of the study by Guttman (1941)- in order to shed light not only on the psychopathological behaviors associated to ED disorders, but also upon the complex structure of the symptoms underlying each different ED subtype. The present study was designed to address these points. One hundred and thirty five subjects participated in the study: fifty five patients (mean age of 17.8 years, 50 female) and eighty controls (mean age of 16.5 years, all female). Diagnoses were made by clinicians experienced in the area of eating disorders using the DSM-IV-TR diagnostic criteria. Comorbidity in terms of anxiety, depression, hostility, interpersonal sensitivity, obsessive compulsive symptoms, paranoid ideation, phobic anxiety, psychoticism, and somatization was assessed by the Symptom Checklist-90 (SCL-90); psychopathological eating behavior (Diet, Bulimia, Oral Control) was assessed by the Eating Attitude Test (EAT-40). From all the Multidimensional Scalogram techniques, HOMALS analyses were used. The results showed that there were different symptom structures not only between clinical and non-clinical population, but also in the different ED subtypes. These findings are discussed in terms of the uses of the information regarding correlations between symptoms within the field of clinical psychology and research.

1. Introduction

To this date, the studies concerning the morbidities and psychopathological behaviors associated to eating disorders (ED) have taken in consideration subtype of such disorders separately. Furthermore, the findings of the research that has been done in the comparative frequency of the symptoms between subtypes are inconclusive. In the works reviewed by Kaye et al. (2004), Bulik (1995), and Swinbourne and Touyz (2007), for example, the prevalence of anxiety disorders emerging in patients with Anorexia Nervosa (AN) and Bulimia (BUL) appear to vary from 25% to 75% in the former group patients (Keck et al.1990; Schwalberg at al.,1992, respectively) and from 23% to 75% in the latter (Laessle et al., 1987; Deep et al.,1995, respectively). It is not clear, therefore, in which of these ED subtypes, if any, anxiety disorders are actually more prevalent. Among anxiety disorders, obsessive-compulsive and social phobia symptoms are the ones that appear the most in ED patients (Fornari et al. 1992; Godart et al.,2000; Kaye et al., 2004; Speranza et al., 2001), but, in some studies, obsessive-compulsive features have been found at a high level in AN (more in Purging AN than in the Restricting one), and more in AN than in BUL (Fornari et al. 1992; Speranza et al., 2001). By contrast, in other studies obsessive compulsive disorders appear more present in bulimic patients than in anorexic ones (Iwasaki et al., 2000). Social phobia and anxiety have been found at a higher level in bulimic patients than in anorexic ones in one study (Hinrichson et al., 2003), but more in AN than in controls in another research paper (Halmi et al. 1991). On the other hand, no difference between AN and BUL emerged in Raestam et al.'s study (1995). Agoraphobia has been found either more in Binge eating and Purging subgroups than in AN patients, or more in this last ED subtype than the first two groups; in other studies, no difference has been reported (see review by Swinbourne&Touyz, 2007). The same contradictory results are found for panic disorders: they have been reported as predominant in bulimic samples (Laessle et al., 1989) as well as in restrictive AN patients (Godart et al., 2000). With respect to binge eating, patients had higher rates of major depression, panic disorder, bulimia nervosa, mood, substance use, and anxiety disorders than the controls (Grilo, White & Masheb, 2009; Yanovski, Nelson, Dubbert & Spitzer, 1993; Wilfley, Friedman, Dounchis, Stein, Welch, & Ball, 2000).

In the aforementioned studies, the systematic analysis of the differences between all the main ED subtypes regarding comorbidity is neglected. The differences that have been studied are focused mainly on Anorexia Nervosa and Bulimia. It is also not clear which anxiety disorder is predominant in ED populations (see review by Swinbourne & Touyz, 2007). Furthermore, no ED-specific diagnostic instrument was used, being it very often the case that studies were based more on clinical interviews and/or clinical observations than on empirical investigation; the diagnoses were made almost exclusively according to the DSM III or IV. Thus, methodological problems significantly limit the usefulness of the findings of such studies, with comorbidities not being assessed by standardized measures. Another limitation those papers are the small sample sizes and frequent lack of any control group. Lastly, a statistical technique which might give an insight into the structure of the psychopathological symptoms underlying each distinct ED subtype has never been applied.

1.1 Purpose of the Study

The present study was designed to address the shortcomings of the literature in ED by analyzing comorbidity and psychopathological eating behavior in a sample patients. Our first aim was to replicate the previously mentioned studies concerning the associations between eating disorders and psychopathologies, but *systematically* investigating differences in all the four main ED subtypes, that is, Restricting Anorexia (RAN), Purging Anorexia (PAN), Bulimia nervosa (BUL) and Binge Eating Disorder (BED), all in a large clinical sample and using a fairly large control group. Secondly, our goal was to provide a picture of the structure underlying the psychopathological symptoms and behaviors in each ED subtype by using the multidimensional scaling technique in the HOMALS analyses, for, by analyzing the simultaneous intercorrelations of each variable with all the others gives, this statistical technique provides the unique opportunity of viewing the clusters made up of symptoms and psychopathological behaviors as they interact with the ED subtypes, displaying a complex structure by means of a "space diagram".

2. Method

2.1. Participants

Fifty five patients (mean age 17.8 years, SD=3.09, 50 female) and eighty controls (mean age 16.5 years, SD=0.70; all female), all of them of a middle-to-low social class according to the indexes by Hollingshead (1975), took part in the study. Participants with eating disorders were recruited from the outpatients attending the Centre for Eating Disorders of two Hospitals in Rome. They had a mean age at onset of 15.3 years (SD=2.25), and the average duration of their illness was 2.5 years (SD=1.85). They had been assessed by expert clinicians according to the DSM-IV-TR criteria (APA, 2000) and had the following distribution of diagnoses: Restricting Anorexia Nervosa (n=24), Purging Anorexia Nervosa (n=8), Bulimia Nervosa (n=11), Binge Eating Disorder (n=12). The anamnestic characteristics of the ED subtypes are reported in Table 1.The control subjects were recruited among students attending a high school in Rome.

Table 1. Anamnestic characteristics of eating disorders subtypes

Eating disorder subtypes	Gender	Age	Onset of eating disorder	Vomiting	Binge	Laxatives	Weight	BMI
Anamnestic characteristics of eating disorders subtypes								
Anorexia Nervosa Restricting (ANR)	24 (4 M; 20 F)	M=16.3 (SD=3.5)	M=14.1 (SD=2.1)				M=43.1 (SD=8.14)	M=15.9 (SD=1.7)
Anorexia Nervosa Purging (ANP)	8 (1 M; 7 F)	M=16.1 (SD=1.9)	M=15.5 (SD=1.9)	7		2	M=45.6 (SD=5.6)	M=17.8 (SD=2.7)
Bulimia Nervosa (BN)	11 F	M=18.7 (SD=1.8)	M=16.4 (SD=1.6)	11	10	5	M=66.5 (SD=13.8)	M=23.7 (SD=4.6)
Binge Eating Disorder (BED)	12 F	M=20.2 (SD=1.6)	M=16.6 (SD=2.1)		12		M=91.9 (SD=11.9)	M=33.2 (SD=2.3)

2.2. Measures

Comorbidity was assessed by means of the Symptom Checklist-90(SCL-90) from Derogatis, Lipman and Covi (1973). This questionnaire is a 90-item self-report symptom inventory designed to measure the psychological symptom patterns of psychiatric patients, and consists of ten primary dimensions, each comprising 6-13 items: anxiety, depression, hostility, interpersonal sensitivity, obsessive compulsive symptoms, paranoid ideation, phobic anxiety, psychoticism, somatization and sleep disorder. Each item of the questionnaire is rated by the patient on a five-point scale of distress from 0 (none) to 4 (extreme). The SCL-90 is a measure of the status of the current psychological symptoms, not of personality; nevertheless, some associations between the scores on some subscales and the diagnosis of some disorders may be assumed: (a) the Somatization Dimension is related to Somatoform Disorder, this subscale addressing symptoms defining Panic Disorder in the DSM-IV, with and without Agoraphobia; (b) Scores on the Obsessive Compulsive Symptoms is related to Obsessive Compulsive Disorder; (c) The Interpersonal Sensitivity Dimension is related to Social Phobia; (d) The Depression Subscale is related to Major Depression and Dysthymic Disorder; (e) The Anxiety subscale is related to General Anxiety Disorders; (f) The Phobic Anxiety Dimension has connection with Agoraphobia (with and without Panic disorder); (g) The Paranoid Ideation and Psychoticism subscales are related mainly to Personality Disorders; (h) The Hostility dimensions do not address any specific disorder.

Psychopathological eating behavior was measured by the Eating Attitude Test (EAT-40), a 40-item multidimensional self-rated scale developed by Garner and Garfinkel (1979) designed to assess the attitudes, behavior, and traits present in eating disorders, particularly Anorexia Nervosa and Bulimia Nervosa, being the most frequently used instrument to measure eating disorders in a variety of cultures. Responses are rated on a spectrum of 1 (Always) to 6 (Never). It consists of three subscales: Dieting, Bulimia, and Oral Control. The Dieting subscale is related to restrictive behaviors such as intake reduction for weight loss purposes, feeling guilty after eating, and preoccupation with thinness and weight loss. The Bulimia subscale is related to binge eating, vomiting, and food preoccupation. It distinguishes not only eating disorders from comparable issues, but also patients with a restricting type of eating disorder from those ones with a bulimic type. The Oral Control subscale is related to the degree of self-control over eating and to the perceived external pressure to eat.

3. Results

By means of a One-Way ANOVA it was observed that the clinical and non-clinical groups differed significantly regarding psychopathological eating behavior, as assessed by the EAT-40, and as to each symptom of comorbidity according to the SCL-90 (Table 2). The control subjects' scores were all below the clinical cutoff values for the EAT-40 (<30 for the total and <10 for each of its dimensions). In contrast, ED patients were above the cutoff values for the total score and also for the DIET dimension, as well as at the limit for the Bulimia and Oral Control subscales. Concerning the results on the SCL-90, the clinical cutoff value is "1", with the control subjects scoring below that threshold in all the comorbidity dimensions, while the patients scored above it (Table 2).

Table 2. EAT 40 and SCL-90 variables: differences between ED patients and controls

Eat Aptitude Test (EAT)	Patients		Control		Anova		
	Mean	SD	Mean	SD	(df)	F	p
Total	58.9	21.1	18.4	12.8	(1.123)	178.8	<.0001
Diet	22.0	10.1	6.0	7.4	(1.125)	105.1	<.0001
Bulimia	9.3	5.1	0.9	1.6	(1.124)	184.1	<.0001
Oral Control	9.1	5.9	2.8	3.5	(1.125)	57.8	<..0001

Symptom Check List (SCL-90)	Patients		Control		Anova		
	Mean	SD	Mean	SD	(df)	F	p
Global Symptom Index	1.4	0.6	0.4	0.3	(1.132)	145.0	<.0001
Somatization	1.2	0.8	0.5	0.4	(1.132)	51.7	<.0001
Obsessive Compulsive	1.4	0.8	0.6	0.4	(1.132)	58.7	<.0001
Interpersonal Sensibility	1.5	0.7	0.6	0.5	(1.132)	82.7	<.0001
Depression	1.6	0.8	0.6	0.5	(1.132)	70.7	<.0001
Anxiety	1.3	0.8	0.5	0.4	(1.132)	68.3	<.0001
Hostility	1.3	0.7	0.4	0.3	(1.132)	106.4	<.0001
Phobic Anxiety	0.9	0.8	0.1	0.2	(1.132)	83.8	<.0001
Paranoid Ideation	1.5	0.7	0.6	0.4	(1.132)	90.3	<.0001
Psychoticism	1.1	0.7	0.1	0.2	(1.132)	145.6	<.0001
Sleep Disorders	1.6	1.1	0.2	0.4	(1.132)	102.8	<.0001

Differences were also found between the ED subtypes in terms of pathological eating behavior as measured by the EAT-40, particularly regarding Bulimia and Oral Control (Table 3). For Bulimia, a post-hoc analysis using Duncan's new multiple range test shows that binge eating, bulimic, and purging patients score higher than restricting anorexia ones (p<.001, p<.0001 and<.05, respectively), while the bulimic and binge eating scored higher than purging (p<.0001). For Oral Control, the same type of analysis showed, unsurprisingly, restricting anorexia patients scoring higher than bulimic (p<.01) and binge eating (p<.01) patients, while purging patients scored higher than binge eating ones (p<.05).

Table 3. EAT- 40. Differences between ED subtypes

Eat Aptitude Test (EAT)	Restricting Anorexia		Purging Anorexia		Bulimia		Binge Eating		Anova		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	(df)	F	p
Total	63	25.1	55.8	29.7	63.3	10.1	50.8	6.4	(3.45)	1.0	ns
Diet	23.4	12.5	20.5	12.8	23.4	6.5	19.4	4.1	(3.45)	0.5	ns
Bulimia	5.3	2.9	8.8	5.5	15.1	1.6	12.3	3.4	(3.43)	19.2	<.0001
Oral Control	12.7	5.3	10.1	5.6	6	4.4	4.4	3.4	(3.44)	8.7	<.001

Comorbidity, as assessed by the SCL-90, was also different between the ED subtypes in terms of symptoms of obsessive-compulsive, interpersonal sensibility, phobic anxiety, and psychoticism (Table 4). A post-hoc analysis using Duncan's new multiple range test showed that obsessive-compulsive symptoms were significantly higher in bulimic patients than in purging ones (p<.05). Interpersonal Sensibility appeared higher in Bulimia and Binge Eating Disorders than in Purging Anorexia (p<.01 in both cases); interestingly, no difference was found between the two types of Anorexia Nervosa in these two dimensions. Anxiety, which did not differ significantly between the ED subtypes in the One-Way ANOVA, was statistically higher in Bulimia than in Purging Anorexia (p<.05), but not in comparison with the other ED subtypes;

not surprisingly, phobic anxiety was also higher in Bulimia than in Purging Anorexia (p<.01), as well as higher in patients with Binge Eating Disorders than in Purging ones (p<.01). Psychoticism appeared higher in Bulimia than in Purging Anorexia (p<.01), and higher in Binge Eating disorders than in Purging ones (p<.05).

Table 4. SCL-90: Differences for comorbidity in each ED subtype.

Symptom Check List (SCL)	Restricting Anorexia		Purging Anorexia		Bulimia		Binge Eating		Anova		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	(df)	F	p
Global Symptom Index	1.2	0.6	0.9	0.6	1.6	0.5	1.5	0.6	(3.50)	2.8	*<.05*
Somatization	1	0.7	1.1	0.7	1.5	0.8	1.4	0.8	(3.50)	1.2	*ns*
Obsessive Compulsive	1.2	0.7	1	0.9	1.8	0.8	1.7	1	(3.50)	2.4	*<.05*
Interpersonal Sensibility	1.4	0.7	1	0.6	1.8	0.7	1.8	0.5	(3.50)	3.4	*<.05*
Depression	1.5	0.7	1.2	1	1.8	0.8	1.7	0.7	(3.50)	1.1	*ns*
Anxiety	1.3	0.8	0.9	0.7	1.6	0.8	1.4	0.8	(3.50)	1.3	*ns*
Hostility	1.1	0.5	1.2	1.1	1.6	0.7	1.4	0.8	(3.50)	1.5	*ns*
Phobic Anxiety	0.8	0.8	0.3	0.3	1.3	0.5	1.3	0.9	(3.50)	4.1	*<.01*
Paranoid Ideation	1.5	0.7	1	1.1	1.6	0.6	1.6	0.6	(3.50)	1.2	*ns*
Psychoticism	1	0.7	0.6	0.3	1.4	0.7	1.3	0.7	(3.50)	2.8	*<.05*
Sleep Disorders	1.4	1.1	1	1.1	2	1	1.8	1	(3.50)	1.8	*ns*

The SCL-90 also allowed to detect, if only at a qualitative and impression-based level of analysis, which disorders were more prevalent in ED patients. Such findings seem to indicate a high prevalence of depression and sleep disorders such patients overall. Depression and paranoid ideation were most common in restricting anorexic patients. Depression and hostility were more frequent in purging anorexia. Depression, interpersonal sensibility, and obsessive compulsive

symptoms were mostly found in bulimic patients. Interpersonal sensibility and sleep disorders appeared most frequently in binge eating patients.

A HOMALS analysis was performed to discover the clusters of comorbidity symptoms and psychopathological eating behaviors of subjects, along with their interactions with the type of diagnosis.

The acronym HOMALS stands for HOMogeneity analysis by means of Alternating Least Squares and, from a conceptual point of view, it is a synonym for multiple correspondence analysis (CA; see e.g., De Leeuw & Rijckevorsel, 1980; Greenacre & Blasius, 2006; Mair& de Leeuw, 2008; Meulman, 1982; Van de Geer, 1993a,b). The difference is that CA is typically solved by singular value decomposition (SVD), whereas in HOMALS by means of a least squares loss function, which represents a criterion of departure from homogeneity to be minimized. The iterative HOMALS algorithm represents a modernized version of the by Guttman (1941), and it belongs to the family of graphic methods of data analysis. It allows for a visual presentation of correlations between variables with a low level of measurement by means of a "space diagram" through which structures can be identified. In HOMALS there are two important measures of quality: discrimination measures and eigenvalues. A discrimination measure describes the ability of a variable to discriminate between the reports on one dimension. The eigenvalue is a measure of explained information whose calculation is based on averaging the discrimination measures for the respective dimension (Van de Geer, 1993).

The HOMALS solution pointed out that the control groups as well as the ED subtypes could be visualized within an axial partition (Figure 1). On the upper part of the left side of the plot are Restricting and Purging Anorexia, not far from EAT pathological behaviors such as Dieting and Oral Control. The control group is also located close to the dimension of Oral Control. Purging and Restricting Anorexia are close to Sleep Disorders, and not far from Obsessive-Compulsive Disorders, Somatization, Anxiety, and Depression. On the bottom part of the right side, we find Binge Eating Disorder and Bulimia, both very close to SCL dimensions such as Phobic Anxiety, Psychoticism, Paranoid Ideation, Interpersonal Sensibility, and Hostility. Not surprisingly, these two ED subtypes are located close to the EAT dimension of Bulimia. Obsessive Compulsive disorders, Somatization, Anxiety, Depression, and Phobic Anxiety are not far from the bottom part of the diagram either, producing a picture of a partial overlapping of symptoms in the two clusters.
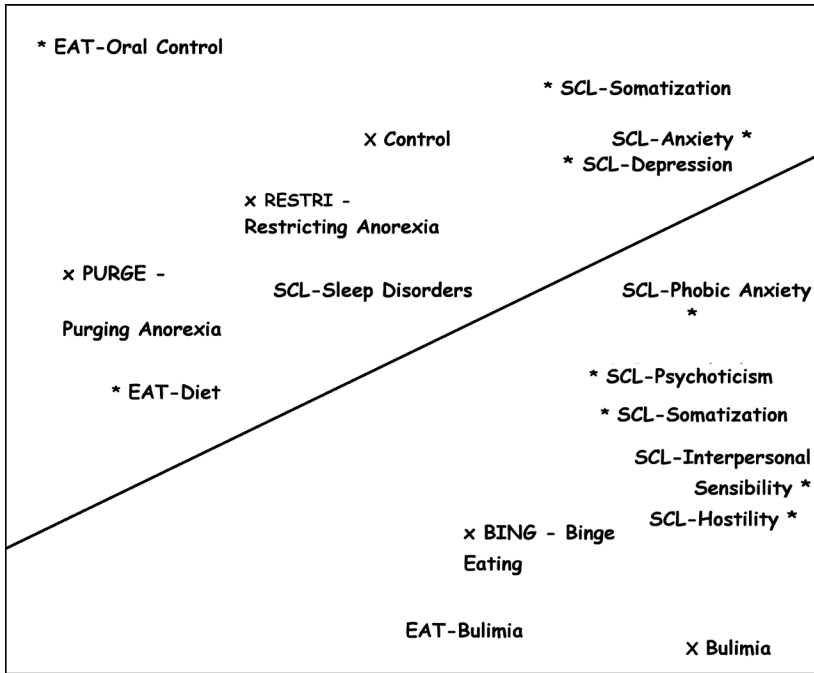
Fig. 1. HOMALS solution. Interaction between comorbidity's symptoms (SCL-90: anxiety, depression, hostility, interpersonal sensitivity, obsessive compulsive symptoms, paranoid ideation, phobic anxiety, psychoticism, and somatization) and psychopathological eating behaviors (Eating Attitude Test EAT-40: Dieting, Bulimia, and Oral Control) with the type of diagnosis (Anorexia, Purging Anorexia, Bulimia, Binge Eating, Control).

4. Discussion

Our findings in the present investigation show that the relationship between anxiety disorders and eating disorders is a very complex one, and that ED may well be associated with disorders other than just anxiety, such as mood or thought disorders. By using clinical interviews and an instrument that leads to a systematic assessment of the symptoms associated with ED, we were able to find which disorder was prevalent in terms of intensity within the ED patients taken as a whole and in each ED subgroup, even if just at a qualitative

and impressionist level of analysis. Depression and sleep disorders had a high prevalence in ED patients, a result that is not in line with studies which found that obsessive-compulsive and social phobia symptoms were the ones appearing mostly in ED patients (e.g., Fornari et al. 1992; Godart et al.,2000; Kaye et al., 2004; Speranza et al., 2001). As to the ED subtypes, depression and paranoid ideation were most common in restricting anorexic patients; depression and hostility were higher scores in Purging Anorexia; depression, interpersonal sensibility, and obsessive compulsive symptoms were the mostly found in bulimic patients; interpersonal sensibility and sleep disorders appeared most frequently in binge eating patients. On the whole, depression appears to be prevalent almost in all the ED subtypes, in line with findings by Fornaro, Perugi, Gabrielli, Prestia, Mattei, Vinciguerra, Fornaro (2010).

Differences between ED subtypes involve obsessive-compulsive, interpersonal sensibility, phobic anxiety, and psychoticism symptoms. Obsessive-Compulsive symptoms were significantly higher in bulimic patients when compared to purging anorexic ones. Interpersonal Sensibility appeared higher in Bulimia and Binge Eating Disorders than in Purging Anorexia; interestingly, no difference was found between the two types of Anorexia Nervosa with respect to these two dimensions. Phobic Anxiety was also higher in Bulimia than in Purging Anorexia, as well as higher in Binge Eating Disorders than in Purging ones. Psychoticism appeared higher in Bulimia than in Purging Anorexia, and higher in Binge Eating disorders than in Purging ones. No significant difference was found between ED subtypes as to somatization, anxiety and depression, a result in line with the review by Swinbourne and Touyz (2007) where it appears that anxiety disorders can be found in almost all the ED subtypes. This picture comparing ED subtypes in terms of intensity of symptoms is unique in the literature on the associations between comorbidities and ED.

Of particular interest is that which emerged when the HOMALS analysis was performed in order to discover the important clusters of comorbidity symptoms and psychopathological eating behaviors as they interact with the type of diagnosis. The space diagram that emerged revealed Restricting and Purging Anorexia in a cluster that included Sleep disorders, Obsessive Compulsive disorders, Somatization, Anxiety, and Depression. In contrast, Binge Eating Disorder, and Bulimia were part of a cluster characterized by Phobic Anxiety, Psychoticism, Paranoid Ideation, Interpersonal Sensibility, and Hostility.

Unfortunately, the present study does not reveal anything about which disorder precedes the other, or whether anxiety and mood disorders follow eating disorders or vice-versa. Many researchers have shown that the onset of an anxiety disorder often precedes the emergence of an eating disorder (Bulik,2003; Godart et al., 2003); reason why Swinbourne and Touyz (2007) suggest that it is the early onset of anxiety that predispose individuals to developing eating disorders (for details, see Bulik et al., 1996). Some researchers even speculate that anxiety disorders, when they have an early onset , might be considered as a genetically mediated pathway to the development of eating disorder (Kaye et al., 2004). Likewise, the fact that obsessive-compulsive disorder has an overlap with Anorexia leads to speculations that these symptoms share genetic, neurobiological, and/or psychological elements, and that compulsive-obsessive behaviors have the function of reducing anxiety levels (see review by Swinbourne & Touyz, 2007). Black Becker et al. (2004) observe that, quite often, eating disorder symptoms are not detected by clinicians since it is masked by anxiety disorders.

The clusters that emerged by means our HOMALS analysis shed light on the extent to which not just a single symptom, but actually a family of correlated ones, might have the function of reducing the high anxiety levels found in ED populations. Binge eating disorders and Bulimia appear associated with the most severe Anxiety disorders, as well as to mood and thought disturbances, with the highest level of anxiety among the ED Subtypes.

Future studies on the subject should evaluate a larger scope of mental health variables in a broader population, preferably in a longitudinal investigation, so as to provide answers to some of the questions raised here. Multivariate analysis, particularly using Facet Theory and HOMALS, should be used to evaluate the behavior of the relational structures over time.

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Eating Disorders and Intergenerational Transmission of Attachment

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Abstract: Over the past decade, results concerning the eventual associations between eating disorders (ED) and attachment styles (IWM) were very inconsistent and problematic. Definitions of the ED populations seldom took into consideration the distinction between diagnoses such as restricting anorexia, purging anorexia, bulimia, and binge eating disorder. Rarely was the link between ED patients' and their parents' IWM studied, and in no study the match between the IWMs of a patients' mother and father has ever been considered. The present study was designed to address these points by analyzing individual and parental attachment styles in both a set of ED patients and a control sample of individuals. The results obtained show that the two groups differed significantly in their attachment status distribution, with a high prevalence of ambivalent and avoidant IWM found in patients and their mothers, and a high prevalence of avoidant IWM found in the fathers. Furthermore, a different distribution of IWMs emerged in the four ED subtypes, with several HOMALS analyses revealing complex structures underlying the match between fathers' and mothers' IWM, as well as regarding the agreement between children's and parents' mental states. Such findings include: the ED population showed a greater mismatch than the controls; the disagreement between mothers' and fathers' IWM was greater in restricting anorexia; disagreements between subjects' and mothers' IWM were greater in Bulimia. All these findings are discussed in terms of the implications of an intergenerational transmission of attachment in the clinical psychology and research of ED.

1. Introduction

Over the past decade, research dealing with Eating Disorders (ED) has been increasingly providing empirical support for the existence of an association between attachment styles and problematic eating behaviour.

John Bowlby's original theory states that attachment disruption in infancy is associated to the later emergence of psychopathology, insofar as early experiences within a family lead to the development of internal working models (IWM) of self and of others, that is, of predictions about the self-reactions and the response of significant others when attachment needs emerge (Bowlby, 1969). It follows, therefore, that the IWM constitute strategies for processing thoughts and feelings, as well as specific emotion regulation patterns. Indeed, caregiver sensitivity and responsiveness to an infant's distress signals have been found to lead to secure attachment mental states which, in turn, facilitate autonomy, self-esteem, strategies for regulating emotions and distress in the short and in the long run (both in adolescence and in adulthood). Parental inconsistency, overprotection, insensitivity or unresponsiveness, on the other hand, have been associated to distress cues that lead to insecure IWM, giving rise to dysfunctional strategies for dealing with anxiety. Intense emotion dysregulation, separation, and anxiety appear when a mother is inconsistent, controlling, and intrusive in her responses to the infant's needs (an insecure-ambivalent relationship). Children, adolescents, and adults whose mothers responded with rejection to their distress cues in infancy showed little distress at separation, a false autonomy, and a conspicuous avoidance of proximity (an insecure-avoidant relationship). Confused behaviour and emotions, and being unable to relieve distress in childhood and adulthood, have been found to be associated with frightened and/or frightening behaviour displayed by maltreating, abusing, and/or traumatic mothers (Ainsworth, Blehar, Walters & Wall, 1978; Main and Solomon, 1990).

Family environments of ED populations have often been described as either overprotective or unresponsive (Bruch, 1973; Palazzoli, 1978), with a high incidence of mental states associated to insecure attachment being found in ED patients (O'Kearny, 1995; Ward, Ramsay and Treasure, 2000; O'Shaughnessy & Dallos, 2009; Zachrisson & Skårderud, 2010; Ramaciotti et al., 2001, Ringer & Crittenden, 2007; Tasca et.al., 2006; Zachrisson & Kulbotten, 2006). In spite

of that, results concerning typologies of attachment insecurity within clinical populations appear contradictory. For example, Cole-Detke & Kobak (1996), Kiang and Harter (2006), Latzer et al.(2002), Ramaciotti et al. (2001), and Ringer & Crittenden (2007) all found a high incidence of avoidant (dismissing) followed by ambivalent (preoccupied) IWMs, whereas other researchers, such as Eggert et al. (2007), Friedberg and Lyddon (1996), Salzman (1997), Troisi et al. (2006), and Tereno et. al. (2008), found the ambivalent (preoccupied) pattern to be more prevalent, while unresolved (disorganized) patterns appear in other studies from Fonagy et al. (1996), Ringer and Crittenden (2007), Ward, Ramsay, Turnbull et al. (2000), Ward, Ramsay, Turnbull et al. (2001), among others.

The evidence concerning the association between IWMs and ED subtypes, such as restricting anorexia (RAN), purging anorexia (PAN), bulimia nervosa (BN), and binge eating disorder (BED), is also unclear. In some investigations, no difference was found between ED subtypes and attachment styles (Broberg et al., 2001, Latzer et al., 2002, Zachrisson & Kulbotten, 2006; Troisi et al., 2005). In other studies, RAN appeared to be associated either with avoidant (dismissing) patterns (Candelori & Ciocca, 1998; Tasca, Richie & Balfour, 2011; Ringer & Crittenden, 2007; Ward et. al., 2001) or with patterns of a simultaneously avoidant and preoccupied (ambivalent) IWM (Barone & Guiducci, 2009). BN and PAN have been reported to be related to ambivalent (preoccupied) styles of attachment (Candelori & Ciocca, 1998; Tasca, Richie & Balfour, 2011, Ringer & Crittenden, 2007). Nevertheless, in some studies BN and BED seem to be also associated with unresolved (disorganized) patterns (Barone & Guiducci, 2009; Ringer & Crittenden, 2007; Ward, Ramsay, Turnbull et al., 2000).

A much neglected issue concerns the associations between the IWMs of ED patients and their parents, which is troublesome given the particular importance of the intergenerational transmission of attachment (replication of parental style) within this pathological population. The investigation of such relationship would also help to understand the differential role played mothers and fathers with respect to the development of eating problems, as well as the effect of combining different rearing styles. Indeed, parents' IWM have been found to deeply affect their caregiving styles (Attili, Vermigli & Roazzi, 2011). Ward et al. (2001) studied a sample of mothers and their daughters with Anorexia Nervosa finding 95% of insecurity in daughters and 83% in mothers, but no significant association between their attachment styles. On the other

hand, it seems that nothing is known about the intergenerational transmission of attachment from the father, neither has there been a study matching the IWM of mothers and fathers. Evidence of this sort would shed light on the extent to which ED populations might have been experiencing contrasting responses to their needs by mothers and fathers.

The present study was designed to address the above points by analyzing the IWMs of children and adolescents with ED and those of their parents.

The first goal was to replicate the studies concerning the associations between eating disorders and the IWM. Since oversensitivity to early separations in ED patients have been reported in both clinical studies (Bruch, 1978; Sours, 1974) and empirical ones (Armstrong & Roth, 1989; Troisi, Massaroni & Cuzzolaro, 2005; Troisi, A., Di Lorenzo, G., Alcini, S. et al., 2006), in the present investigation, in contrast to the previous ones, the IWM was assessed through the Separation Anxiety Test (SAT) by Klagsbrun and Bowlby (1976), which requires that participants reflect on the beliefs and emotions connected to being away from an attachment figure.

The second goal was to assess the IWMs of ED patients and both their parents in order to study the intergenerational transmission of attachment, a phenomenon well known in non-clinical population (van Ijzendoorn, 1995; Obegi, Morrison & Shaver, 2004), and to help fill the absence of such studies among the ED population, except for the one concerning mothers and their daughters (Ward et al., 2001). The aim of taking into consideration the fathers was to examine the relative impact of each parent in shaping an eating disordered child's IWM.

The third goal was to investigate the match between the IWMs of mothers and fathers in order to shed light on the extent to which ED population might have been experiencing contrasting responses to their needs by the two parents, given that parents' IWMs have been found to deeply affect their caregiving styles (Attili, Vermigli & Roazzi, 2011).

The fourth goal was to study all of the questions included in the three previous goals with consideration as to the ED subtypes.

The final goal was to produce an overall picture the distribution of the IWMs of both the ED patients and their parents, the degree to which the IWMs of both parents match, and the associations of such things with mental states and ED subtypes. Given that the purpose was to evaluate the the simultaneous correlations of each variable with all the others, several HOMALS analyses were

performed, finding important clusters of IWMs (Secure, Avoidant, Ambivalent, and Disorganized) for the three groups (Patient, Father, Mother), and the type of ED diagnosis (Restricting Anorexia, Purging Anorexia, Bulimia, Binge Eating, and Control) shown by means of the structure of "space diagrams".

2. Method

2.1. Participants

A total of 405 participants took part in the study, 55 ED patients, 80 controls and their respective parents (all families were intact). Their sex, age, age of parents, and parental level of education are summed up in Table 1.

Participants with eating disorders were recruited from the outpatients attending the Centre for Eating Disorders of two Hospitals in Rome. Their mean age of onset was 15.3 years (SD=2.25), and the average duration of illness was 2.5 years (SD=1.85). Their diagnosis was made by expert clinicians according to the criteria of the DSMIV TR, with the following distribution in the sample: Restricting Anorexia Nervosa (n=24), Purging Anorexia Nervosa (n=8), Bulimia Nervosa (n=11), Binge Eating Disorder (n=12). The control subjects were recruited among students attending a high school in Rome.

Table 1: Sociodemographic profile of the paticipants.

Sociodemographic Variable		ED Patients (n=55)	Controls (n=80)
Sex	Male	5	0
	Female	50	80
Individual's Age (Years)	Mean	17.8	16.5
	SD	3.09	0.70
Father's Age (Years)	Mean	48.1	46.9
	SD	7.50	8.48
Mother's Age (Years)	Mean	44.2	42.2
	SD	6.05	7.07
Father's Education (Years)	Mean	13.1	15.1
	SD	1.50	3.10
Mother's Education (Years)	Mean	12.8	13.1
	SD	2.40	0.06

2.2. Measures and Procedures

Attachment patterns were assessed by a modified version (Attili, 2001) of the Separation Anxiety Test (SAT) by Klagsbrun and Bowlby (1976). For the clinical group (patients and their parents), the test was administered to each participant individually, in the hospital, by two experimenters blind to patients' diagnosis. The control group was tested at the participant's own homes.

The SAT is a semi-projective measure of separation anxiety, derived directly from attachment theory, and consists of six drawings, each depicting a child whose parents are leaving him/her for a severe separation (for the evening, leaving child at home; for the weekend leaving the little girl/boy with an aunt; for two weeks, leaving the child at home) or a mild one (for the first day at school; in a park, asking him/her to run off and play by him/herself since they want some time alone to talk; putting the child to bed and going out the door). After each picture is described, the tester ask *"How does the child in the picture feel?", "Why does he/she feel this way?", "What do you think he/she will do?", "What is he/she going to feel/do at reunion with parents"*. Participants' responses were transcribed and then classified into 17 emotional categories such as *loneliness, sadness, rejection, anger, withdrawn, etc.* These were afterwards grouped in eight main classes of responses linked to the ideas developed by Bowlby (1969, 1973), that is to say: *attachment, loss of self-esteem, hostility, well-being, avoidance, anxiety, unresolvable distress, confusion.* Using an ordinal scale, a score was given to responses falling into each class. Summing these scores an overall test score was given to each subject designed to classify him/her into one of the four attachment typology outlined by Ainsworth et al. (1978) and Main and Solomon (1990): secure (B), ambivalent-resistant (C), avoidant (A) disorganized (D). All transcripts were classified by two coders. Agreement among them, calculated on the basis of 20 transcripts, was 80%.

3. Results

The two samples studied differed significantly in the distribution of their own attachment status, as well as of that of their parents (Table 2).

Table 2. Attachment pattern distribution in Eating Disordered patients and control group according to Subjects, Mothers and Fathers:

	Secure	Ambivalent	Avoidant	Disorganized	Total
Subjects					
Control Subjects	40 / 50.%	28 / 35%	10 / 12,5%	2 / 2.5%	80
Patients (Total)	5 / 9%	21 / 38%	17 / 31%	12 / 22%	55
Restricting Anorexia	3 / 13%	5 / 21%	10 / 42%	6 / 25%	24
Purging Anorexia	0 / .0%	3 / 37.5%	4 / 50%	1 / 12.5%	8
Bulimia	1 / 9%	2 / 18%	3 / 27%	5 / 45.5%	11
Binge Eating	1 / 8.3%	11 / 92%	0 / .0%	0 / .0%	12
Mothers					
Control Mothers	39 / 49%	30 / 38%	8 / 10%	2 / 2.5%	79
Patients' Mothers (Total)	5 / 9.6%	24 / 46%	17 / 33%	6 / 11.5%	52
Restricting Anorexia	4 / 17%	9 / 39%	7 / 30%	3 / 13%	23
Purging Anorexia	0 / .0%	1 / 17%	3 / 50%	2 / 33%	6
Bulimia	0 / .0%	6 / 54.5%	4 / 36%	1 / 9%	11
Binge Eating	1 / 8%	8 / 67%	3 / 25%	0 / .0%	12
Fathers					
Control Fathers	42 / 52.5%	31 / 39%	6 / 8%	1 / 1%	80
Patients' Fathers (Total)	5 / 10%	15 / 30%	19 / 38%	11 / 22%	50
Restricting Anorexia	2 / 10.5%	7 / 37%	6 / 32%	4 / 21%	19
Purging Anorexia	0 / .0%	2 / 25%	4 / 50%	2 / 25%	8
Bulimia	2 / 18%	1 / 9%	5 / 45.5%	3 / 27%	11
Binge Eating	1 / 8%	5 / 42%	4 / 33%	2 / 17%	12

Note: 1th line N, 2nd line % row (within Diagnosis)

Roughly 91% of patients and 90% of their mothers and fathers were insecure in their IWM, whereas 50% of the controls were secure. There were differences between the groups regarding the proportion in secure (9% versus 50%), avoidant (13% versus 31%), and disorganized (22% versus 3%) patterns ($\chi2$ =21.73, df 2, p=.0001, the disorganized patterns not taken in consideration due to the small sample size). The same held for mothers who significantly differed in the two samples for secure (49% versus 9.6%), avoidant (10% versus 33%), and disorganized (2.5% versus 11.5%) patterns ($\chi2$ = 23.88 df2, p=.0001, without the disorganized pattern). For the fathers, differences were found as regarding secure (10% versus 53%), avoidant (38% versus 8%), and disorganized (22% versus 1%) patterns ($\chi2$=31.51, df 2, p=.0001, without the disorganized pattern). Ambivalent patterns tended to be more present in patients and their mothers than in the controls, the opposite occurring with the fathers.

Apparent differences were found for the distribution of attachment styles in the four diagnostic ED subtypes, though p-values were not computed due to the small sample sizes. RAN patients were mainly Avoidant (42%), but their mothers and fathers were predominantly Ambivalent (respectively, 39% and 37%) and avoidant (respectively, 30% and 32%). PAN patients were mainly Avoidant (50%) and Ambivalent (37%), with their mothers and fathers being primarily Avoidant as well (50%), though there were many Disorganized mothers (33%). BUL patients were mainly Disorganized (45%), with mothers primarily Ambivalent (55%) and avoidant (36%), and fathers mainly Avoidant (46%). BED patients and their mothers were mostly Ambivalent (respectively, 92% and 67%), with their fathers being mainly Ambivalent (43%) and Avoidant (33%).

The iterative HOMALS algorithm is a modernized version of the one created by Guttman (1941), and belongs to the family of graphic methods of data analysis. It allows a visual presentation of correlations between variables with a low level of measurement. The acronym stands for HOMogeneity analysis by means of Alternating Least Squares and, from a conceptual point of view, it is a synonym for multiple correspondence analysis (De Leeuw & Rijckevorsel, 1980; Greenacre & Blasius, 2006; Mair & de Leeuw, 2008). Nevertheless, correspondence analysis is typically solved by singular value, whereas, in HOMALS, an ALS is used on a least squares loss function, which represents a criterion of departure from homogeneity to be minimized.

In a HOMALS output for Multidimensional Scalogram Analysis (MSA), particularly in the corresponding module of the SPSS 18, there are two important measures of quality: discrimination measures and eigenvalues. A discrimination measure in an MSA describes the ability of a variable to discriminate between the reports on one dimension. The eigenvalue is a measure of explained variance whose calculation is based on averaging the discrimination measures for the respective dimension (Van de Geer, 1993).

A HOMALS analysis was performed to investigate the eventual clusters of patient and parental IWMs and types of ED diagnosis. From it, emerged a "space diagram", a visualization of a relational structure of all the variables studied.

The HOMALS solution that was found for the control group and the ED subtypes can be visualized as having an axial partition (Figure 1). On the upper right portion of the plot are the control participants, close to secure IWM for the subjects, their mothers and fathers. On the upper left portion of the diagram is Bulimia, close to patients' and fathers' disorganized IWM and not far from fathers' avoidance, mothers' avoidance, and ambivalence. Both Purging and Restricting Anorexia are located in the centre left portion of the diagram, close to subjects', mothers' and fathers' avoidant IWM. It should be observed that Restricting Anorexia is not far from mothers' and fathers' ambivalence. Binge eating disorders are located in the lower portion of the diagram, close to patient's, mother's and father's Ambivalent IWM.
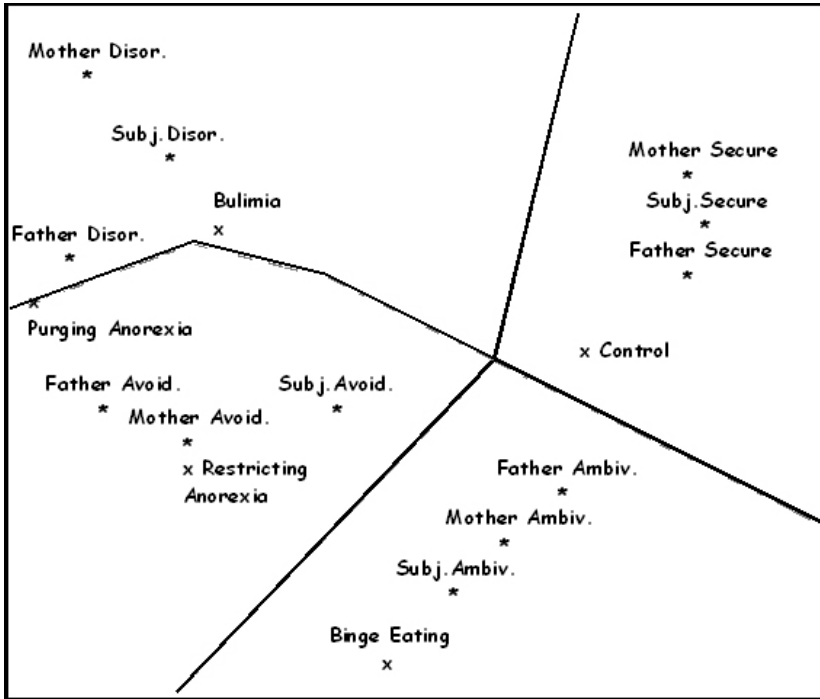
Fig. 1. HOMALS solution of Diagnosis x Subject, Mothers, Fathers attachment internal working models.

In order to study the intergenerational transmission of attachment and the predominance of one parent over the other in shaping their eating disordered child's IWM, an analysis was made of the match between the IWMs of the participants and their parents in both the clinical and control group (Table 2).

Different levels of matching were found, with more disagreement in the ED group than in the controls. Also, patients' IWM were matched mainly with those of their mothers rather than with those of their fathers (48% versus 30%), but much less than it the case of the controls (83.5% versus 65%). For subject-mother correspondences, $\chi2 = 18.60$, df=1, p=.0001; for subject-father correspondences, $\chi2=15.09$, df=1, p=.0001 (see Table 3). In fact patients' IWM appear often not to match that of anyone of his or her parents, with a subject-nobody frequency of 35% versus 6% in the control group ($\chi2=17.93$, df1, p=.0001).

As to the goal of verifying the hypothesis that ED patients might have experienced contrasting rearing styles by their parents, we analysed the correspondence between mothers' and fathers' IWM (Table 3). An impressive mismatch between parents was found in the ED patients (73%) but not so much in the control group (39%), a statistically significant difference ($\chi2 = 13.57$, df=2, p= .001). Likewise, there were fewer matches between an individual's IMW and that of both his or her parents among the ED patients (13%) than among the controls (54%), which was also statistically significant ($\chi2 = 22.15$, df2, p=.0001).

Table 3. Matching between IWM in patients and control group - Subject-Mother, Subject-Father, Subject-Both Parents and Father-Mother.

	Subject - Mother	Subject - Father	Subject - Both Parents	Subject - Nobody	Mother - Father
	66 (79)	52 (80)	43 (79)	5 (80)	48 (79)
Control group	83.5%	65%	54%	6%	61%
	25 (52)	15 (50)	6 (48)	17 (48)	13 (48)
Patients (Total)	48%	30%	12.5%	35%	27%
Restricting Anorexia	13 (23)	5 (19)	2 (19)	4 (19)	4 (19)
	56.5%	26%	10.5%	21%	21%
Purging Anorexia	2 (6)	4 (8)	1 (6)	3 (6)	2 (6)
	33%	50%	17%	50%	33%
Bulimia	3 (11)	1 (11)	0 (11)	7 (11)	3 (11)
	27%	9%	0%	64%	27%
Binge Eating	7 (12)	5 (12)	3 (12)	3 (12)	4 (12)
	58%	42%	25%	25%	33%

Note: 1st line shown N and, between parenthesis, Total N; 2nd line shows the corresponding percentage.

All of these results emerge, in a relatively detailed form, in the visualization of the HOMALS solution (Figure 2). While the control group was located in the "agreement" area on the right portion of the diagram for each variable (matches between subject-mother, sub-father, sub-both parent, and mother-father), the different ED subtypes appeared all in the "disagreement" portion on the left side. Indeed, the disagreement between the IWMs of mothers and fathers IWM was greater in the Restricting Anorexia (79%), followed by Bulimia (73%), and Purging Anorexia and Binge Eating (67% each), as shown in Table 3. The disagreement between the IWMs of patients and their mothers was greatest in those with Bulimia (73%), followed by those with Purging Anorexia (67%). In contrast, the IWMs of Restriction Anorexia and Binge Eating matched their mothers' the most (57% and 58%, respectively). Differences between subtypes were also found for the transmission of attachment by fathers (Table 3 and Figure 2). The IWMs of PAN and BED patients were associated mostly to that of their fathers (50% and 42% respectively). Overall, the findings show that an ED patient's attachment styles tend to match mainly those of their mothers in the RAN and BED subtypes, and, to a lesser extent, the BUL, with the PAN patients tending to be more similar to those of their fathers. In the BUL and PAN patients, a high percentage of individuals had IWMs that did not match that of any of their parents (64% in BUL, 50% in PAN).

4. Discussion

The findings of the present study seem to confirm the specialized literature with regards to the observation that ED patients have mostly insecure IWMs, with a prevalence at around 90%. By using the Separation Anxiety Test for assessing attachment styles, an instrument that, to the best of our knowledge, has been used only by Armstrong and Roth (1989), we consistently found in the present study that ED patients showed attachment difficulties in hypothesizing responses to separations, revealing a tendency towards a significant exclusion of painful information (38% Anxious Ambivalent, 31% Avoidant, and 22% Disorganized). These results are in line with both Troisi et al.(2005, 2006) and Zachrisson and Kulbotten (2006), who found an extreme separation anxiety in their ED patients (mostly Ambivalent), with evidence of specific maladaptive strategies in emotional regulation tending to emphasize positive emotions

such as joy and surprise (Overton, Selway, Strongman & Houston, 2005), and being unable to integrate the memory of positive and negative experiences (Nandrino, Doba, Lesne, Christophe & Pezard, 2006). Indeed, the Avoidant subjects investigated here seemed to lack the capacity to hypothesize anger and sorrow in the children depicted in the SAT vignettes, in line with De Filippis, Franco, D'Arista, Frustaci, and Pozzi (2004), and Espina (2003), who found ED patients to be affected by alessithimic syndromes.
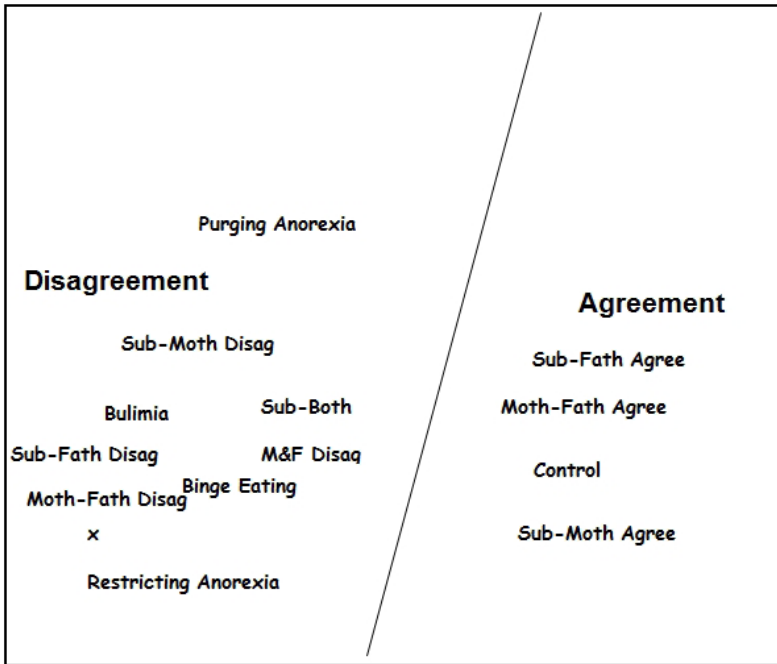

Fig. 2. Homals solution of Diagnosis x Mothers and Fathers attachment internal working models matching of IWMs in patients and control group.

By using a HOMALS analysis, a complex structure emerged that shed light on patients' attachment styles according to ED subtypes. The resulting diagram could be easily partitioned so as to show the control subjects on one side and the various types of patients on the other, with the ED subtypes capable of being further subdivided into spatially separate categories. The geometric allocation of the groups illustrated not only which IWM was prevalent in each

ED subtype, but also the incidence of concomitant mental states. The controls were mainly secure, while those with Restricting Anorexia were typically Avoidant, in accordance with Candelori and Ciocca (1998), Tasca, Richie and Balfour (2011), Ringer and Crittenden (2007), and Ward et. al. (2001) who, by the way, did not distinguish between the Anorexia subtypes. Purging Anorexia was also associated to Avoidance, even though it was not far from Ambivalence. Bulimia was related to Disorganization, as found previously by Ringer and Crittenden (2007), as well as Ward, Ramsay, Turnbull et al.(2000).

The ED patient's parents were found to be insecure in 90% of the cases, as observed by Ward et al. (2001), Tereno et al. (2008), and Ringer and Crittenden (2007). In the present study, all of the attachment patterns were found among the parents, with 17% Disorganized, 35% Avoidant, and 38% Ambivalent, though Ambivalent patterns were slightly dominant in the mothers and Avoidant ones in the fathers. Since parents' IWMs greatly affects their rearing styles (Attili, Vermigli & Roazzi, 2011), this finding is in line with the description from Bruch (1978) of a family environment characterized by the mothers' overprotection, intrusiveness, and control, which one usually associates with the Ambivalent/Entangled IWM. Here, it appeared in 46% of the mothers. At the same time, our results are in accordance with Palazzoli (1978), who describes the emotional unresponsiveness and the poor conflict resolution of ED population's families, particularly Anorexic patients, something strongly associated to an Avoidant/Dismissing IWM. Indeed in our study mothers of Purging Anorexic patients were mainly Avoidant/Dismissing, in line with Ward et al. (2001), even though in our RAN patients' mothers appeared not only Avoidant/Dismissing, but also Ambivalent/Preoccupied.

The unique contribution of our study is to consider the role of the father in the development of eating disorders. In doing so, we shed light upon a more complex family dynamics where difficulties in a patients' early relationships go beyond the relationship with mothers alone. Until now, no study had analysed the direct and concomitant influence of the fathers' IWM in the ED population and subtypes. The few works addressing the matter at all are limited to depictions of fathers made by the patients themselves, using either the Main's AAI self-report scales or PBI, and, in them, the fathers appear emotionally unavailable, neglecting, critical, and not keen to give support (Barone & Guiducci, 2009, Botta & Dumlao, 2002; Cohle-Detke & Kobak, 1996), a rearing style which may be considered the outcome of the fathers'

avoidant IWM, as it appears in our study (the fathers' IWMs were avoidant in 38% of the cases). Our Bulimic patient's fathers appear to be mostly Avoidant, but Disorganized too, in line with other studies where patients recall a lack of paternal care, empathy, and loving experiences (Steiger, Van der Feen, et al.,1989) or even hostility (Becker, Bell & Billington, 1987). Binge Eating appeared to be associated with the fathers' Ambivalence, though there was some Avoidance and Disorganization, concurring with studies showing that this type of disorder tends to be negatively correlated with the care from the father (Pace, Cacioppo & Schimmenti, 2011). The Anorexic patients' fathers were mostly avoidant in PAN, and both Ambivalent and Avoidant in RAN, with some Disorganization appearing in both subtypes.

The intergenerational transmission of attachment, not just by mothers but also by fathers, is a well known phenomenon in non-clinical populations (van Lizendoorn, 1995; Obegi, Morrison & Shaver, 2004), but it is largely neglected in studies on ED patients, except only for the one by Ward et al. (2001), where only mothers and the diagnosis of Anorexia Nervosa were considered. By taking both parents into account, as well as the ED subtypes, the present study allows for an in-depth accurate description both of the differential role played by each parent in the development of eating problems and of the effect of each parents' rearing styles. We found that the patients' IWMs matched more their mothers' than fathers', corroborating the studies hypothesizing that it is mainly the relationship with the mother that affects the onset of eating disorders (Latzer, Hochdorf, Bachar & Canetti, 2002; Kiang & Harter, 2006; Ringer & Crittenden, 2007). However, this matching occurred much less frequently than in the controls. Furthermore, even though insecure attachment in the ED population appears to be explained more from the attachment patterns of their mothers than from those of their fathers. The difference between the matches with the mother versus the ones with the father was not striking. Somehow, no caregiver seems to have been predominant in taking care of his/her child. Interestingly, the patients' IWMs appear to often not match the IWM of any parent. An explanation might be found in the impressive mismatch (73%) found between the IWMs of their mothers and fathers, which allows one to hypothesize very contrasting rearing styles and hidden family conflicts. In the contrast to receiving responses to their needs from their parents, the ED population seems unable to inherit any clear attachment script from them. Developing one's own, particular, attachment style might be considered an

unconscious strategy for protecting oneself from the confusion in face of emotional conflicts. The HOMAL analysis defines very clearly the complex structure characterizing the patients' family experiences in the ED subtypes as opposed to those of the controls. The disagreement between the IMWs of mothers and fathers appears in all the ED subtypes, all located on the left part of the diagram, while the controls and the agreements were all located on the right side. Interestingly, the mismatch between mothers' and fathers' attachment modes (and, thus, between their rearing styles) appear greater, even though not significantly so, in Restricting Anorexia (79%), much more so than in other ED subtypes, indicating that Anorexic patients are more exposed to risk in their family systems.

In conclusion, our results show that eating disorders may emerge in different family systems. Given the intrusiveness and controls of Ambivalent parents and/or the critical attitude of Avoidant ones, ED patients might feel that they are unable to please their parents. Disengaging from efforts to gain comfort from them and redirecting attention from attachment to goals more easily reached, such as changing one's appearance or resorting to food, might be interpreted as an unconscious strategy for avoiding having to face the pain of not being loved. Thus, it would seem that ED patients are supposed to benefit the least from current symptom-focused therapies (Tasca, Ritchie & Balfour, 2011). In contrast, they might benefit more from therapists who provide nurturance in a non-threatening way, playing the role of a secure base of emotional support. Nevertheless, the Avoidant mental states of Anorexia might require a non-intrusive intervention, while the Disorganization of a Bulimic and the Ambivalence of Binge Eating patients might necessitate a treatment aimed to help the emotional dysregulation (Wisnieski& Kelly, 2003). Psychotherapeutic intervention should aim at letting patients revise their internal working models by recalling memories of the contrasting and conflicting way they have been treated by their parents and by focusing attention on their own conflicting needs. Intervention should take in consideration what is specific of each attachment cognitive script.

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Mediation of Self-rumination on Mental Health Related Aspects: A Multidimensional Approach

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Abstract: Private self-consciousness refers to the functional level of consciousness where the focus of attention is turned to intangible events, such as thoughts, feelings, sensation and perception, values, goals, beliefs, memories, and so forth, i.e., to the internal factors that relate the self to itself (Morin, 2004, 2006; Nascimento, 2008). Self-focus can be directed either to the negative aspects of the self (self-rumination), promoting anxiety, or to the positive ones (self-reflection), producing pleasure and well-being (Morin, 2002a). For some time now, researchers have attempted to establish a relationship between personality traits pertaining to self-conscious activities and various elements of mood, behavior and mental health (Trapnell & Campbell, 1999). Indeed, studies have shown that self-rumination is associated to psychopathologies, acting as a mediator in the occurrence of anxiety and depression. In a recent investigation, it was found that the participants of three Brazilian syncretic religions (namely, Santo Daime, União do Vegetal, and Sociedade Panteísta Ayahuasca) that make use of the psychedelic drink Ayahuasca, which is known to influence consciousness, presented low scores on measures of psychopathology (Escobar, 2013). In that study, religious ayahuasqueros (n=110) were submitted to several psychometric instruments, including Lipp's Inventory of Stress Symptoms, Beck's Anxiety and Hopelessness Indexes, CES-D Depression Scale, Goldberg's General Health Questionnaire, Manual Line Bisection Test, and Social Skills Inventory. The results obtained showed that, overall, the participants

as displayed a good level of mental health, though those belonging to the Santo Daime group showed statistically higher results when compared to the other groups (but still not in a level indicative of psychopathology). For the present study, it was hypothesized that personality traits may be involved in the results of the study from Escobar (2013), particularly relating to the operation of self-consciousness. Therefore, the Rumination-Reflection Questionnaire was applied to those same participants in order to explore the mediating role of self-rumination and self-reflection on the results obtained in the study by Escobar (2013). In order to investigate the relationships between the various empirical scales with the variable of interest, the Similarity Structure Analysis (SSA) was used on the resulting data, treating belonging to of the three ayahuasqueros groups with the "external variables as points" technique. The results yielded a scalogram that, interpreted by means of Facet Theory, showed a polar structure evidencing that all the religious groups had elevated values of self-reflection, but the Santo Daime group had the highest values for self-rumination. These findings support the hypothesis that the functioning of one's self-consciousness is a personality trait that has a mediating role in the emergence of psychopathologies.

1. Introduction

Ayahuasca is an ancient psychedelic traditional native Amazonian drink with potent and mysterious effects on human consciousness and behavior. Its name means "liana of the soul", in reference to the deep altered state of consciousness promoted by its oral consumption in shamanic rituals (Escobar & Roazzi, 2010; B. C. Labate & Araújo, 2002; Schultes, Hofmann, & Rätsch, 2001).

Currently, the ritual consumption of ayahuasca has expanded to urban environments with a variety of contexts within which it is offered to the users, following the different cosmogonies of the religious groups. Most of these abide to a thinking system based on complementary dualism, along with tenets from Christian values that receive the syncretic addition of beliefs in reincarnation, African religiosity, and indigenous motifs (B. C. Labate & Araújo, 2002; Beatriz Caiuby Labate, Rose, & Santos, 2008; MacRae, 2004). There are also some groups with shamanic-like functioning infused with New Age ideologies (B. C. Labate, 2004; Lira, 2009), as well as one with a unique

monistic-pantheist religiosity where ayahuasca is used to worship Creation and the Universe (Escobar, 2013).

The psychoactive effects of ayahuasca are due to the combined presence of the monoamine serotonin-like dimethyltryptamine (DMT) in the leaves of the *Psychotria viridis* and the β-carbolines in the stem of the *Banisteriopsis caapi*. The latter, commonly harmine, harmaline, and tetrahydroharmine, have the role of interacting with the gastrointestinal monoamine oxydase A (MAO-A), a monoamine degrading enzyme, so as to inhibit its action, allowing the DMT to be absorbed intact (Riba, 2003). DMT, which is analogous to LSD, psilocybin, and mescaline, acts as an agonist in the serotonin receptors present in certain brain areas involved in psychological processes such as arousal, cognition, volition, perception, emotion, etc. (Nichols, 2004; Ray, 2010).

The altered state of consciousness produced by ayahuasca can vary significantly, but common occurrences include dream-like visions, changes in the perception of light and color, accelerated thinking, enlightenment, and spiritual experiences, sometimes including depersonalization, derealization, or dread, all of which may or not be accompanied by vomit and diarrhea (Schultes, et al., 2001; Shanon, 2003).

The clinical safety of ayahuasca has been demonstrated in more than one study, with the most significant adverse effect being some elevation of the arterial blood pressure (Riba, 2003; Strassman & Qualls, 1994). There is no evidence for development of tolerance and dependence (Riba, 2003; Santos et al., 2012; Strassman, Qualls, & Berg, 1996) and the effects on autonomic, neuroendocrine and behavioral systems do not seem to be dangerous (Barbanoj, Riba, Clos, & Gimenez, 2008; Riba et al., 2003; Santos, et al., 2012; Santos et al., 2011).

Some researchers have proposed that the interaction between DMT and serotoninergic mechanisms are involved in the occurrence of psychopathology. In fact, research had been conducted to establish the relation between schizophrenia and the use of psychedelics, obtaining results suggesting that the existence of phenomenological and neurochemical similarities between both those altered states of consciousness (Costa, Figueiredo, & Cazenave, 2005; Pomilio et al., 1999; Santos & Strassman, 2011).

Understanding ayahuasca's effect on serotonergic neurotransmission may be interesting for the development of the theory about psychopathology, given that a low flow of serotonin or high availability of MAO-A seems to be

related to occurrence of depression, anxiety, suicide, drugs abuse and other mental health problems (Markou, Kosten, & Koob, 1998; Nemeroff & Vale, 2005; Nestler et al., 2002; Quan-Bui et al., 1984; Sullivan et al., 2006). Indeed, ayahuasca consumption is capable of increasing the number of serotonin receptors and mimic the effects of antidepressants, with instances of this being used as adjuvant in psychotherapy and psychiatric treatment (Escobar & Roazzi, 2010; B. C. Labate, Santos, Anderson, Mercante, & Barbosa, 2010; Mabit, 2007; Mercante, 2009; Osório et al., 2012). Some other psychedelics have likewise been considered as potentially important therapeutic tools (Winkelman & Roberts, 2007).

The therapeutic properties of ayahuasca and of psychedelics in general can also be credited to the ritual involved in their use, that is to say, how the experience is conducted and the offering of social support (B. T. Anderson, 2012; B. C. Labate, et al., 2010; Sánchez & Yurrebaso, 2009; Sanchez & Nappo, 2008; Tuguimoto et al., 2011). It is also believed that the effects upon serotonergic neural substrates promote access to constitutive memories that would eventually be signified and reintegrated into the Self system with consequent changes in behavior (Winkelman, 1996, 2001, 2007). Some of the neural substrates involved in limbic and vision systems, as well as other mechanisms related to volition, are demonstrated in the effects of ayahuasca and other psychedelics, and seem to offer support to this hypothesis (Almeida Prado et al., 2009; de Araujo et al., 2012; Geyer, Nichols, & Vollenweider, 2009; Gouzoulis-Mayfrank et al., 1999; Nichols, 2004; Riba, 2003; Riba et al., 2006; Vollenweider & Geyer, 2001).

Some studies demonstrates that ayahuasca could be an important aid to treat addiction, and its use is related to abandoning the habit of alcohol and other drugs, though the mechanisms involved are not well known (Fábregas et al., 2010; Grob et al., 1996; Halpern, Sherwood, Passie, Blackwell, & Ruttenber, 2008; Labigalini, 1998; Santos, Moraes, & Holanda, 2006). The tea could be involved in acute schizophrenia or psychotic episodes (Santos & Strassman, 2011), but studies have failed to demonstrate any deleterious effects on ayahuasca users or any significant occurrence of psychopathological problems due to continuous use (Bouso et al., 2012; Doering-Silveira et al., 2005; Escobar, 2013; Grob, et al., 1996; Halpern, et al., 2008; Tófoli, 2010).

In truth, ayahuasca has been largely associated to good mental health, with improvements found on issues of drug abuse, stress, anxiety, and the

occurrence of minor disorders, as well as positive changes in personality, spirituality and worldview (P. C. Barbosa, Cazorla, Giglio, & Strassman, 2009; P. C. R. Barbosa, Giglio, & Dalgalarrondo, 2005; Escobar, 2013; Kjellgren, Eriksson, & Norlander, 2009; Mabit, 2007; McKenna, 2004; Trichter, Klimo, & Krippner, 2009).

It is fairly certain that there are both biological and psychosocial mechanisms involved in mental health problems, these being related to thinking styles and different modes of functioning in the world (Fenigstein, Scheier, & Buss, 1975; A. Morin, 2002a; Takano & Tanno, 2009; Trapnell & Campbell, 1999; Yook, Kim, Suh, & Lee, 2010). Psychopathologies such as chronic stress, generalized anxiety, and depression had been related to deficits in serotonin neurotransmission as well as to the patient's low resilience and inefficient social support (Markou, et al., 1998; Nemeroff & Vale, 2005; Nestler, et al., 2002; Quan-Bui, et al., 1984; Sullivan, et al., 2006; Telles-Correia & Barbosa, 2009).

It is postulated here that consciousness is a human activity arising from natural selection, one that has a spectrum of modi operandi with different states of functioning (Dietrich, 2003; Escobar, 2013). It also involves different forms of interaction between the environment and intrinsic personal information, with different impacts on the functions of consciousness; the more conscious access to information there is, the higher the level of functioning (A. Morin, 2004, 2006).

The state of altered consciousness produced by ayahuasca has been called a "psychointegrator", due to its properties of accessing intrinsic memories or silenced personal problems and trauma, that is to say, accessing unconscious information with the possibility of rearranging these contents so as to modify their integration to the Self system, with consequent changes in behavior (Winkelman, 1996, 2001, 2007). It seems that ayahuasca facilitates the resolution of psychological processes by assessing the unconscious symbolic systems that could be consciously modified during psychedelic experience. The ways or mechanisms by which consciousness does it successfully are still unknown, however, and significant research and theoretical efforts are still necessary.

It appears quite clear that the experience with ayahuasca and analogous psychedelics allows a special access to constitutive self-information, one which could contribute to the understanding and treatment of mental health in different ways. Accessing one's negative self-aspects would tend to produce

psychopathology, whereas accessing the positive ones would improve or promote mental health (Morin, 2002).

The access to this kind of self-information occurs in a high level of consciousness, where the Self focuses attention on itself, something which directs the individual reflection to shape personal traits such as values, behaviors, etc. (Duval & Wicklund, 1972; A. Morin, 2006). Self-consciousness can be of two kinds: public or private. Public self-consciousness refers to self-awareness activity with self-focus turned to the visible self attributes to other selves (i.e. behavior, physical appearance, opinion of others, etc.), while private self-consciousness is related to non-observable events (sensations, perceptions, values, own opinions, beliefs, memories, etc.), that is, to internal factors that relate to the self itself (Fenigstein, et al., 1975; A. Morin, 2006; Nascimento, 2008).

Private self-consciousness is a special mechanism of the mind designed to produce critical reflection upon constitutive contents, and it occurs by means of cognitive operations like thinking, imagination, self-talk, and so on, creating self-perception in the experience of awareness, making the subject him or herself as a reflexive observer processing self-information (A. Morin, 2004, 2006; Nascimento, 2008). Research on this level of conscious activity demonstrates need to isolate these properties and progress in the construction of adequate instruments (E. M. Anderson, Bohon, & Berrigan, 1996; Froming & Carver, 1981; Piliavin & Charng, 1988; Trapnell & Campbell, 1999).

A self-reflective factor found in the private self-consciousness scale (Fenigstein, et al., 1975) was investigated by Trapnell and Campbell (1999), who observed that the self-reflexive factor of private self-consciousness presents two components: one intellectual, related to positive affect, and another ruminative, related to negative affect. The isolation of these two aspects (self-reflection and self-rumination) have opened new perspectives for the understanding of the role of modes of thinking and self-awareness as personality traits in mental health (Trapnell & Campbell, 1999).

Some of the work done points to the existence of intrinsic relations between self-rumination as trait and the occurrence of anxiety, depression and other mental problems (Jones & Fernyhough, 2009; Luyckx et al., 2007; A. Morin, 2002a; Nascimento, 2008; Takano & Tanno, 2009; Trapnell & Campbell, 1999; Wupperman & Neumann, 2006; Yook, et al., 2010; Zanon, 2009; Zanon, Borsa, Bandeira, & Hutz, 2012; Zanon & Hutz, 2009).

In a nutshell, Ayahuasca is capable of promoting an altered state of consciousness due to the effects of a substance that improves serotonergic mechanisms in brain, increases access to self-information, and has a ritualistic use that allows for social support and reintegration (Escobar & Roazzi, 2010; Grob, et al., 1996; McKenna, 2004). It has the peculiar feature of activating certain brain areas related to self-consciousness and self-awareness (Almeida Prado, et al., 2009; de Araujo, et al., 2012; A. Morin, 2002b) and also acting as a psychointegrator substance (Winkelman, 2007). Thus, the goals of the present study were to explore the occurrence of signs of psychopathology in ayahuasca users of different religiosities and to study the relationships with self-rumination and self-reflexive activities.

2. Method

2.1. Participants

This was a cross-sectional study with a sample of convenience comprised of 110 individuals of three ayahuascan religiosities from the state of Pernambuco: Santo Daime (StD), União do Vegetal (UDV) and Sociedade Panteísta Ayahuasca (SPA). Most participants were from the UDV (n=68, 61.8%), followed by StD (n=23, 20.9%), and SPA (n=18, 16.4%), with one of the subjects not reporting his religious affiliation (0.9%). Overall, the sample consisted of 56 male subjects (51.9%) and 52 females (48.1%) with a mean age was 38.8 years (SD = 12.70), ranging individually from the ages of 20 to 68. Regarding education, most had a bachelor's degree or higher (63.3%), the remaining having a lesser level education (36.7%). The average length of use of ayahuasca among the participants was 94.2 months (SD = 88.36), ranging individually from 1 to 355 months.

2.2. Instruments

To investigate the mediation role of self-consciousness in psychopathology among ayahuasca users, various psychometric instruments and tasks were used, with their internal reliability accessed by the Kaiser-Meyer-Olkin index and Cronbach's Alpha.

Stress. Lipp's Inventory of Stress Symptoms (ISS) was used to measure pathological stress and its severity (Lipp, 2005).

Anxiety. Beck's Anxiety Index (BAI) was used to assess the occurrence and severity of anxiety (Cunha, 2001).

Hopelessness. Beck's Hopelessness Scale (BHS) was used to measure the occurrence and severity of feelings of hopelessness (Cunha, 2001).

Depression. The Depression Scale of the Center of Epidemiological Studies (CES-D) was used to measure depression (Silveira & Jorge, 1998). This test, however, did not show a good fit to the present sample, so a series of factor analyses were carried out until the two factors emerged (Depressive Affect, Negative Affect) with a Cronbach Alpha score higher than 0.70 (Escobar, 2013).

Minor Disorders. The Goldberg General Health Questionnaire (GHQ) was used to assess the occurrence of non-psychotic symptoms (psychic stress, death wish, distrust in one's own performance, sleep disturbances, psychosomatic disturbances) and their severity (Pasquali, Gouveia, Andriola, Miranda, & Ramos, 1996).

Social Abilities. The Inventory of Social Abilities (ISA) was used to evaluate the social strategies of the participants (Del Prette & Del Prette, 2005). In this questionnaire, only two factors out of the original six (Coping and self-assertion with risk, Coping and self-assertion in the expression of positive sentiment) showed an adequate level of reliability (Cronbach Alpha higher than 0.70) and, therefore, only those two factors were used (Escobar, 2013).

Visual Neglect. The Manual Line Bisection Test (MLBT) was used to measure the deterioration of visual mechanisms and attention (Cavezian et al., 2007; Halligan & Marshall, 1988).

Self-rumination and Self-reflection. The Rumination-Reflection Questionnaire (RRQ) was used to assess the two components of the Reflection factor of the Private Self-Consciousness Scale (Trapnell & Campbell, 1999; Zanon & Hutz, 2009).

2.3. Procedures

After an initial contact with those responsible for the religious movements in order to explain the research goals and to obtain their authorization for the investigation, the general members of such movements were invited to enroll in the study. All necessary ethical cautions were taken, following the criteria from Resolution 196/96 of the National Health Council in Brazil, as well as from the Ethics Committee on Human Research of the Center for Health Sciences, Federal University of Pernambuco (protocol no. 384/11).

The participants answered all questionnaires and scales in a single protocol, having been informed about the nature and goals of the investigation beforehand. There was no time limit for the responses; the spontaneous settling time ranged from 1:30 to 2:30 hours.

3. Results

3.1. Instruments Measures

Table 1 shows the statistics for all the instruments used, as well as the analytical procedures and significances values adopted, considering the specific religious group (StD, UDV, and SPA) as between-subject factors or grouping variable.

The members of the ayahuascan groups presented low psychopathology scores (ISS, BAI, BHS, CES-D, GHQ, and MLBT). None of these instruments produced means that exceeded their predicted cutoff values, indicating an absence of psychopathology in the sample studied. The statistical differences found regarding the BHS indicated that the UDV group was less hopeless than the other two. The mean results of the ISA indicated that ayahuasca users presented a good repertoire of social abilities. Self-consciousness activity was statistically elevated and predominantly self-reflective. Differences were found between both activities of the RRQ, with the SPA participants being more self-reflexive. On the other hand, self-rumination activity was higher in the StD participants. The ratio of these results in RRQ factors was 1.24 (3.92/3.16; range 1.11 to 1.34) and self-reflection was higher than self-rumination in all religious groups.

Table 1. Means and standard deviations of the participants for the scores on the instruments and statistical comparisons between religious groups.

Instruments	N	Religiosities	Statistical	P
ISS			**GLM Repeated Measures**	
Phase Alertness	107	1.62 (1.64)		
Phase Resistance	107	1.43 (1.8)	$F(2, 206) = 0,928$	0,449
Phase Exhaustion	107	1.62 (2.01)		
BAI			**Kruskal-Wallis**	
Total	99	3.47 (5.12)	$\chi^2 = 4.674; df = 2$	0.097
BHS †			**Kruskal-Wallis**	
Total	107	2.40 (1.84)	$\chi^2 = 13.147; df = 2$	0.001
CES-D			**Kruskal-Wallis**	
Depressive Affect	107	0.3 (0.5)	$\chi^2 = 5.290; df = 2$	0.71
Negative Affect	108	0.49 (0.62)	$\chi^2 = 2.272; df = 2$	0.321
GHQ			**Kruskal-Wallis**	
Global Score	108	1.5 (0.27)	$\chi^2 = 3.052; df = 2$	0.217
Psychic Stress	108	1.48 (0.39)	$\chi^2 = 5.453; df = 2$	0.065
Death Wish	107	1.12 (0.27)	$\chi^2 = 4.076; df = 2$	0.130
Distrust in Own Performance	108	1.65 (0.35)	$\chi^2 = 1.130; df = 2$	0.514
Sleep Disturbances	108	1.36 (0.42)	$\chi^2 = 2.661; df = 2$	0.264
Psychosomatic Disturbances	108	1.46 (0.36)	$\chi^2 = 0.730; df = 2$	0.694
ISA			**Kruskal-Wallis**	
Coping and self-assertion with risk	106	10.46 (3.16)	$\chi^2 = 3.563; df = 2$	0.168
Coping and self-assertion in the expression of positive sentiment	106	8.96 (1.9)	$\chi^2 = 0.047; df = 2$	0.977
MLBT			**GLM Repeated Measures**	
Double Cue	99	-1.88 (4.11)		
No Cue	99	-2.06 (3.51)	$F(3, 288) = 2.017$	0.063
Right Cue	99	-0.81 (3.53)		
Left Cue	99	-3.24 (3.6)		
RRQ ††			**GLM Repeated Measures**	
Self-Rumination	108	3.16 (0.79)	$F(2, 104) = 3.568$	0.032
Self-Reflection	108	3.92 (0.52)		

† Mann-Whitney U Post Hoc test showed differences between UDV < StD (p = 0.001) and UDV < SPA (p = 0.043).
†† LSD Post Hoc test showed differences in self-reflection to SPA > StD (p = 0.013) and SPA > UDV (p = 0.001), and in self-rumination to StD > UDV (p = 0.019).

3.2. SSA Analysis

A Structural Similarity Analysis (SSA) was used to identify the relationships between the various psychometric instruments themselves and with the three religious groups studied. This statistical technique belongs to the family of multidimensional scaling methods, which allow psychological associations to be expressed as geometrical distances (Guttman, 1968, 1991). The analysis was made possible by the method of external variables as points (Cohen & Amar, 1999; Roazzi & Dias, 2001) which allowed each *ayahuasquero* group to be positioned within in the relational structure found between the psychometric variables. Facet Theory was used as a meta-theoretical reference for the interpretation of the results (Roazzi & Dias, 2001), enabling an accurate description of the relationships between the factors of these various scales the different religious groups.

Figure 1 shows the scalogram found for the SSA, displaying a spatial distribution of variables indicating the relative proximity of the StD participants with the factors related to stress, anxiety, depression, and non-psychotic disorders, having the highest levels of self-rumination. The SPA, on the other hand, had the highest level of self-reflection. These two self-consciousness activities assumed opposite positions relative to the psychopathology indexes. The ISA factors presented similar behavior, with the repertoire of adequate social strategies being distant from the measures of psychopathology.

Generally speaking, the consumption of ayahuasca was not related to the occurrence of symptoms of stress, anxiety, depression, hopelessness, visual perception or attentional disturbances and minor disorders. It was found that these measures are related to self-rumination, a trait more powerfully observed in the StD sample, which was also found to be more vulnerable than the others to stress, anxiety, hopelessness, negative affect, sleep disturbances and other psychopathological indexes, though not at pathological levels.

4. Discussion

Since the altered states of consciousness induced by the use of ayahuasca and other psychedelics substances are similar to symptoms of schizophrenia, some investigators had suggested their relationship to psychoses (Costa, et al.,

2005; Pomilio, et al., 1999; Santos & Strassman, 2011; Vollenweider & Geyer, 2001). If that were the case, it would follow that one would tend to find mental health problems in the population studied, however, in the present study it was shown that the use of ayahuasca in different ritual contexts in Northeastern Brazil did not seem to promote signs of psychopathology or the deterioration of visual-attentional mechanisms.

There were varying durations of the use of ayahuasca in the present investigation, ranging from one month to almost 30 years, yet, the findings obtained are in line with the studies that failed to find an association between such a use and psychological and psychiatric problems (P. C. Barbosa, et al., 2009; P. C. R. Barbosa, et al., 2005; Bouso, et al., 2012; Doering-Silveira, et al., 2005; Fábregas, et al., 2010; Grob, et al., 1996; Halpern, et al., 2008). Not only does it appear that ayahuasca used in a ritualistic context does not promote psychopathologies, but it also seems that it might be protective or even therapeutic against problems such as alcohol and drug abuse, psychosis, violent trauma (i.e. panic syndrome and post-traumatic stress), and other mental health issues (Escobar & Roazzi, 2010; B. C. Labate, et al., 2010; Mercante, 2009).

The *União do Vegetal* showed less hopelessness than the *Santo Daime* and *Sociedade Panteísta Ayahuasca*, though the differences were not within the psychopathological range and the ritual use of ayahuasca investigated here does not seem to negatively interfere with mental health.

The participants also displayed a good level of social ability, with various strategies for dealing with people and society. This is in alignment with studies that identify groups based on religion and faith as social support mechanisms (Sanchez & Nappo, 2008; Tuguimoto, et al., 2011) and potential promoters of social cohesion and reintegration (Sánchez & Yurrebaso, 2009). From this perspective, it seems that the ritual use of ayahuasca aimed towards spiritual evolution provides an opportunity to exercise self-control, personal discipline, and living within a collective.

It is still unclear as to what are the factors contributing to the good levels of mental health observed among the religious users ayahuasca, but it is obviously necessary to consider the bio-psychosocial model. It is possible that serotonergic mechanisms are involved, predisposing people to the positive aspects of life (McKenna, 2004). At the same time, faith, social support, and noetic experiences could be contributing to provide the subjects with a balance between themselves and others.
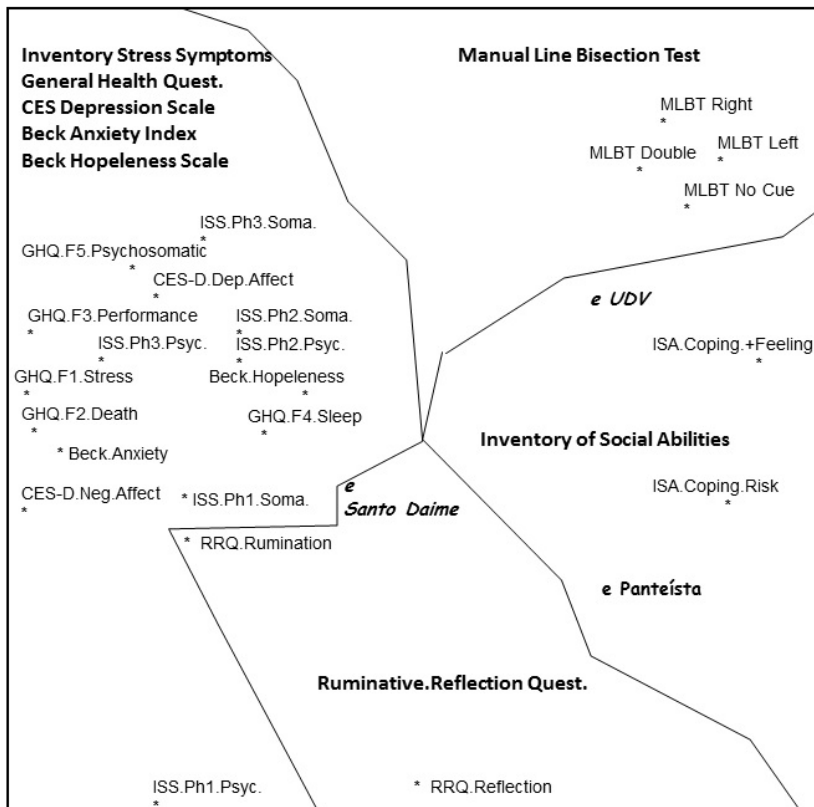
Fig. 1. SSA Projection in different scales measured in terms of ayahuasqueros groups (Santo Daime, Sociedade Panteísta Ayahuasca and União do Vegetal) as external variables (e) (3-D axis 1 vs. axis 2, coefficient of alienation = 0.10).

Legend: ISS = Lipp's Inventory of Stress Symptoms, Ph1. = phase alertness, Ph2. = phase resistance/near exhaustion, Ph3. = phase exhaustion, Psych. = psychosomatic, Soma. = somatic; GHQ = Goldberg's General Health Questionnaire, F1 = psychological stress, F2 = death wish, F3 = distrust in own performance, F4 = sleep disturbances, F5 = psychosomatic disturbances; Beck.Hopelessness = Beck Hopelessness Scale; Beck.Anxiety = Beck Anxiety Index; CES-D = Depression Scale of the Center for Epidemiologic Studies, Neg.Affect = negative affect, Dep.Affect = depressive affect; ISA = Inventory of Social Abilities, Coping.+Feeling = coping and self-assertion in the expression of positive sentiment, Coping.Risk = coping and self-assertion with risk; MLBT = Manual Line Bisection Test; RRQ = Rumination-Reflection Questionnaire, Reflection = self-reflection, Rumination = self-rumination.

The ayahuasca experience seems to be a profound and transforming one, with positive impacts in behavior and well-being (P. C. R. Barbosa, et al., 2005; Halpern, et al., 2008; Kjellgren, et al., 2009; Lira, 2009; Trichter, et al., 2009). Indeed, studies conducted with psilocybin, a substance analogous to the DMT present in ayahuasca, showed that it was capable of promoting positive changes in personality (Griffiths, Richards, Johnson, Mccann, & Jesse, 2008; MacLean, Johnson, & Griffiths, 2011). The best explanation for this so far is that psychedelics act as psychointegrator substances, thereby facilitating the homeostasis of psychophysiological and psychocultural dynamic processes (Winkelman, 2007).

The SSA pattern and facets that were found pointed to the Santo Daime group as being, in relative terms, slightly more vulnerable to mental health than the other groups. The greater proximity of that group to self-rumination activity points to a role of that activity in mediating the emergence of psychopathology, while the fairly large distance between all of these things and self-reflection indicates that the latter activity has the opposite effect. This is consistent with Morin (2002), who pointed out that the prevalence of a high level of self-reflection is indicative that the person has an autofocus on epistemic self-interests. It is also in agreement with studies that propose that self-rumination could act as an activity capable of neutralizing the positive effects of self-reflection (Takano & Tanno, 2009).

Based on the clinical researches exploring the power of self-ruminative thinking in explaining depression and psychosis (Jones & Fernyhough, 2009; Joormann, Dkane, & Gotlib, 2006; Koster, Lissnyder, Derakshan, & Raedt, 2011; Yook, et al., 2010), the *Santo Daime* group probably does not present mental health problems due to the ratio between self-reflection and self-rumination, with self-reflection being the prominent activity. Indeed, Luyckx et al. (2007) has shown the importance of the self-reflection in the consolidation of identity and in well-being, a fact that seems to be important in understanding the present results.

The ritual use of ayahuasca is characterized by increases in content awareness and intrusive information, which can be especially important for the development of cognitive strategies to handle self-information. Processes such as self-talk and the effectiveness of the internal dialogue can be crucial for an individual to process self-information in successfully way (A. Morin, 1993, 1995; Alain Morin & Everett, 1990).

The finding that self-rumination apparently mediates the emergence of psychopathology is of extreme importance. Though this activity is frequently seen as simply a personality trait, in regards to the occurrence of psychopathology, it may be an important element to identify self-conscious activity and develop techniques aimed to establish an equilibrium between rumination and reflection.

In summary, the present study used SSA and facet Theory to demonstrate the role of self-rumination in the mediation of psychopathological processes, showing that religious ayahuasca users generally present a good level of mental health, most likely due to the self-conscious activities of rumination-reflection. Future research on the subject needs to develop a way to isolate the biological, psychological, and social mechanisms involved in order to produce a better understanding of the potential role of the use of ayahuasca in the improvement of mental health.

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8 | Views of Society and Environment

Party-Voters Congruence in Israel Regarding Views about Distributive Justice

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Abstract: This study investigates the agreement between the declared position of Israeli political parties and the views of their voters regarding issues of distributive justice (DJ). We aimed to find out to what extent Israeli voters choose their party according to economic justice issues. Another goal was to retest Shye's structural hypotheses regarding the concept of distributive justice as an action system, analyzable through facet theory methods.

For this purpose, a total of 191 Israeli participants, voters of three main parties, responded to a 24 item questionnaire dealing with three main issues in distributive justice. Additionally, the platforms of those parties were content-analyzed by Shye's theory of distributive justice as an action system, in order to retrieve the views reflected in them.

The resulting database was then analyzed through Faceted SSA. Findings fully supported and corroborated Shye's theory, but indicated a lower voters-party congruence than expected. The hypothesis of such a congruence stemmed out of vast theoretical and empirical findings from political science. In fact, the voters-party incongruence was found despite a large number of parties in the Israeli party system and a lack of incentive for insincere voting. This suggests that the Israeli electoral system may be unique in inducing both a high voters-party congruence regarding certain issues (mainly security and foreign affairs), and a low congruence regarding others (mainly socioeconomic).

1. Introduction

People's views on different issues are expressed in various ways. One of these ways is participating in the general elections, once every four years. However, one may ask how much their choice of a certain party truly reflects their views on different subjects. The issue of distributive justice (DJ) is a salient issue in the public discussion in Israel, and is also a philosophical question many have discussed. On this background, Shye has presented a new theory which bases the concept of DJ as a scientific, measurable concept, relying on his theory of action systems.

In this paper we have chosen to explore how much the Israeli voter's vote for a certain party is associated with her own views regarding distributive justice. To do so, we have incorporated both the theory of DJ as an action system, and certain political-scientific assumptions regarding voting behaviour, into the Israeli electoral system. As a part of this exploration, we tried to corroborate Shye's initial findings as to whether DJ can indeed be referred to as an action system.

Section 2 describes Shye's systemic theory of DJ. Section 3 reports our replication of Shye's structural findings depicting DJ as an action system. Section 4 presents our procedure for testing party-voters congruence: the analysis of party platforms, a brief review of political scientific theory and findings, and finally our data analyses.

2. A Systemic Analysis of the Concept of Distributive Justice

Over the course of human history many theories have developed, which deal with the concept of justice in general, and with distributive justice – the just manner of the allocation of resources – in particular. Many philosophers, including Aristotle, Rawls, Harsanyi and more have procured a variety of justice principles, which in part stand in contradiction to one another. Consequently, political philosopher David Miller has noted that some people might think the concept of justice has no substantive content, and that it represents a mere consent (i.e. 'just' is that which I agree with).

2.1. Theory of Action Systems

On this background, Shye (1995; 1999) has sought to create a solid basis for the concept of distributive justice, one which will allow it to be defined and measured scientifically. His definition relies upon his theory of *action systems* (Shye, 1985). An *action system* has been defined as a system having four essential attributes - it is stable, organized, open, and active. Arguing from elementary axioms, four modes of functioning are identified for an action system - the *expressive, adaptive, integrative*, and *conservative* modes. The axiomatic derivation of the four modes of functioning suggests a structural hypothesis formulated in terms of Faceted Smallest Space Analysis (Shye, 1985; 1989). The hypothesis essentially claims that the four modes, represented by appropriate observational variables, would be mutually oriented in space as depicted in Figure 1.

Expressive	Adaptive
Integrative	Conservative

Fig. 1. The Plane Created By the Action System – The Four Modes of Functioning

2.2. Distributive Justice as an Action System

The theory of action systems has been a research tool in several studies in diverse fields of social science, including the evaluation of quality of life and of distributive justice. These studies have corroborated the aforementioned structural hypothesis.

Distributive justice is characterized by different approaches regarding the form of distribution to be executed. Shye (1995; 1999) has found, that the four main principles of distribution, which are derived out of the main theories in political philosophy, are distribution by *equality, fairness (equity), utility* and *corrective action (law)*. Shye has suggested that we can *view these principles as constituting the four systemic modes of the DJ System*. Following is a short description of the connection between

the four main forms of distribution and the four modes of functioning of DJ as an action system.

Equality suggests that the just distribution consists in the allocation of strictly equal shares of the resource in question among all those who have a claim for it. As a fundamental abstract principle, equality is at the root of all other forms of distribution and as such it constitutes the generating code of the DJ System. Therefore, equality plays the role of the systemic *conservative mode* as defined.

Fairness. In many situations there is a justification to divert from equal shares so as to take account of differences in relevant attributes between the claimants, thus aiming for an *equitable* or *fair* distribution. The principle of fairness dictates that the allocation would reflect *equality relative to desert (eligibility)* - desert that stems from contribution, need, investment, taste, or from any combination of these. The principle of fairness can be described as relying on a process of weighting all the considerations that are *internal* to the distribution task at hand. Therefore this principle is identified with the *integrative mode* of the DJ System.

Utility. The utility principle aims to maximize the amount of happiness, as embodied in the maxim of seeking "the greatest good of the greatest number". However, this principle in fact contains two separate principles: maximizing the total happiness, and maximizing the number of people whose happiness is promoted. These two principles might contradict one another. However since equality, the basis of every form of distribution, is reflected more directly in the latter principle, the distribution of happiness to the maximum number of people should prevail unless compelling utilitarian arguments point to the 'total happiness' principle. Utility then, too, may constitute grounds for departure from equal distribution, the justification being that an unequal distribution will bring happiness to a maximum number of people. The utility principle aims to maximize the utility of the entire society, with society acting as the environment of the DJ System. In this sense utility can be identified with the *adaptive mode* of that system.

Law (Corrective Action). The fourth principle of distribution is that of distribution by *law*, a decision-making mechanism based on principles of justice.

The most prominent example of this principle is that of *corrective action*. A corrective action might be set by law to prefer certain groups which were earlier discriminated against. This could result in unequal distributions which cannot be justified either in terms of fairness or present utility. This is done out of a long-term perspective, as an attempt to attain equality not only with respect to the distribution case at hand, but to more fundamental or structural aspects of distribution in society, compensating for past transgressions. Distribution by law is an attempt to mold the external reality by the internal egalitarian idea of justice, and therefore is identified with the *expressive mode* of the DJ System. Figure 2 shows the correspondence between the four forms of distribution and the four modes of systemic functioning, specifying in effect an hypothesis concerning the structure of the DJ Action System.

In order to test the suggested systemic structure of DJ, Shye has conducted a survey among 636 participants, representing the adult population in Israel. Respondents were asked to assess the degree of justice of different allocations of a certain amount of class hours between two groups of students, one gifted and the other normal. The allocations presented to respondents represented the four modes of the DJ System: Equality, Fairness, Utility and Corrective Action. Faceted SSA (Figure 3) has confirmed Shye's hypothesis regarding the structure of distribution: The map could be partitioned into four sectors, each with variables of one distribution form. Moreover, as predicted, the sectors were circularly ordered with corrective action opposite equality and utility opposite fairness.

Corrective Action Expressive	**Utility** Adaptive
Fairness Integrative	**Equality** Conservative

Fig. 2. The correspondence between the four DJ functioning modes and the four distribution principles suggests a structural hypothesis for the distributive justice action system

This result is rather surprising, since a common-sense, non-systemic analysis of the DJ concepts might naturally place corrective action (which

allots the most of the resources to the weak) as far away as possible from utility (which allots the most of the resources to the strong), rather than right next to it. Since the systemic structural hypothesis confirmed in Shye's study is rather bold and counter-intuitive, it seems desirable to re-test it in diverse data sets. This is our next task.
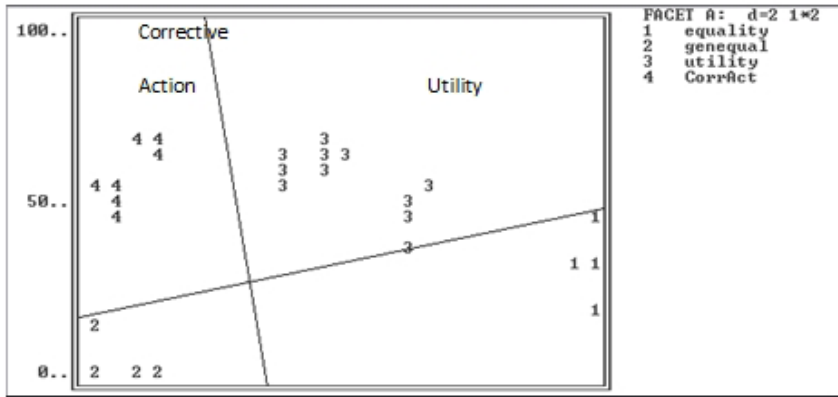

Fig. 3. Shye's FSSA Map Representing the Plane of Distributive Justice System

3. Replication of Shye's Findings

The present study consisted of 191 Israeli participants. They were presented with a 24 item questionnaire dealing with three main issues in DJ, similar in fashion to the one used by Shye (1995; 1999, see Section 2). A detailed description of the questionnaire is given in Section 4 below.

An FSSA of the 24 variables is shown in Figure 4. It is apparent that the space obtained may be adequately partitioned into four sectors representing the four modes of functioning. Moreover, the sectors are circularly ordered just as Shye's theory predicts, and in particular the utility and corrective action sectors, counter-intuitively, are indeed adjacent to each other. These findings fully corroborate Shye's (1995; 1999) findings and further support the notion of DJ as an action system.
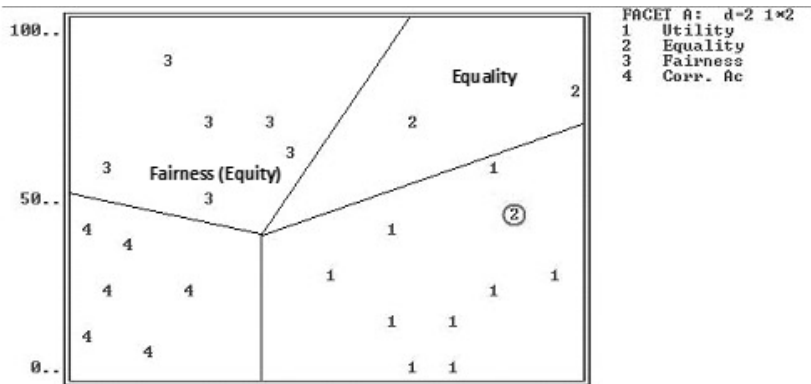
Fig. 4. An FSSA of distributive justice assessments partitionable into circularly ordered regions representing equality, fairness, utility and corrective action, which supports the distributive justice action system hypothesis

4. Party-Voters Congruence

4.1. Party Platform Analysis

Our next task was to assess the agreement between parties and their voters. To do so, we needed first to record what each party's views actually are. This we did by content-analyzing the platforms of Israeli parties, using the action system theory of DJ. We assessed every claim regarding distributive justice in the platforms as to the extent it reflects each of the four distribution-forms. As this study was conducted in fall of 2012, the most updated platforms were the ones written for the 2009 elections. We analyzed four distinct parties in Israel – Likud, Kadima, Avoda and Meretz. Likud (The Consolidation) Party is a major right wing party, which represents neo-liberalism in Israel. Kadima is a centrist-right wing party which is considered liberal regarding most issues. Avoda (Labor) Party is a centrist-left wing party which has diverse opinions regarding socio-economic issues, but tends to social-democratic views. Meretz is a classic left-wing, social-democratic party. Sadly, while collecting the data we realized that we do not have a sufficient amount of Likud voters in our data, so we decided to focus our research on the remaining three parties - *Kadima*, *Avoda* and *Meretz*.

Table 1 presents our analysis of the platforms of these three parties (Avoda party, 2009; Kadima Party, 2009; Meretz New Party, 2009). Each issue of DJ referred to in the platforms was analyzed through the action system theory, with the view of each party on that issue associated with a certain form of distribution (equality, fairness (equity), utility or corrective action). The views were taken as party opinions regarding distribution of public resources (through the annual state budget), and *not* regarding the redistribution of resources in society. Therefore, for example, the Avoda party opinion regarding housing was associated with the *equality* mode of DJ. This is not to say that Avoda party believes all houses in Israel should be distributed (or rather, *redistributed*) equally among all the citizens, but that it believes all *new* houses should be distributed equally among all citizens.

Table 1. Schematic Comparison of Parties' Views Regarding Different Issues By Forms of Distribution

	Meretz	*Kadima*	*Avoda*
Housing	Fairness	Utility	Equality
Gender Equality	Corrective Action	Equality	Corrective Action
Education	Fairness	Fairness	Equality* *Higher Education - Utility

While analyzing the party platforms we have realized that the main disputes between them concern three main issues: housing, gender equality and education. Therefore, as we built our questionnaire we focused on building scenarios incorporating these issues. For each group of party voters, we regarded the parties' views in these issues as the "Party Opinion" with respect to which we measured the voters' agreement. Thus, while analyzing Meretz voters we regarded fairness in the housing scenario, corrective action in the gender issues scenario, and fairness in the education scenario as the "party opinion"; for Kadima voters we regarded utility in housing, equality in gender issues, and fairness in education as the "party opinion"; and for Avoda voters we regarded equality in housing, corrective action in gender issues, and equality in education as the "party opinion".

4.2. The Connection between Electoral Systems, Number of Parties and Sincere Voting

What outcome shall we expect to obtain in this study? Intuitively, the correlation between a voter's view and the ones of the party she votes for should rely on the ability she has to vote for a party which sincerely represents the values she believes in.

In political science it is a well-known fact that the electoral system affects the number of parties in parliament. One possible system is the *plurality* (or *majority*) *rule* system, where a country is divided into districts (e.g. states), from each of which a single candidate is elected through a plurality vote. The other is the *proportional representation* system in which the whole country is usually a single constituency, candidates are not elected personally but as a part of a party list, and seats in parliament are divided proportionally according to the proportion that each party received in the general elections.

Duverger (1951) claimed that the majority rule system is conducive to the emergence of a *two-party system* while proportional representation system is conducive to a *multiparty system*, where coalitions have to be formed in order to create a government. In the latter system, which holds in Israel, votes are expected to be more "sincere" and less strategic (Duverger, 1972). Meaning, a voter would be more inclined to vote for a party that best represents her beliefs, rather than for one which holds a better chance at achieving many votes. This is brought about by the large variety of parties a voter may choose from in a multiparty system. Several studies in Western European multiparty systems show that this hypothesis is valid (e.g. Dalton, 1985; Wessels, 1999). These studies show that in those systems the voters' and parties› views are very similar regarding economic issues. The more proportional a system is, the better the policy representation of party voters. Hence, as Israel's is a highly proportional system, the hypothesis of this study anticipates a high agreement between parties' positions and voters' views.

4.3. The Empirical Study

4.3.1. Methodology

Questionnaire. For each of the three issues (housing, gender equality and education), we described a possible scenario presenting participants with a DJ dilemma. Participants were asked to assess (on a scale from 1 to 5) how just is each of eight possible distributions given in the scenario. An example from the original questionnaire, describing one scenario out of the total of three given, is shown in Figure 5 (in English translation).

Housing: The mayor of a large city in the Central District has decided to allot 100 new residential units within the city. The allotment is done between two groups: a group of young struggling couples, without any property, and a group of affluent and educated couples (of all ages). If the affluent couples will come to the city, this will raise city tax revenues and service levels by twice the amount which the young couples may bring. Please rate each of the following unit distributions between the groups, reflecting its level of justice in your eyes:

Affluent: 100   Young: 0

Affluent: 80   Young: 20

Affluent: 60   Young: 40

Affluent: 50   Young: 50

Affluent: 40   Young: 60

Affluent: 30   Young: 70

Affluent: 20   Young: 80

Affluent: 0   Young: 100

Fig. 5. Example of One Scenario Shown in the Questionnaire

The eight distributions presented in each case were such that each could be reasonably assigned to one of the four DJ modes. Thus, in each scenario the three first options, in which there is a maximum expected utility, were associated with the utility mode. The fourth option allotting the resource equally was associated with equality mode. Next, the two options that approximated the relative need of the two groups were associated with the fairness mode.

Finally, the last two options which allot to the needy group well beyond its need were associated with the corrective action ('law') mode. Thus:

$$\left\{ \begin{array}{l} \textit{100:0 (utility 1)} \\ \textit{80:20 (utility 2)} \\ \textit{60:40 (utility 3)} \\ \textit{50:50 (equality)} \\ \textit{40:60 (fairness 1)} \\ \textit{30:70 (fairness 2)} \\ \textit{20:80 (corr. action 1)} \\ \textit{0:100 (corr. action 2)} \end{array} \right\}$$

The questionnaire included a personal details section, in which we asked about participants' voting history while trying to avoid social desirability bias by them - as is shown to occur in many cases (e.g. Hoffman et al, 1994). Figure 6a shows the mapping sentence (see, e.g., Shye & Elizur, 1994) for this questionnaire.

The questionnaire was sent via e-mail to people who voted for the three aforementioned parties. It was formed as a freely accessed online survey, the link to which was sent to specific people who were listed as members of the three parties - and in high probability voted for them in the last elections. Indeed, the vast majority of participants were actually voters of these three parties. The total sample consisted of 191 participants; out of whom 65 were Avoda Party voters, 54 Meretz voters, 48 Kadima voters, 20 voters of other parties (which were only considered for analysis of the whole sample, described in Section 3), and 4 questionnaires which were excluded due to inappropriate data
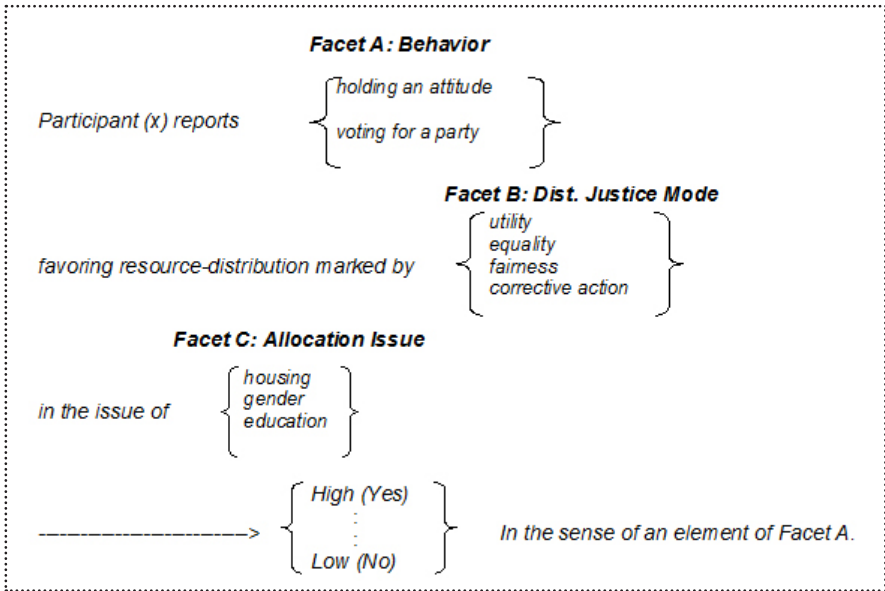
Fig. 6a. Mapping Sentence for Party-Voters Congruence Observations in DJ issues. This mapping sentence highlights the essential theoretical aspects of the study. Note that Facet A embodies the commonality of DJ assessments and voting behavior, between which congruence is hypothesized

To test our hypothesis, we have devised two methods of assessing party-voters congruence. In the first method, the correlational method, we defined three auxiliary Boolean variables which denoted whether or not a participant has voted for Meretz, for Avoda and for Kadima respectively. We then calculated the correlations between these variables with the ones representing all the distribution-options of the questionnaire. The results are shown in Table 2.

The results clearly show little correlation between voting for Meretz or Avoda parties, and supporting what we have defined as their "Party Opinions" (see Section 4.1). For example, Meretz voters, on the issue of gender equality, show the highest correlation with supporting the high utility option (Utility 1). However, as shown in Section 4.1, the party opinion on that issue was to have corrective action in distribution - i.e. the farthest option from Utility 1 as possible. All other issues within these two parties show virtually the same results. With Kadima Party, however, there appears to be a stronger correlation between voting for it and agreeing with its opinions regarding DJ. In the issue of

housing, for example, there is a certain correlation between voting for Kadima and agreeing with its opinion on the issue - i.e. distribution by utility. Overall, however, the mean correlations between supporting party opinion and voting for Meretz, Avoda and Kadima were -0.2, -0.13, and 0.21 respectively. These results are far from the strong correlations we expected.

Table 2 - Coefficients of Correlation between Voting for Meretz, Avoda or Kadima and Justice Assessment of Each Option of Distribution (With 'Party Opinions' Highlighted)

		Voting for Meretz	Voting for Avoda	Voting for Kadima
	Utility 1	0.06	-0.46	0.65
	Utility 2	-0.37	-0.22	0.68
	Utility 3	-0.01	0.13	-0.15
Housing	Equality Fairness 1	0.05	0.13	-0.20
	Fairness 2	-0.12	0.03	0.08
	Corrective Action 1	-0.49	0.48	-0.04
	Corrective Action 2	-0.22	-0.37	0.73
		0.09	-0.25	0.21
	Utility 1	0.87	-0.83	0.55
	Utility 2	0.56	-0.17	-0.32
	Utility 3	0	0.25	-0.29
Gender Equality	Equality Fairness 1	0.17	0.20	-0.48
	Fairness 2	-0.10	-0.13	0.25
	Corrective Action 1	-0.27	0.14	0.11
	Corrective Action 2	-0.17	-0.28	0.52
		0.14	-0.48	0.55
	Utility 1	0.64	-0.19	-0.32
	Utility 2	0.14	0.15	-0.28
	Utility 3	0.04	0.28	-0.38
Education	Equality Fairness 1	0.04	0.12	-0.21
	Fairness 2	-0.27	-0.13	0.45
	Corrective Action 1	-0.11	0.04	0.08
	Corrective Action 2	-0.32	-0.58	0.40
		0.66	-0.62	0.16

In the second method, the *regional method*, for assessing party-voters congruence we made use of Multidimensional Scaling (MDS) by SSA. We divided the sample into three sub-samples, according to the party for which participants voted. For each sub-sample a separate FSSA map was created, using a newly conceived facet defined for each of the three parties. The new facet, the **"*distance from party position*"** facet, classifies all 24 observed variables into four categories thus: The first facet category, is of all variables representing the Party Opinions in all the issues. The second category is of variables representing the two distributions adjacent to the Party Opinion variables (this category was denoted "first circle"). The next two distributions, further removed from the Party Opinion, define the third category of the new facet ("second circle"), while the remaining distributions (the "third circle") define the fourth category. That is, for each sub-sample, we first selected for each issue the option which is the Party Opinion, and that is what determined the sorting of the rest of the distributions. For each party, the Party Opinion was of course different and thus the sorting to categories was completely endogenous to every given party. For example, in the *Avoda Party* group, in the issue of *housing*, party opinion was associated with distribution by *equality* (as shown in Table 1) and therefore the option of distribution of 50:50 was chosen as party opinion. Afterwards the two closest options (60:40 and 40:60) were depicted "first circle", and so on. This was done separately for each party, creating three separate FSSA maps, where each map integrates data of all three DJ issues. Figure 6b is the mapping sentence of the observational design for the regional method for assessing Part-voter congruence.
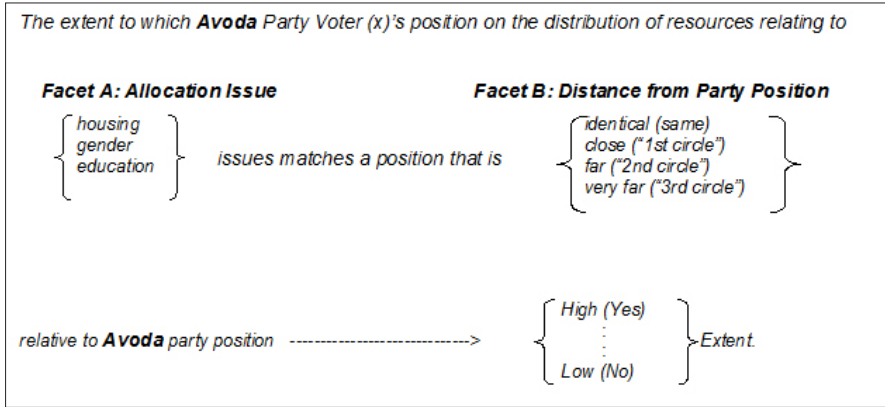
Fig. 6b. A Mapping Sentence for Avoda Party-Voters Overall Congruence in DJ issues. This mapping sentence highlights the essential theoretical aspects of the study with respect to the second, regional method of analysis. Note that Facet B classifies the eight distributions sampled in the questionnaire, not by the four DJ modes but rather by how close they are to the party in question's position concerning the allocation issue specified in Facet A. A similar mapping sentence was designed for each of the parties of this study.

An overall party-voters' agreement in all sampled DJ issues is expected to be manifested by the elements of Facet B being linearly ordered. This means that in the FSSA of each party Facet B is expected be axial or radial (see Figure 7).
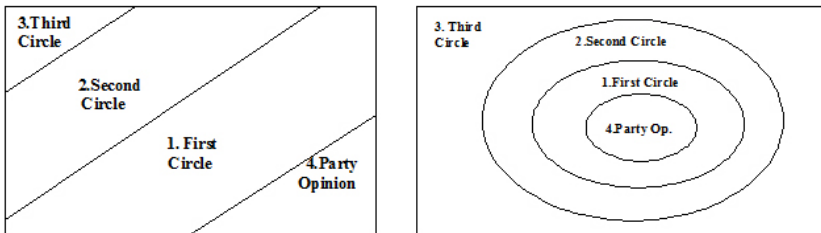
Fig. 7. The Regional Method for Assessing voter-party congruence: Hypothesized Regional Partition Patterns in FSSA Maps

4.3.2. The Regional Method: Analysis and Results

The data analysis was based on the regional analysis method explained above. Figure 8 depicts the FSSA results for this method.
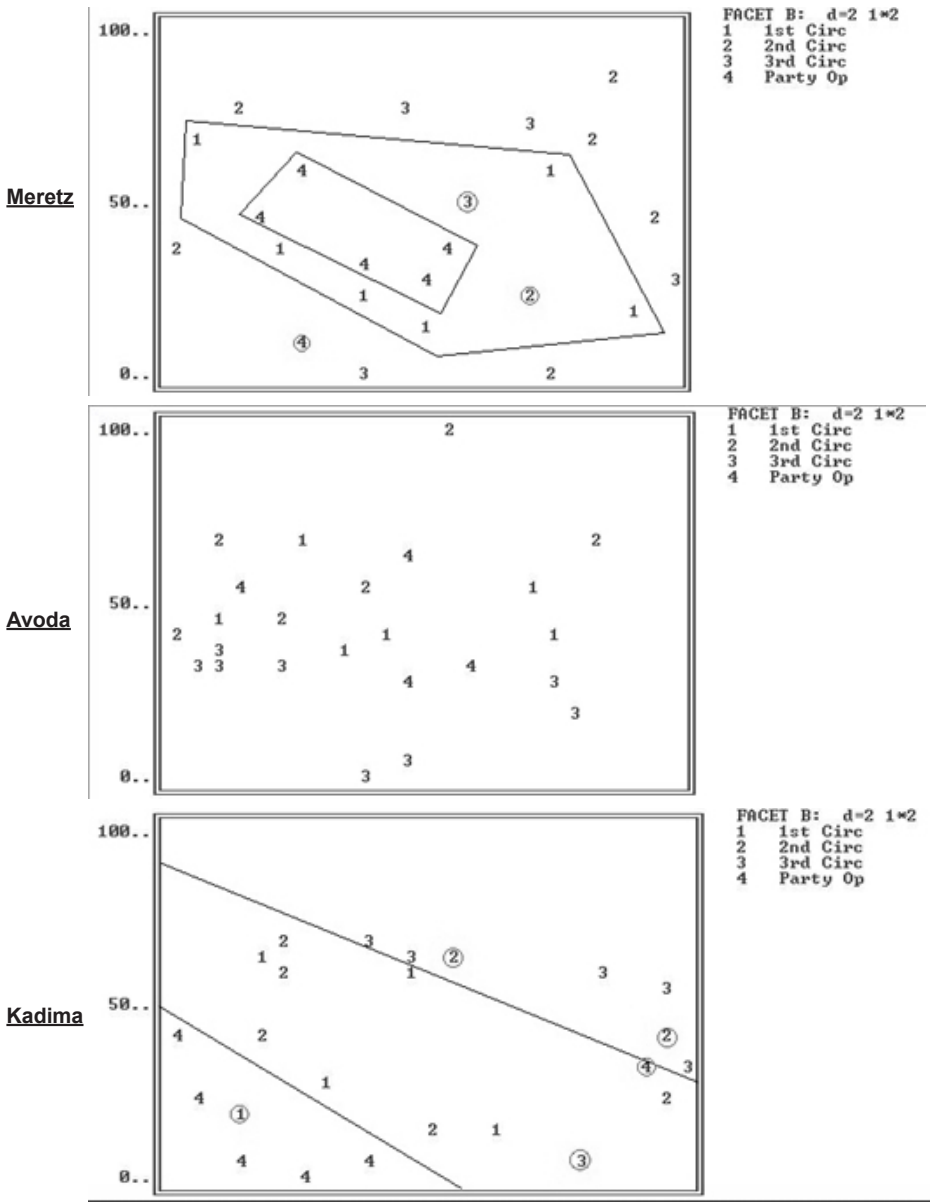
Fig. 8. FSSA Maps of Meretz, Avoda, and Kadima Party Voters by Distance from Party Opinions

The maps partially corroborate our hypotheses. In the Kadima map there is a region in the bottom left corner of 'Party Opinion' variables (assigned the number 4), and a less distinct section of 'Third Circle' variables on the upper right corner of the map - the furthest away from party opinion, as expected. This agrees with our structural hypothesis. The Meretz map is interesting as well, as there is an apparent section of Party Opinion in the center of the map with a less distinct First Circle section surrounding it. Although this shows certain agreement of Kadima and Meretz voters with their respective parties, it does not fully support our hypotheses. As for the Avoda party map, there is simply no apparent way of partitioning it into sections. This analysis gives a better understanding of the voters-party congruence within the different parties than that given in the first "straight-forward" method.

That these findings do not fully support our hypotheses may be explained by the fact that the Israeli elections traditionally do not revolve around issues of DJ or even more general socioeconomic issues. The latter are often pushed aside by the special circumstances in Israel involving questions of security and the peace process. That is, it might be that a sincere vote does take place among voters, but only regarding the main security issues, with a compromise being made over socioeconomic ones. Therefore if this study were to assess the congruence of security issues between parties and voters, the congruence would have been significantly higher. On the other hand, the last elections in Israel (January 2013) seem to be an exception, and were considered to have been revolved around socioeconomic issues. Possibly a follow-up study conducted after those elections would produce different results. Moreover, as Kadima is not thought as having strong opinions regarding security issues and takes a centralist view, it is plausible to assume that voting for Kadima reflects views on predominantly socioeconomic issues rather than security ones. This could begin to explain its much higher voters-party congruence observed regarding issues of DJ in this party.

Another possible explanation for the weak party-voters agreement on DJ issues may be that voting (in Israel especially and possibly elsewhere) is not a completely rational process. It constitutes - beyond the obvious situation of one's attempt to elect the party which best represents her views – of a number of processes which include irrational elements such as peer pressure, loyalty, family ties or even aesthetics. Either one of those could explain our results in this study.

5. Conclusion

In summary, the purpose of this study was to explore the agreement between the views of voters and those of the parties they vote for, regarding different issues of distributive justice, and relying on Shye's action system theory. The hypothesis for this study, that the agreement is expected to be high, was based on proven approaches and empirical data in political science. These claimed that in a proportional representation system, such as in Israel, there is a large supply of parties and therefore a sincere vote is possible with no incentive to act otherwise. However, while corroborating once more Shye's action-system structural hypotheses, the results of the study have shown there is no strong agreement between parties and their voters. Possible explanations were given for this result. Future studies could be conducted in order to examine whether the public discussion of socioeconomic issues that accompanied the last elections has raised the voters-party agreement on these issues. Furthermore, perhaps questions about the participants' close environment and their voting patterns should be added, in order to explore possible irrational effects of the social environment on their vote.

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The Possible Role of Low Legitimacy in Inside/ Outside Partition in Systemic Quality of Life Structures: Evidence from Three Studies

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Abstract: The systemic quality of life model, developed by Shye (1975;1989) is one of the more well founded models for understanding and researching human well being (Taillefer et al. 2003). The Model defines Quality of life as the effective functioning in four functioning modes (Expression, Adaptation, Integration and Conservation) in four functioning sub-systems (Personality, Physical, Social and Cultural)Most of the research published on quality of life structures, Utilizing FSSA or MDS, found Partitions along the four sub-systems.This paper presents three studies that demonstrate a different Qol structure: the first two were explorational in nature: Inmates in Juvenile correctional institutions & Arab students in Israeli community College. On the basis of those structures we formulated a theoretical rational that was tested and verified in the third study: Israeli reserve combat troops serving in the occupied territories.

1. Introduction

The Systemic Quality of Life model (SQOL) (Shye, 1979; 1985) has been used extensively in research on quality of life and is one of facet theory's significant contributions to the social sciences, together with intelligence and structure of human values system research(Greenbaum, 2009). The SQOL model defines quality of life as the level of functioning of the human system across two planes: functioning modes (expression, adaptation, integration, and conservation) and sub-systems (personality-related, physical, social, and cultural).

Myriad researchers have used the model for studying a wide variety of population groups (see a survey in Feigin, Barnetz & Davidson-Arad, 2008).

How quality of life is structured is one of the critical issues dealt with in research and theory, and studies have almost always reached the conclusion that quality of life characteristics can be broken down according to sub-systems (personality-related, physical, social, and cultural) for a variety of populations and living conditions. Some examples are studies carried out on members of kibbutzim in various stages of privatization from their previous socialist milieu (Barnetz & Livne, 2009), women who have chosen to become single-parent mothers (Segal- Engelchin & Wozner,2005), healthy family members of chronically ill patients (Feigin, Barnetz & Davidson-Arad, 2008), immigrants to Israel (Beinish- Weisman & Shye, 2009), residents of bad neighborhoods (Shye, 1989) and social workers' assessments of the quality of life of at-risk children (Davidson-Arad,2001).

The aim of the present article is to present three studies that uncovered an atypical quality of life structure – one based on functioning modes – together with a theoretic explanation capable of predicting the conditions under which such a structure might be created.

The first two studies were explorational- we did not have any a priory hypothesis regarding the Qol structure. The first of them presents the construct of the quality of life of adolescents living in juvenile correctional institutions. The second part, presents the structure for the quality of life of Israeli-Arab students studying at an Israeli college in which the vast majority of the students are members of the Israeli-Jewish population.

Using these two structures as a point of departure, we will attempt to provide a comprehensive hypothesis regarding the conditions under which a quality of life structure based on functional modes would be expected to develop.

This theoretic hypothesis is the foundation of the third study we will present, which measures the structure of the quality of life of Israeli Defense Forces (IDF) reserve combat soldiers who serve in the territories occupied by Israel.

1.1. A Note on the Questionnaires Used:

Since all three studies employ systemic quality of life questionnaires it is important to note that the items we used are the ones described in details in Feagin, Barnetz & Davidson- Arad (2008), the only difference is in the questionnaires used in study 1- that specifically addressed quality of life within the residential institution ("Maon" in Hebrew). Thus, for example, the question regarding Cultural Expression in studies 2 and three was:" To what extent are you able to express your values and beliefs?", in study 1 the question was :" To what extent are you able to express your values and beliefs in the Maon ?"

2. Study 1: Mapping the Quality of Life of Wards in Juvenile Correctional Institutions

This study presents the structure of the quality of life of wards in juvenile correctional institutions in Israel as part of a wider study that examined the connection between the functional characteristics of the institutions and the quality of life of the wards (Barnetz, 2007). The study sample included 361 young people, boys and girls from all such institutions run by the Israeli Department of Welfare's Youth Protection Authority.
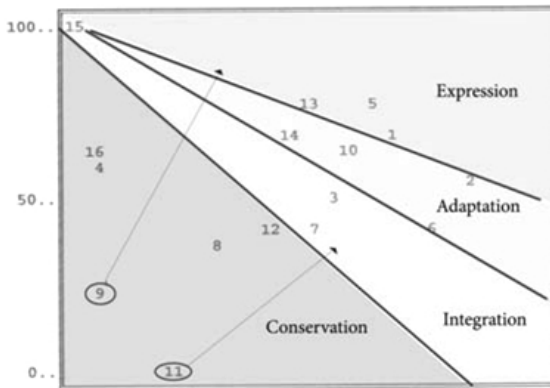

Fig. 1. Structure of the quality of life of wards in juvenile correctional institutions.

2.1. Analysis:

Chart 1 shows the frontal projection of the three dimensional solution (Coa of Alienation= 0.18) the map reveals that the quality of life of the wards in the sample is divided according to functioning modes in the following order: expression-adaptation-integration-conservation.

According to the theoretic definitions set out in Shye's Quality of Life Model (1985), the expression and adaptation modes are analogous in that that they both deal with actions actualized outside of the action system, while integration and conservation are analogous in that they both deal with actions actualized within the system.

Consequently, the quality of life construct is not only divided according to functioning modes, but between the «internal» and the «external» as well.

Such a division among wards in juvenile correctional institutions can be explained by the fact that the institutions were designed to effect internal change among their wards – in personality, values, life skills, and life styles – change initiated not by the wards themselves, but by social workers; education experts; and judges, all representatives of the social mainstream. The wards did not decide that they wanted to change and they had no hand in designing the powerful environment they find themselves incarcerated in. The division between the internal and the external is, therefore, an attempt by the wards to defend themselves against unwanted change not initiated by them – changes forced on them by society.

3. Study 2: Mapping the Quality of Life of Israeli-Arab Students in an Israeli Mainstream College

The second study was carried out in a public academic college in the north of Israel. The study dealt with reciprocal relations among perceived racism, cultural identification, academic achievement, and the quality of life of Israeli-Arab students studying in a college in which they were vastly outnumbered by Israeli-Jewish students. The sample included 100 students, 65 women and 35 men. Almost all of the participants were between the ages of 22 and 28; 75 of them were Moslem and 25 were Christian; 89 were single and a small minority were married (8) or widowed (3).The quality of life structure of these students appears in Figure 2:
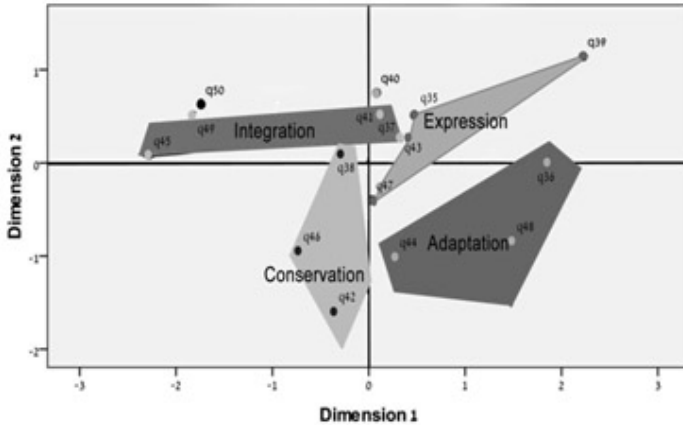
Fig. 2. Quality of life map of Israeli Arab College Students

3.1. Analysis

Chart 2 shows the 2 dimensional MDS solution (Stress= 0.18; RSQ= 0.84). The map reveals differentiation according to functional modes organized in an angular (circular) order: expression, adaptation, conversation, and integration.   Much like the quality of life of wards in juvenile correctional institutions, it is possible to discern a division between the external (expression and adaptation) and the internal (integration and conservation) modes.

Interpretation of this chart is based on answers to questionnaires about experiences with racism, the details of which, unfortunately, are beyond the scope of the present article. Suffice it to say that the Israeli-Arab students reported that they were treated with high levels of reserve and suspicion, especially on the part of Jewish students. Furthermore, they frequently felt out of place in discussions in the classrooms – and outside of them – and also felt that expressing their real opinions or talking about their experiences could have serious repercussions. As a result, these students must deal with anger and hurt they are unable to express, which is difficult psychologically; physically; socially; and culturally, leading them to divide their quality of life according to the internal and external dimensions illustrated in Chart 2.

3.2. Discussion of Studies 1 and 2:

In light of the fact that the literature shows extensive evidence relating to the structure of quality of life divided according to sub-systems (see Introduction), and the fact that the two quality of life maps we have discussed above are among the first to demonstrate a quality of life structure divided according to functioning modes, it is important to attempt to decipher the structural similarity between the two research groups.

A theoretic analysis of the results has led me to suggest an explanation based on a combination of two variables:

1. *A low degree of legitimacy*: Legitimacy is the degree to which an individual or a group internally accepts a controlling authority (Light, Roscigno & Kalev, 2011; Weber, 1978). A low degree of legitimacy refers to a situation in which an individual – or a group – is under the control of an authority they do not feel is legitimate – internally, they do not grant it the authority to hold power over them.

2. *The inability to distance oneself from the dominant field of discourse*. Ison, Saltzburg and Bledsoe (2010) argue that the distance individuals can put between themselves and the dominant field of discourse has great significance in determining their level of autonomy and quality of life, especially when there are discrepancies between   them and the dominant discourse.

Combining the two suggested variables, being close to the dominant field of discourse – which legitimacy is questioned or unaccepted creates stress that manifest itself in an Inside/ outside partition in the QOL maps.

The claim is, therefore, that the two groups discussed in Study 1 and Study 2 are analogous in that they are both in situations in which they are being dominated by authority they perceive illegitimate, without being able to distance themselves from the dominant discourse. This might explain two results that are apparent in the two quality of life maps: they are both divided, A.) according to functional modes; and B. according to the "internal" and the "external." I tested the theoretical argument presented above in a third study that dealt with the structure of the quality of life of IDF reserve combat soldiers serving in territories occupied by Israel.

4. Study 3: Mapping the Level of Legitimacy and Quality of Life of Reserve Combat Soldiers Serving in Territories Occupied by Israel

The theoretic model presented above required us to find a group that would fulfill two conditions: (1) perception that the authority having control over them is not legitimate and (2) the inability to distance itself from the dominant field of discourse.

It seems that reserve soldiers serving in combat units intrinsically fulfill the second condition – they are unable to distance themselves from the dominant field of discourse. The challenge, then, is to differentiate, among these soldiers, between those who consider the authority legitimate and those who do not.

To do this, we developed a "System- legitimacy questionnaire" based on three focus groups with three different groups of reserve combat troops were conducted and recorded. The System legitimacy theme reflected the participant's apprehension of the logic behind the army's orders and rules regarding combat situations in civilian urban environment. According to the theme, 10 questions evaluating System legitimacy were constructed to measure: the extent to which the soldier feels that the commands he was expected to act upon were based on sound reasoning, were adequate to reality, and he has faith in the high military ranks that ordered these commands (e.g., «To what extent do you feel you trust the rank that formulates the orders you had been given?»).

This questionnaire and a quality of life questionnaire were administered to a sample of 184 reserve soldiers in combat units serving in territories occupied by Israel. The internal consistency of the questionnaire was high ($\alpha= 0.87$).

Table 1. Prevalence of System Legitimation levels

Prevalence of System Legitimation levels	
	% (n)
Low S. Legitimation	23.8 (40)
Medium S. Legitimation	62.5 (105)
High S. Legitimation	13.7 (23)

On the basis of how they rated the legitimacy of the controlling authority, the soldiers were divided into three groups (high system legitimacy, medium system legitimacy, and low system legitimacy, see table 1). Only the two extreme groups were used to test our hypothesis.

The hypothesis was that the structure of the quality of life of soldiers who considered the controlling authority *highly legitimate* would be organized according to *sub-systems*, while the structure of the quality of life of soldiers who considered the controlling authority *poorly legitimate* would be organized according to *functioning modes*.The following results support the hypothesis.
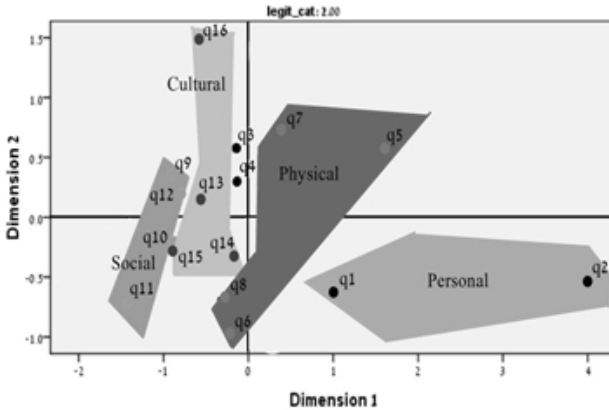
Fig. 3. Quality of life structure of high legitimacy level reserve combat soldiers serving in territories occupied by Israel
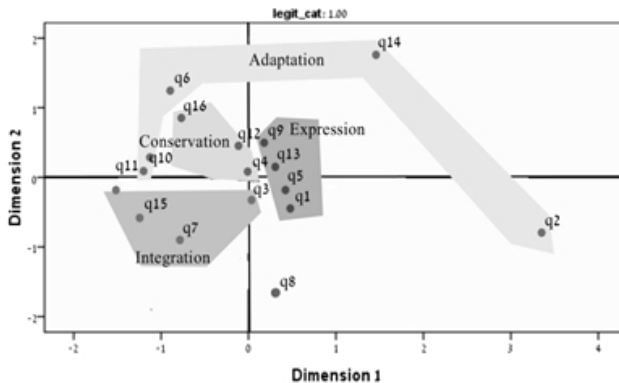

Fig. 4. Quality of life structure of low legitimacy level reserve combat soldiers serving in territories occupied by Israel

4.1. Analysis and Discussion

Chart 2 shows the 2 dimensional MDS solution for soldiers with high system legitimation levels (Stress= 0.12; RSQ= 0.95). Chart 4 shows the 2 dimensional MDS solution for soldiers with low system legitimation levels (Stress= 0.13; RSQ= 0.93). Based on the legitimacy variable, we were able to separate the subjects into two groups with different quality of life structures. The high legitimacy group (figure 3, displayed a quality of life structure divided according to sub-systems, while the low legitimacy group exhibited a quality of life structure divided according to functioning modes, which can be respectively termed external (expression + adaptation) and internal (integration + conservation). It is important to not that a close inspection on figure 4 can show that the map could be partitioned, if less clearly' according to the sub-systems (e.g.- Items 9-12- Social Subsystem; 1-4, Personal Subsystem) but figure 3 could not be partitioned according to the functioning modes. A similar conclusion was arrived concerning figure 1 (see Barnetz ,2007). Therefore- our Hypotheses concerns predicting under what conditions can we expect a structure based on functioning modes, without excluding partition according to the sub- systems.

These results supply support to the hypothesis that when individuals are under the control of an authority they do not perceive to be legitimate and they are not able to distance themselves from the dominant field of discourse, we expect to find a distinctive quality of life structure characterized by division according to expression modes and internal and external divisions.

The quality of life map of soldiers with low legitimacy also has a distinctive characteristic –extreme structural proximity between the expression and the conservation modes relative to Israeli-Arab students and wards in juvenile correction institutions.

According to the Systemic Quality of Life model, the expression and conservation modes are polar opposites: the expression mode relates to actions that commence within the system being studied but are actualized outside of it, manifesting growth; life; and spontaneity, while the conservation mode relates to actions that commence outside of the system being studied but are actualized within it, manifesting stability, security, and continuity (Shye, 1985). The conflicting relations between them are the basis for the concept

"the General human system." These facts lead us to interpret the structural proximity between expression and conservation on this map as testifying to the acute tension present in the systems the groups were living in. One possible explanation for this proximity was provided to us by the focus groups mentioned in the methodology section. Some of the soldiers described a "legitimacy crisis" towards the system that only began during their tour of duty – they had arrived believing the system had a reasonable amount of legitimacy, but found themselves asking probing questions regarding the logic used by the people who sent them to serve, undermining the degree of trust they had in the system. It is possible, therefore, that the structural proximity between expression and conservation is the result of a legitimacy crisis. It could be assumed that, in contrast with soldiers serving in the territories, Israeli-Arab students and juvenile offenders perceive low levels of legitimacy from much early stages of their lives and to a certain extent are used to organizing their lives around it. It may also be that there is room for qualitative research that will throw important light on how individuals experience, interpret, and cope with legitimacy crises .

4.2. General Discussion:

It seems that the division into internal and external modes in the quality of life maps of people living under what they consider illegitimate authority and who are unable to distance themselves from the dominant field of discourse, described in this paper, still needs further research and confirmations. Two kinds of research seem to be needed: the first- research that compares similar groups who do not live under close illegitimate authority (E.g. Youth at risk living at home, Young Israeli Arabs outside the academy). The second- testing the hypothesis on additional populations.

Although the finding and theoretical explanations needs further validation, I would like to conclude with two inter-related ideas that can demonstrate the human meaning of the Inside- Outside partition demonstrated in this paper.

The first concept is Du Bois's "double consciousness," according to which people living under oppressive conditions learn to experience reality simultaneously from two perspectives: that of the factor controlling the situation and their own internal perspective (Lyubansky & Eidelson, 2005). Though

this is a way to cope with life, it comes at a high price. This human price is profoundly reflected in the following quote from a rabbinical interpretation of an ancient Jewish text:

> The literal translation of the Aramaic for "to humiliate someone" is "to whiten his face." The soul moves in two directions – towards the outside and towards the inside. And when a person is humiliated, his anger is directed outwards, causing his face to become livid. If he is unable to deflect the humiliation, his anger turns inwards and his face pales from sorrow.

This quote teaches that living under illegitimate authority without the power to distance oneself from the dominant field of discourse, and the Inside – Outside partition that follows, might imply a life spent at continuous risk of "whitening the face": being confronted by attitudes, demands, or discourse that present the person in a much different light than he or she perceives himself, without the ability to voice feelings effectively.

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Perceived Racism, Emotional Responses, Behavioral Responses, and Internalized Racism among Ethiopian Adolescent Girls in Israel: A Facet Theory Approach

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Abstract: The present study examined perceived racism in a sample of 93 girls aged 15-21 from the Ethiopian Jewish community in Israel, its correlation with emotional and behavioral coping styles, and its psychological effects (internalized racism), employing Facet Theory tools (multidimensional scaling analyses; FSSA; Mapping definition).

The few studies that have been conducted on this subject in Israel found that young Ethiopian people experience racism based on skin color.

It was found that the intensity of perceived racism correlates with internalized racism. A multidimensional scaling map provides a general picture of the girls' emotional responses (anger, empowerment, internalized emotions) and behavioral responses (adapt, fight, and flight) to the experience of perceived racism.

In the discussion it is suggested that racism is experienced as a danger situation in which three coping style archetypes are chosen as a line of defense, and that each of these styles is effective in a different way.

The present study seeks to contribute to the corpus of knowledge on the effects of racism on the individual suffering from it by means of Facet Theory principles, and the following article presents a mapping definition for the research question regarding the effects of racism on individuals suffering from it.

1. Theoretical Background

In the broad body of academic knowledge on issues of racism, one of the key questions pertains to the psychological effects of living in a racist environment. In recent decades a large number of studies have been conducted that shed light on how people from minority groups perceive racist incidents they experience, the emotions and behaviors responds to these incidents, and their psychological implications for the individual.

Although all the variables described above (racist incidents, emotions, behavior, internalized racism) are studied extensively, it is difficult to find studies that attempt to combine the different variables into a comprehensive model. Thus for example, of thirty-nine studies reviewed by Carter (2007), twenty-four examine the correlation between racist incidents and various mental health measures, e.g., depression, anxiety, psychological functioning (Dohrenwend, 2000), six examine the correlation between racist incidents and different dimensions of physical health, e.g., blood pressure, infant weight (Collins et al., 2004), two examine the correlation between racist incidents and displays of self-destructiveness, e.g., cigarette smoking, alcohol consumption (Guthrie et al., 2002), and some of the studies engage in an in-depth examination of the emotions aroused in respondents as a result of a racist experience, or their coping styles (Plummer & Slane, 1996).

The present study presents an approach to measuring and analyzing perceived racism and its effects on the individual suffering from it by employing Facet Theory principles, especially multidimensional scaling analyses and the mapping definition technique (Borg & Shye, 1995; Levy, 2003; Shye & Elizur 1994). The article presents a conceptual and empirical system that enables the broad conceptualization and measuring of the individual's perception of the racist incident, the emotions aroused in him or her in the wake of the incident (emotional response), his or her behavioral response to the racist incident, and the internal implications of coping with racism (internalize racism). We will endeavor to contend with this challenge by means of a sample of adolescent girls of Ethiopian origin living in Israel.

1.1. Perceived Racism

Studies have demonstrated that in many cases, race-based experiences are perceived as stressful events, which may threaten the sense of self-worth, self-confidence, and well-being (Carter, 2007). Moreover, the central aspect of racist experiences is the perception of these events and the subjective interpretation of the individual: If one does not perceive an event as negative, it will not produce harm (Carter, 2007).

Racism is an everyday experience and is not necessarily manifested in extreme cases, such as hate crimes (Swim et al., 2003). Often, racism is present, just not expressed openly (unseen or hidden), and in many other cases it is overt. The racist experiences documented in various studies may be manifested as acts perpetrated by various public institutions (Pettigrew, 2007; Sue et al., 2008; Thomas et al., 2008; Utsey, 1999), bad service in public institutions (Swim et al., 2003), verbal racist expressions (Swim et al., 2003; Sue et al., 2008), and non-verbal racist expressions (Pettigrew, 2007; Sue et al., 2008; Swim et al., 2003). Despite the great variance, Carter (2007) suggests classifying racist incidents into three types: racial discrimination (avoidance), racial harassment (hostile), and discriminatory harassment (combination of harassment and discrimination). Researchers explain that ambiguous racism, as opposed to direct racism, can be experienced as a more chronic source of stress (prolonged emotional response), and can lead to prolonged cognitive processing and emotional stimulation that can result in negative responses in the person experiencing it, especially if he has had prior racist experiences (Bennett et al., 2004).

1.2. Emotional and Behavioral Responses and Implications

Studies conducted in the United States show that for the person experiencing it, racism triggers psychological, emotional, social, and behavioral responses (Brown, 2003; Fanon, 1982; Swim et al., 2003). A review of the research literature examining the emotions that surface in an encounter with racism shows the emergence of intense negative emotions, including anger and anxiety (Swim et al., 2003; Bennett et al. 2004), powerlessness, non-visibility, obedience, submissiveness, forced compliance, and stress

deriving from a sense of having to represent an entire group (Sue et al., 2008; Bennett et al., 2004).

On the other hand, very few studies have focused on coping styles and behavioral responses toward racism (Sue et al., 2008). This may be due to the latent nature and elusive character of contemporary racism (Utsey et al., 2000). Although there is only a small number of studies in the field of behavioral response to racism, a literature review shows that the majority do respond in one way or another (behavioral or emotional responses) to a racist incident in which they are the target (Swim et al., 2003).

1.3. Internalized Racism

Racism tends to be internalized by its targets, and is manifested in anti-self issues, suppressed anger expression, and nihilistic tendencies (which are defined as self-destructive) (Brown, 2003). *Anti-self issues* occur when a person feels alienated from his racial identity and seeks to escape from it, and subsequently from any connection with other members of his racial community (Brown, 2003). Members of minority groups encounter innumerable opportunities to be angry, but these expressions of anger are attended by sanctions. When the denial of anger and aggression becomes normative, the expressions of suppressed anger, which is defined as *suppressed anger expression*, result in artificial friendliness, passivity, and ultimately withdrawal or self-destructiveness (Brown, 2003).

Nihilistic tendencies in this context are a strong tendency toward self-destructiveness and harm due to fatalism associated with racial categorization. Self-destructive disorder is defined as self-defeating attempts to survive in a society that systematically frustrates normative efforts toward natural human development. It is manifested by the individual himself; he is his own worst enemy, and acts with the intention of destroying himself (Brown, 2003). According to Brown (2003), internalize racism is divided to three subcategories: Anti-self issues, suppressed anger expression and Nihilistic tendencies. These describe the manner in which internalize racism affects the individual's mental health.

1.4. Ethiopian Youth in Israel

The Ethiopian community is a Jewish black minority in Israeli society. The first Ethiopian immigrants arrived in Israel in the 1980s (Shabtay, 1999), today they account for 1.86 per cent of the total population in Israel (Israel Central Bureau of Statistics, 2009), and constitute a minority group based on skin color. Studies conducted in Israel that focused on the adjustment processes of Ethiopian immigrants indicated that their efforts to integrate into Israeli society were attended by feelings of rejection by society. The findings indicate that many perceive difference in skin color as one of the main reasons for their difficulty in integrating into Israeli society, despite being Jewish, which is a generalizing mechanism directed toward integration in Israel (Shabtay, 1999).As we demonstrate before, studies conducted in the United States focus on emotional and behavioral coping styles and internalized implications (Brown, 2003; Swim et al., 2003; Utsey et al., 2000). Several studies which examined Ethiopian immigrants' experience of being black in Israel, found racial manifestations equivalent to those mentioned above (Ben-David & Tirosh Ben-Ari, 1997; Ben-Eliezer, 2008; Shabtay, 2001).

Studies shows (Ben-David & Tirosh Ben-Ari, 1997; Ben-Eliezer, 2008; Shabtay, 2001) that racism in the Israeli society, on its different aspects, creates considerable distress amongst those youth.

Other studies conducted among youths indeed indicate self-destructive elements; an approximate 33 per cent dropout rate from the education system, experience with drugs (25 per cent, i.e., twice the rate among all Israeli youths), alcohol consumption, and suicidal behavior (at twice the rate of all Israeli youths) (Edelstein, 2004,). There is an over-representation of Ethiopian youths in the criminal statistics pertaining to Israeli youths (Edelstein, 2004).

Ethiopian girls, in comparison with boys, constitute a distinctive risk group due to their age, being women, children of immigrants, their low socioeconomic status, and due to society's perceptions and racist attitudes toward their skin color. Evidence of the distinctiveness of Ethiopian girls and how this is manifested in risk behaviors can also be found in studies conducted in Israel (Zaslavsky, Apter, & Idan, 2002).A few studies that focused on Ethiopian girls found that the level of their integration into their peer group is lower compared to Israeli youths in general. It was also found that about a third of these girls are involved in one of the following risk

behaviors: drug use, alcohol consumption, indiscriminate sexual relations, and delinquency (Zaslavsky et al., 2002).

To summarize, in order to gain an understanding of the complex reality with which these girls have to cope, it is important to understand their perception of racism, a perception comprising a complex correlation between several variables: perceived racism, emotional responds to these incidents, their behavioral response to racist incidents, and how and to what extent they internalize this racism.

These complex correlations will be examined using Facet Theory tools and principles.

1.5. Research Goals

The study engages in an exploration of the inner structure and correlation between the variables: perceived racism, emotional responses (anger, frustration, sadness, helpless, shame, empowerment), behavioral responses (try to change behavior, try to behave better, disregard, try to avoid contact, pray, try to forget, become violent, respond and tell the racist he is wrong), and internalized racism (nihilistic tendencies, anti-self issues, suppressed anger expression), in order to identify the dynamics of coping with racism from the subjective perception of the individual.

Based on the complex correlations between the variables, a general model (mapping definition) will be constructed that endeavors to describe the range of choices facing an Ethiopian adolescent girl coping with racism, from the subjective perception of the reality in which she lives and with which she is coping. The mapping sentence will help to define the general research question regarding the individual's responses to the racist incidents she encounters.

2. Research Method

2.1. Participants

93 adolescent girls, aged 15-21, from the Ethiopian community participated in the study. The girls were enlisted by approaching institutions attended by a concentration of Ethiopian youths. 125 adolescents were approached, and 93 returned the completed questionnaires (74 per cent).

2.2. Measures

As described above, the present study attempts to measure the concepts: perceive racism, emotional responses to racism, behavioral responses to racism, and internalized racism.

The questionnaires were developed by combining two bases: theoretical and empirical ideas from the literature, and a series of focus groups conducted with Ethiopian girls.

2.2.1. Demographic Background Questionnaire:

Data was collected regarding participants' age, grades at school, and affiliation to religion, as well as the year their parents emigrated, their jobs, who they live with at home, number of bedrooms, and their financial situation compared with their friends.

2.2.2. Perceived Racism Questionnaire

This questionnaire was constructed on the basis of the focus groups described above and on current available literature (Carter, 2007). It comprises seven items representing perceived racism. This type of racism is defined as the subjective perception of an event experienced by an adolescent girl and defined by her as a racial event (i.e. disrespectful attitude toward me because I'm Ethiopian). The respondents were asked to indicate the degree to which each of the situations applies to them on a scale of 1 to 7, with 1="to a very low degree", and 7="to the highest possible degree". The questionnaire was found to have high reliability ($\alpha=0.88$).

2.2.3. Emotional Responses Questionnaire

This questionnaire is based on a questionnaire developed by Barnetz (2008) for a study that examined the perceptions of a sample of Arab pharmacists in Israel concerning racist responses they encounter from customers, and for focus groups held with girls at a center for girls at risk, from which a number of dominant emotions emerged.

The final version of the questionnaire included six emotional responses: anger, frustration, sadness, helplessness, shame, and empowerment. These are the emotions that can manifest when experiencing perceived racism. The respondents were asked to indicate the degree to which each of the situations applies to them on a scale of 1 to 7, with 1="to a very low degree", and 7="to the highest possible degree". Since the reliability of the questionnaire was found to be moderate (α=0.67), a multidimensional scaling analysis was carried out, according to which the six emotions were classified into three categories: anger, empowerment, and internalized emotions. The analysis is presented in the Findings section.

2.2.4. Behavioral Responses Questionnaire

This questionnaire is based on a questionnaire developed by Barnetz (2008) for a study that examined the perceptions of a sample of Arab pharmacists in Israel concerning racist responses they encounter from customers, and for focus groups held with girls at a center for girls at risk. The questionnaire includes eight behavioral responses that might be adopted as a reaction to perceived racism (efforts to behave better). The respondents were asked to indicate the degree to which each of these responses applies to them on a scale of 1 to 7, with 1="to a very low degree", and 7="to the highest possible degree".

Since the overall reliability of the questionnaire was found to be moderate (0.57=α), a multidimensional scaling analysis was carried out, according to which the behavioral responses were classified into three categories: fight (α=0.64), flight (α=0.66), and adapt (α=0.58). The analysis is presented in the Findings section.

2.2.5. Internalized racism Questionnaire

This 15-item questionnaire, which is comprised of 3 subcategories, was developed and formulated by Barnetz (2008). This questionnaire measures internalize racism by three (out of five) hypothetical mental health problems that could exist because of racial stratification the following dimensions in accordance with the conceptualization developed by Brown (2003): self-destructive behaviors (fighting, practicing unsafe sex, alcohol and drug use, and

life-threatening behaviors), anti-self issues (I wish I had lighter skin color), and suppressed anger expression (angry about things associated with the issue of race but having to control myself, anger and inner fury, angry with myself for not expressing anger over a racist incident, lying when a veteran Israeli asks if I'm angry at not being treated as an equal, and I pretend to like veteran Israelis).

Respondents were asked to indicate the degree to which each of these responses applies to them on a scale of 1 to 7, with 1="to a very low degree", and 7="to the highest possible degree". The questionnaire was found to have high to moderate reliability (suppressed anger expression – α=0.67; nihilistic tendencies – α=0.80; anti-self issues – α=0.73). The multidimensional scaling analysis of this questionnaire is presented in the Findings section.

2.3. Procedure

Various institutions attended by adolescent girls from the Ethiopian community were approached through professionals. After receiving approval, most of the questionnaires were administered to the girls by the researcher, and the remainder were handed over to the responsible persons at the institutions with a detailed explanation on how to present the study and administer the questionnaire. The questionnaires were completed anonymously, sealed in an envelope, and mailed to the researcher.

3. Research Results

To identify the separate spheres of *emotional responses*, we carried out multidimensional scaling analysis on of the averages of the six items. The two statistical dimensions of the figure, Stress=0.036 and RSQ=0.995, obtained relatively high scores. Figure 1 shows that the map is divided into three regions of emotional responses. The four emotional responses: frustrated, sad, ashamed, and helpless, which were named *internalized emotional responses*, appear in the first region, and one response appears in each of the two other regions: *empowerment* and *anger*, which expresses an externalized emotional response.
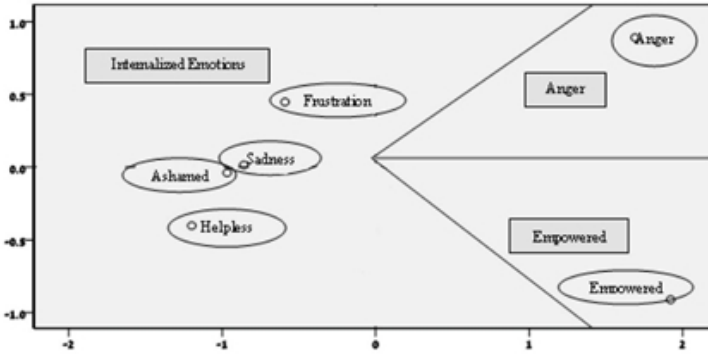
Fig. 1. Map of Emotional Responses

To identify the separate spheres of *behavioral responses*, we carried out multidimensional scaling analysis on the eight variables. The two statistical dimensions of the figure, Stress=0.018 and RSQ=0.997, obtained relatively high scores. Figure 2 shows that the behavioral responses occupy various locations on the map and create a circular flow, which is possible to begin describing the circle at the point of the behavioral "praying" response and ends with the "become violent" response. we divided the map into three regions: *adaptation*, which includes the behaviors: praying, changing behavior, trying to forget, taking no notice, and trying to behave better (α=0.64), *flight*, which includes avoiding contact with the racist (α=0.66), and *fight*, which includes: answering back, and violence (α=0.58).
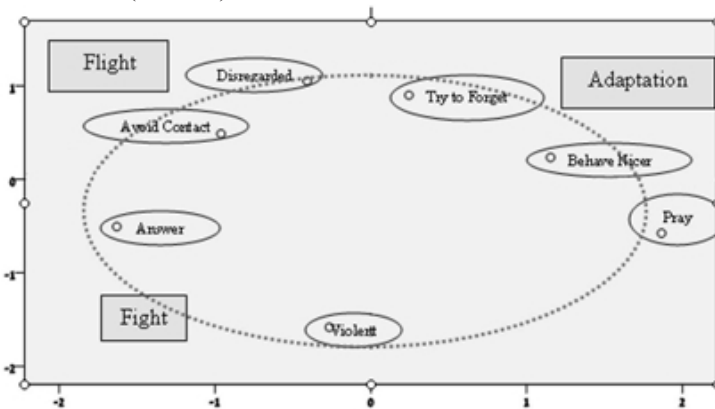

Fig. 2. Map of Behavioral Responses

To identify whether there are separate spheres of *internalized racism,* we carried out multidimensional scaling analysis on the fifteen averages of the variables representing the implications for identity. The two statistical dimensions of the figure, Stress=0.099 and RSQ=0.957, obtained relatively high scores. Figure 3 shows that the different dimensions of internalized racism are spread throughout the map, and can be divided into three different content worlds in accordance with their location. Based on this division, the three following variables were constructed which match Brown's (2003) classification (see p 3).
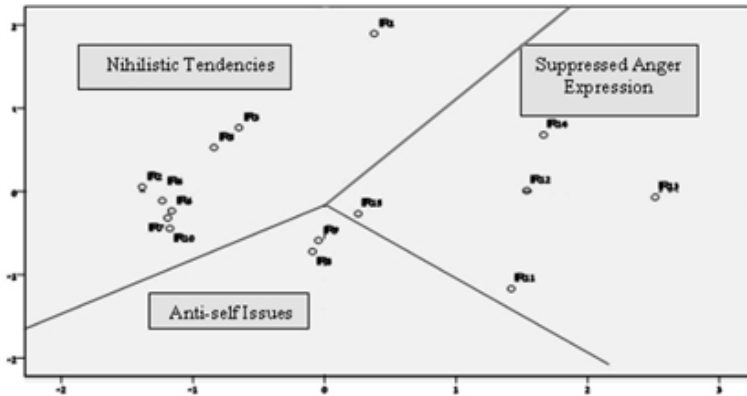

Fig. 3. Map of Internalized Racism Dimensions

3.1. Perceived Racism and Emotional and Behavioral responses, and Internalized Racism

We conducted a Fssa that included all the studied variables in order to examine whether there is any regularity between the facets and the elements presented in Figure 1-3.
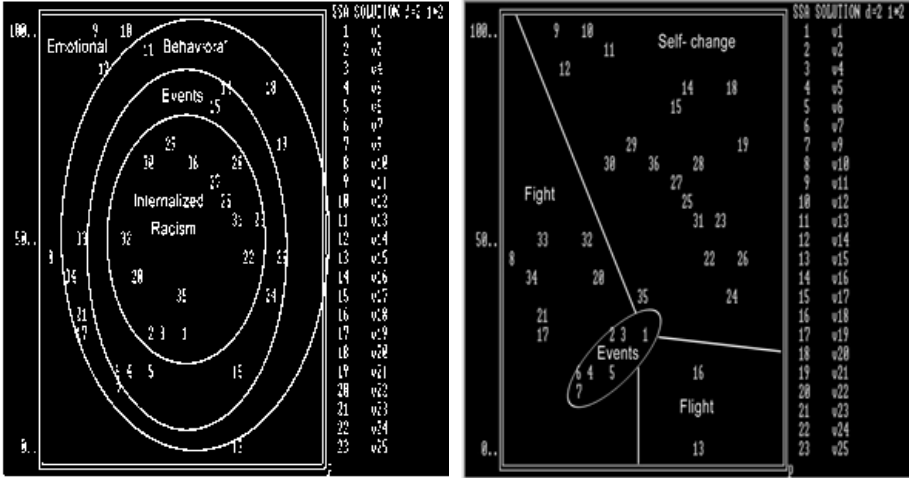
Fig. 4. Map of all the variables: Perceived Racism, Emotional and Behavioral Responses, and Internalized Racism: Radial Partition and Angular Partition

Figure 4 shows regularity between the facets and the various elements in two respects. Two components of internalized racism variables (anti-self issues, and nihilistic tendencies) appear in the center of the map, The racist incidents appear next, the behavioral responses to racism (fight, flight, adaptation) appear in the third circle, and the emotional responses (internalized, anger, empowerment) appear in the outermost circle, In Facet Theory this kind of map distribution is called "radial distribution" (shye & Elizur, 1994).Seprn Index for this facet was 0.84

Figure 4 also shows that the map can be divided into three sections, at the center of which is the perceived racism variable. The first region includes the responses: anger (emotional response), and fight (behavioral response); along with suppressed anger expression, the second region: empowerment (emotional response), and flight (behavioral response); and in the third region: internalized emotional response (emotional response), and adaptation (behavioral response), as well as the internalized racism variables (anti-self issues, and nihilistic tendencies). This division indicates a connection between the different variables and perceived racism as a mediating variable, a connection between behavioral and emotional responses, and a connection between some of them and internalized racism. In Facet Theory this kind of map distribution is called

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"angular distribution" (Guttman & Greenbaum, 1998; Shye et al., 1994).Seprn Index for this facet was 1.00

In Facet Theory, the combination of radial and angular distribution is known as "**radex**" (Guttman & Greenbaum, 1998; Shye & Elizur, 1994). The implications of the radex structure for the mapping sentence are detailed in the Discussion section.

4. Discussion

The present study examined Ethiopian girls' experiences and perceptions of racism. It did not examine actual expressions of racism, on the premise that the individual's experience and the implications of the subjective experience are the most meaningful. The "objective truth" of the incident is irrelevant to the effects and implications of the experience (Carter, 2007).

Combined with Facet Theory tools, the study's findings show correlations between the girls' different coping styles: emotional and behavioral responses, and internalized racism. Analysis of the Map of all Variables: Perceived Racism, Emotional and Behavioral Responses, and Internalized Racism (Figure 4) indicates three archetypes for coping with racism, each with a typical emotional responses, a typical behavioral responses, and internalize racism. The first coping style, *"fight"*, is when in response to racism the girl is angry, fights, and is then angry again – at herself for not fighting hard enough (suppressed anger expression). The second, *"flight"*, is when the girl feels empowered by racist experiences and consequently avoids contact with the racist. The "empowered" response combined with flight and avoidance possibly stems from the girl thinking "I'm not going to stoop to your level", and consequently she withdraws out of inner pride. The sense of empowerment is one of "I know my worth", but this experience results in the girls avoiding contact with the racist, and consequently reducing their personal space in society.

The last coping style, *"self change"*, is emotional – internalized emotional responses: frustration, sadness, shame, and helplessness, which lead to adaptation behavioral responses: trying to forget or ignore the incident, praying, changing behavior, and trying to behave better. These coping styles lead to the most powerful form of internalized racism:, anti-self issues, and nihilistic tendencies. The more the girls internalize their emotional responses

and try to adapt themselves in terms of behavior, thus they will suffer more from psychological damage.

At times the stress resulting from encountering a racist experience mandates the costly response of avoidance (Feagin et al., 2001).

Girls who choose "flight" (avoidance) and "empowered" coping styles are least affected by internalized racism, but at the same time they also have the lowest chances of integrating into society. The conclusion, therefore, is that a girl who avoids Israeli society has fewer chances of being damaged by it, but will pay the price of social and economic non-integration.

It is difficult to ignore the similarity between the three archetypes described above and Gordon's (2002) classic description of the choices facing people contending with a racist reality: "*Every black person faces history – his or her story – every day as a situation, as a choice, of how to stand in relation to oppression, of whether to live as a being subsumed by oppression or to live as active resistance toward liberation or to live as mere indifference. This conception of history is rooted in daily life*" (Gordon, 2002, p. 250).

The findings of the present study, and especially Figure 4, corroborate Gordon's (2002) observation and complement it. As we have shown, the findings specify the emotional and behavioral significance of each choice and show which of the choices are more strongly linked to the internalized damage caused by racism.

Based on this view, a mapping definition can be formulated. The division into three coping style archetypes described above forming the first facet. The second facet defines the aspects in which the three archetype manifest themselves: the (a) recognition of racist events, the (b) emotional and (c) behavioral coping as well as the (d) internalized implications of coping with racism.

Consequently, the following mapping definition is proposed for the effects of racism on the individual suffering from it:

An item belongs to the content world of the effects of racism on the individual only if it asks about the extent to which A member (x) of a minority ("disadvantaged") social group

$$\left\{\begin{array}{l}\textit{recognizes racial attitude of}\\ \textit{responds behaviorally to racial attitude by}\\ \textit{responds emotionally to racial attitude by}\\ \textit{makes internal adjustments to racial attitudes by}\end{array}\right\} a$$

$$\left\{\begin{array}{l}\textit{fight}\\ \textit{flight}\\ \textit{self change}\end{array}\right\} \text{behavior} \rightarrow \left\{\begin{array}{c}\textit{very often}\\ \cdot\\ \cdot\\ \cdot\\ \textit{never}\end{array}\right\}$$

4.1. Suggestions for Further Research

The mapping sentence directs us to a number of challenges:

1. To attempt to conceptualize and understand the elements of internalized implications of coping with racism especially referring to the flight coping style: the findings highlight that the internalized cost indicated by Brown (2003), i.e., anti-self issues, and nihilistic tendencies, particularly specify the heavy price entailed in an adaptation coping style. While suppressed anger expression relates to the "Fight" coping style. We need to understand the price and corresponding effects of adopting a coping style of flight. Qualitative studies, as well as analysis of literary works, can advance us in this respect.
2. To test the validity of the mapping sentence for different ethnic groups, gender groups and age groups in order to examine the generalizability of the findings. For example, it is important to also examine the experiences of people from minority groups who have succeeded in order to examine perceived racism of the discriminatory harassment type, which we were unable to address in the present study.

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A new multi-dimensional Worldview model to investigate people's Environmental risk perception and Pro-environmental behaviours

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Abstract: In this study, 170 Mandarin-speaking residents of major Chinese cities completed an online survey assessing both environmental and cultural worldviews. A new multidimensional model of environmental worldviews was constructed using Smallest Space Analysis (SSA) through the HUDAP software. Four cultural worldview scales (egalitarianism, individualism, hierarchism, and fatalism) were treated as external variables to investigate their associations with environmental worldviews in this new multidimensional configuration. Results indicated that egalitarian respondents were more likely to endorse environmental worldviews that emphasise the fragility of nature's balance and the possibility of eco-crisis, whereas individuals who valued strong social hierarchies and fatalism were more likely to possess environmental worldviews that supported human domination over nature. All four of the cultural worldview subgroups are in the same partition in the figure.

1. Introduction

1.1. Worldviews and Pro-environmental Behaviour

Whereas research on worldviews and pro-environmental behaviour has a 40-year history in Europe and North America, relatively few studies have been conducted in China and other developing countries (Kellstedt, Zahran, & Vedlitz, 2008; Zhang, 1993). Worldviews constitute generalized attitudes toward the world and its social organization (Dake, 1991). They are "orienting dispositions" that guide people's responses in complex situations (Peter & Slovic, 1996), which can reflect an individual's bias towards nature, culture, society, interpersonal relationships, war, peace, etc. In the past 50 years, the scholarly study of both psychology and philosophy has identified many different types of worldviews. Within environmental psychology, two main worldview types have been linked to risk perceptions and pro-environmental behaviour: (1) environmental worldviews; and (2) social worldviews.

1.1.1. Environmental Worldviews

*E*nvironmental worldviews are a relevant part of the "circumstances under which individuals and groups make decisions and enact behaviours that affect levels of resource consumption and environmental pollution" (Stokols, 1995, p.828). Two main measures have been used to assess environmental worldviews: Dunlap and Van Liere's (1978) New Ecological/Environmental Paradigm (NEP) (Dunlap 2000), and Thompson and Barton's (1994) Anthropocentrism/Eco-centrism/Apathy model. The NEP assesses beliefs about humans' relationship with nature (Amburgey & Thoman, 2011). The original version of the scale, called the N*ew Environmental Paradigm,* assesses three dimensions: (1) 'limits to growth', (2) 'the fragility of nature's balance', and (3) 'human dominance over the nature'. A later version of the scale, the N*ew Ecological Paradigm,* consists of 15 items assesses the three original dimensions, as well as two additional ones: the 'rejection of exemptionalism' and the 'possibility of an eco-crisis'.

Table 1. The New Environmental/Ecological Paradigm Scale

Original NEP scale	Revised NEP scale
New Environmental Paradigm 12 items 3 facets Introduced in 1978	New Ecological Paradigm 15 items 5 facets Introduced in 2000

In last 20 years, most studies have treated the NEP as a unidimensional measure, although several factor analytic studies have suggested the presence of a multidimensional structure in the whole scale (Bechtel & Verdugo,1999; Hawcroft & Milfont, 2010). Although the unidimensional approach has the advantage of simplicity, there are important limitations associated with this approach (Wisemana & Bogner, 2003). For example, overall predictive power of the single unidimensional scale may be less than for a combination of several NEP subscales. In addition, the unidimensional approach does not enable researchers to investigate the relative predictive power of the specific subscales.

Compared with the dimensions in the NEP scale, the concepts of anthropocentrism and eco-centrism are another two ways of understanding an extension of ethics to nature. In an anthropocentric ethic, nature deserves moral consideration only in so far as it relates to humans. In an eco-centric ethic nature deserves moral consideration because nature has intrinsic value. In this study, items of the NEP scale were divided into two groups based on those items' own attributes. One group of the NEP items is to assess participants' values towards anti-anthropocentrism, and the other is about eco-centrism. Then, a new statistical approach was introduced to investigate both the perspective from anti-anthropocentrism/eco-centrism, and the perspective from original dimensions of the NEP scale (e.g. 'the fragility of nature's balance) together in a same model.

1.1.2. Cultural /social worldviews

Cultural theory implies that risks are socially constructed; namely, people choose what to fear and how to fear it to sustain their preferred pattern of social relations (Douglas & Wildavsky, 1982). It is argued that worldviews

about authority and social organization play an important "orienting" role in determining individuals' risk perceptions and preferences for managing risk (Leiserowitz, 2006). According to cultural theory, there are four main social worldviews associated with preferred organization of society:

Hierarchism – A preference for clear hierarchical power structures, fear of social deviance that threatens status quo, and reliance of risk management by experts.

Individualism – A fear of restrictions on their autonomy, strong belief in deregulation, the free market, and providing opportunities for people to maximize personal gain.

Egalitarianism – High levels of concern about social injustice, suspicion of authority, high tolerance for social deviance, support for participatory democracy and consensus-based decision making.

Fatalism – High levels of disengagement, tend to believe that whatever happens is largely beyond their control.

These four social worldviews derived from different cultural societies that can be distinguished by a two-dimension model. These two dimensions are grid (the set of constraining classifications which may impinge on people's behaviour) and group (the extent to which people are incorporated into communities or other social groups) (Michaud, 2009). Numerous studies have examined the associations between social worldviews and environmental worldviews or pro-environmental behaviour in Holland, Rome, Portugal and Zimbabwe (e.g., Steg & Sievers, 2000; Poortinga & Vlek, 2002; Bonnes, Passafaro, & Carrus, 2010; Castro, 2006; Van Petegem & Blieck, 2006) through correlation or regression models. However, the present approach of investigating these relations sometimes seems limited, which might indicate new approach needed to be introduced to explain those associations.

1.2. Facet Theory and Mapping Sentence

As indicated, the most important limitation of exploring the associations between NEP scale and cultural theory contains two aspects. The first is treating the NEP as a single measure through adopting its total score; the other is simply measuring the similarity between the NEP scale and each dimension in cultural theory through correlation coefficients. However, the measure of similarity between variables need not only be a statistical correlation coefficient, but a vivid figure to show the exact position which people with these four social worldviews would be located in.

In this study, facet theory was applied for its unique figure characters supplied to better understand the measurement of environmental worldview, and also relations between those four dimensions in cultural theory and environmental worldviews. Facet theory is a general conceptual and methodological approach for research in behavioural sciences that evolved from Louis Guttman's work (Guttman, 1968). This approach has been already broadly applied in numerous psychological research, such as people's perspective (Maslovaty Marshall, and Alkin, 2001), values (Schwartz, 1992), intelligence (Guttman, 1991), and personality (Maraun & Chrisjohn, 1995). In this study, a new multiple dimensional model of environmental worldview, along with its relation to social worldviews, was examined through theoretical and methodological tools introduced by facet theory.

The tool named mapping sentences in facet theory was adopted at first to present the general theoretical framework of this new environmental worldview model. A mapping sentence is a definitional framework for empirical observations in a given research project. As such, it schematically specifies all observational assignments that can be recorded (Shye, 1994, p.25), with each facet defined in the mapping sentence representing a distinct conceptual category, which describes a discrete component of a particular object or area of research (Donald, 1995). In a mapping sentence, each facet is composed of discrete components termed elements. In a given empirical investigation, every such element can be represented by one or more items within a questionnaire or test (Ben-Shalom & Horenczyk, 2003).

Facet definitions for the expanded multidimensional model of environmental worldviews that were examined in this study are formulated

in the mapping sentence presented in figure 1. In this figure, following both Dunlap's (Dunlap, Van Liere, & Jones, 2000) dimensionality in the NEP scale and the anti-anthropocentrism/eco-centrism model, the mapping sentence includes two facets. As defined, each facet contained in the mapping sentence is one way of classifying the research variables. They are "a properly defined set of n facets provides an n-way simultaneous classification of variables" (Levy, 1998, p. 302). In this study, the first facet (Facet A) shown in figure 1 is the classification of the environmental worldview variable from the NEP scale, which consists of the 3 dimensions of NEP scale: 'fragility of nature's balance', and 'human dominance over the nature', and the 'possibility of an eco-crisis'. Simultaneously, facet B is an additional facet to incorporate the elaboration of anti-anthropocentrism/eco-centrism model to Dunlap's theory, which reflects respondents' perspectives about anti-anthropocentrism and eco-centrism. In that case, facet B provides another classification of the environmental worldview variable from the anti-anthropocentrism/eco-centrism angle
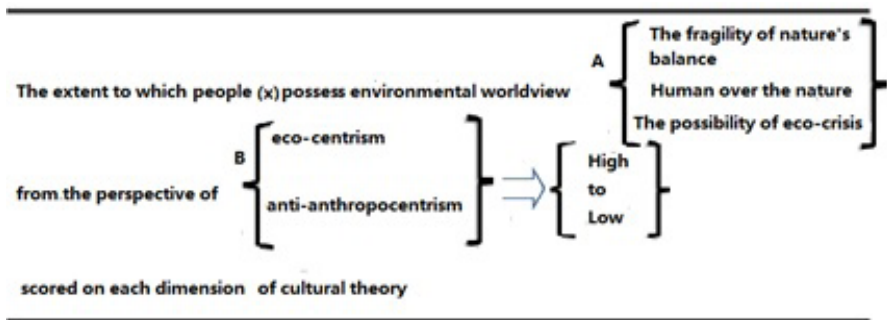

Fig. 1. Facet Definitions and Mapping Sentence for environmental worldviews

To examine the validation of the mapping sentence framework shown in figure 1, a confirmatory smallest space analysis (SSA) was also performed based on the prediction of a radex structure in the SSA space. SSA is a multidimensional scaling technique that was developed by Guttman (1968), which maps the location of each item in a multidimensional space. It treats each variable as a point in this space, in such a way that the higher the correlation between two variables, the closer they are in the space (Guttman, 1968). The location of each item is determined by a measure of similarity or dissimilarity to all of the other items. SSA can produce two informal indicators of configuration

quality (Shye et al.,1994): the coefficient of alienation and the separation index, which reflects how it fit between the spatial configuration and the data (values of this index range from 0 (best) to 1 (worst), while the separation index examines the fit between the spatial solution found in the confirmatory SSA and the a priori spatial hypothesis derived from the mapping sentence, which ranges from 0 (worst) to 1 (best) (Shye et al., 1994).

2. Method

2.1. Sample and Data Collection

A sample was selected from China by a Chinese social marketing website associated with the online survey. Participants were asked to complete an online questionnaire assessing both their environmental and social worldviews. All responses were anonymous. Finally, 170 Chinese participants were involved in this investigation from major cities, towns and villages of China, aged 15–57 years, and 54.7% of them are females.

2.2. Measures

This questionnaire involved:
1. Personal basic information, such as age, gender, education background, career.
2. Only 9 items of three dimensions in the NEP scale were adopted in this scale, while those two dimensions "the limits to growth" and the "rejection of exemptionalism" which are not strongly associated with environmental risk perception or activities were deleted, based on the result of meta-analysis (Xue, Hine, and Thorsteinsson, 2012).
3.Value scales in Cultural theory: the value scale in Culture Theory is a set of questions introduced by Dake (1991), and then revised by Peters and Slovic (1996), and Rippl (2002). In this study, each cultural worldview was assessed by 3 items. Thus, there were 12 cultural worldview items in total.
All the scales had been translated into Chinese (Mandarin).

3. Results

3.1. Confirmatory Smallest Space Analysis (SSA)

The multidimensional configuration of environmental worldviews is presented in Figure 2. The obtained pattern of proximities among the original dimensions of the NEP scale reflects a clear radex structure. The facet A divided the SSA map into polar partitions: 'fragility of nature's balance', 'human domination over the nature' and 'possibility of an eco-crisis'. The partition of the map according to the polarizing facet was almost as predicted: not all items were located in their separated locations, although the separation index = 1. As shown in figure 2, Item 3 that 'Humans are meant to rule over the rest of nature' of the dimension 'the balance of nature' is far from the other two items in this dimension. The perspective facet (Facet B in the mapping sentence) divides the map into two concentric regions: The inner circle includes items regarding whether the respondents holding a value of anti-anthropocentrism, whereas items located in the external circle assess the respondents'perceptions regarding the eco-centrism. The assignment of items to the two areas defined by this radial facet was satisfactory (separation index = 1). Taken together, the polarizing and radial partitions yield the predicted radex configuration of the new environmental model.
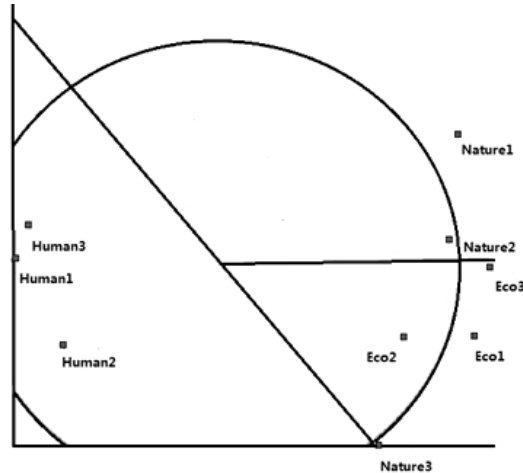

Fig. 2. New Dimensional Configuration of Environmental Worldviews

3.2. External Variables

The 4 dimensions divided in the cultural theory: individualism (low grid, low group), fatalism (high grip, low group), egalitarianism (low grid, low group), hierarchism (high grip, high group), are treated as external variables and added to the spatial configuration of environmental worldviews through the HUDAP software. Their locations are depicted in the new environmental worldviews model (see Figure 3). As predicted the location of external cultural theory variables were associated with respondents' environmental worldviews: respondents who valued egalitarianism held more eco-centric environmental worldviews than respondents who were fatalistic or preferred society to be organised in terms of strong social hierarchies. Moreover, in the cultural theory model, both hierarchism and fatalism are located in high position of the 'grid' dimension, indicating people in this 'high grid' position tended to score higher on anti-anthropocentrism than eco-centrism. Individualists fell between these two extremes, indicating people who like free markets and maximize their own benefits are less eco-centric than egalitarians, and less anti-anthropocentric than hierarchists and fatalists. It was unexpected that all four of the cultural worldview variables are in the same partition in the figure (in the partition made by 'fragility of nature' items). This may explain why some studies have found no significant relationships between these cultural worldview scales and pro-environmental worldviews, risk perceptions, and behaviour.
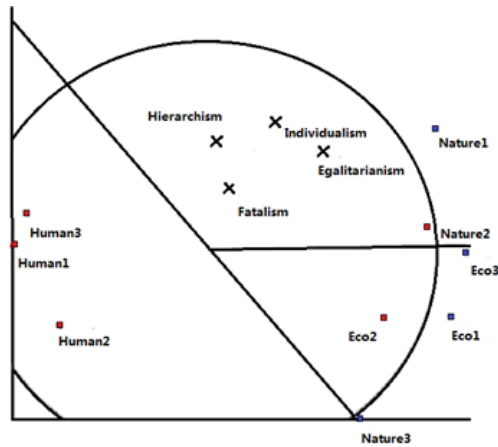

Fig.3. Environmental Worldviews Configuration with External Variables

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Information, Persuasion and the Seduction of Urban Signscapes

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Abstract: This article aims to provide empirical information on the effects of two features of urban signscape - complexity and coherence - on the perceived visual quality of their informative, persuasive and seductive natures. The empirical research was designed according to facet theory. The data were analyzed using the non-metric multidimensional procedure of SSA (Smallest Space Analysis). The results show that the intensity of the characteristics of complexity and coherence in urban signscapes, as well as the spatial proximity of observers to the scenes observed, support the hypothesis of a perceived visual quality in urban signscape.

1. Introduction

When viewed in isolation, signs may present a favorable image and attract attention, but when many of them are placed side by side in the urban landscape, the result is often inappropriate. Therefore, it is important to consider the combined effect of these signs, that is to say, the urban signscape.

Due to the fact that urban signscapes occupy the main urban arteries and are regularly seen by the public, cities try to control their appearance through mechanisms which provide for the placement and arrangement of their signs. Research to help in the formulation of these regulations and guidelines, however, usually omits empirical analyses of perceived visual quality.

Two studies on the features of signscape (Nasar, 1988; Nasar & Hong 1999) provided empirical information on the effect of signscape features on perceived visual quality. Two signscape features - complexity and coherence - were chosen in these studies. The stability of complexity, however, has proven

to be inconsistent in the various studies on this type of analysis (Kaplan & Kaplan, 1982; Wohlwill, 1976).

It was within this strategic context that the empirical research was planned, being structured through the facet theory, and adopting the two features of urban signscape mentioned above - complexity and coherence - to assess their effects on the visual quality of the nature of urban signscapes' informative, persuasive and seductive communications, from the perception of experts and non-experts of urban signscape. In pursuit of this objective, a mapping sentence was formulated to outline the description of a system of components and elements that comprises the problem being studied, the assumptions made and the tools for collecting and analyzing data.

2. Theoretical Issues

2.1. Environmental components of perceived visual quality

Perceived visual quality is described as the product of two fundamental human needs when confronted with a scene: *to be involved* and *to make sense* (Kaplan & Kaplan, 1982). The environment should be engaging enough to attract human attention and for human beings operating within it to make sense of it. Both complexity and coherence play major roles in satisfying these human needs.

Complexity is defined as the amount of variety within a scene, whereas consistency is defined as the degree to which the scenes fit together (Nasar, 1988). Too little complexity is monotonous and boring, whilst too much is chaotic and stressful. The middle level of complexity is therefore the most pleasing. Hence, the hedonic tone of the scene (beauty or pleasantness) with respect to complexity has the shape of an inverted "U" (Berlyne, 1972; WohlwilL, 1976). In order to aid understanding, coherence (which is achieved by reducing the contrast of the signs with the other elements within the scene) can reduce uncertainty and increase hedonic tone (Kaplan & Kaplan, 1982; Wolhwill, 1976). These relationships have been consistently confirmed in empirical research (Nasar, 1988).

2.2. The natures of urban signscape communication

It is assumed in this research that urban signscape perform three main functions of communication – *informative, persuasive, seductive* – in a consumer society, although other secondary functions cannot be ignored.

The *informative nature* of urban signscape is a visual reference and is centered on the use of identification signs in order to transmit messages in the city and on the city. It has now become established as an important component in public activities in large cities today because the images of these cities demonstrate a diversity of uses and the difficulty of representing them only as distinct architectural forms. The increased amount of information and simultaneous contrast, however, requires a kind of continuous immersion of the individual. From the physical and cognitive perspective, it is impossible to apprehend them all at once. From this standpoint, each physical area of big cities, marked by the presence of urban signscapes, can be regarded as a structure of complex perception that stimulates a special type of reading activity. When reflecting on this, Venturi, Scott-Brown & Izenour (2003), concluded that the studies on urban perception and "imageability" ignored the relations and combinations of this communication system with the surrounding architectural and urban space, and there are indications that such signscapes confused their theories since, despite the noise of competing signs, you can still find what you are looking for.

The *persuasive nature* of urban signscape is a tool to persuade or seduce the purchaser. Closely related to the economic mechanisms of consumer society, this characteristic is intended to increase the use of certain products and establish the brand, it being associated with the sector producing goods and services. The psychological action for these motivations may exert a powerful pressure on the individual, it being only a question of means. Therefore, without a brand and without advertising, and thereby without communication, in normal situations within the capitalist system, a product cannot be marketed. As a result, advertising is predominantly responsible for the branding of products, such as the symbols on the goods. The brands, in this context, are codes which are carefully manipulated in order to maintain the new consumer

society, leading urban centers to acquire, as defined by Klingmann (2007), new spatial definitions, which give rise to new vocabulary of brandcities, brandlands, and brandscapes, which result from the increasing externalization of corporate identities combined with an artificial making of place. According to Vargas (2007), however, outdoor advertisements need to be taken in isolation to promote persuasion. In this sense the nature of urban signscapes' persuasive communication is an issue which will be empirically tested in this research.

The *seductive nature* of urban signscape suggests more than it says. It entices and excites more than convinces. It evokes stored images, and creates connotations which are an aesthetic superimposed on semantic fields. From this angle, the urban signscape is a permanent gallery of aesthetic and emotional structures, the perception of which is produced by people around town. This aesthetic dimension, however, is built spontaneously, since the various elements that structure the advertising image of urban signscape come together randomly as isolated parts of a context. The issue of aesthetics, in this type of landscape, according to Vargas (2007), involves the perception and treatment of people from different places and must include the subjectivity of individuals and specific places. Robert Venturi's admiration of outdoor advertising yielded an entire book in association with Denise Scott-Brown & Steven Izenour. The authors introduce the commercial strip, the car in motion, as the new urban landscape. In this landscape of big signs, small buildings and high speeds, the buildings go beyond the functions they represent, and function as symbols that convey multiple meanings.

3. Theoretical-Methodological Issues

This research adopts the theory of facets in the design of the investigation (Guttman, 1981; Shye, Elizur & Hoffman, 1994; Bilsky, 2003; Amar & Toledano, 2005) and the empirical research conforms to the "Purposive Evaluation of Place" outlined by Canter (1983), which proposes that an evaluation of the environment is related to the extension of the purposes of actions directed at humans who fall within these environments and, as such, takes into account the intentions of these environments.

By definition, generally, there are three basic facets of environmental assessment, each representing a component of the place being investigated: referent, focus, and level. The first facet defines the referent's experience and outlines the different ways in which people rely on to make their assessments. The facet of focus modulates the referent of experience. The level facet takes into account the existence of the environmental scale, which influences the evaluation of spaces. These relationships between different aspects of the experience of people within a given environment can be summarized through a mapping sentence, which describes the components of the environments and how they are experienced by users.

3.1 Mapping Sentence

Table 1 presents the mapping sentence, the names of the facets of content, and their elements. The evaluation is understood here as a statement or expression of the perceived quality of the main natures of urban signscape communication. The first type of facet refers to the population covered in the survey (background). The second covers the content of the researched variables (content). The third type refers to the universe of the responses of the subjects who were studied (common range).

Table 1. The mapping sentence of the evaluation of urban signscape

The observer (**expert**	**non-expert**) evaluated the urban signscape features of:		
CONTRAST – CT		**COMPLEXITY – CP**	
CT1 size		CP1 format	
CT2 color	as well as	CP2 location	
		CP3 direction	
	INTENSITY – I		
	I1 minimum		
varying level	I2 moderate	and scenic experience	
	I3 maximum		
PROXIMITY – P			
P1 national		facilitate	⟶
P2 international			
COMMOM RANGE			
(1) nothing			
(2) a little	the visual quality of its informative, persuasive and seductive		
(3) more or less	natures of communication		
(4) a lot			
(5) very much			

The population under study is comprised of two different perspectives. One based on a scientific experiment and another marked by common sense: 1 | experts (architects and designers); 2 | non-experts (traders and ordinary citizens).

The reason to consider these different groups is due to the fact that decisions about the visual quality of urban signscapes are generally taken by experts. Unfortunately, research, however, indicates that the environmental preferences of experts differ from that of non-experts (Groat, 1982).

The first facet related to the referent of experience, *contrast*, is a variable of the coherence whose internal elements are directly regulated by the mechanisms of sign ordinances on the signscape: 1 | size; 2 | color. The second facet, *complexity*, had its internal composition defined by variations which also suffer from the restrictions of these mechanisms: 1 | format; 2 | location (height and centrality in the facade); 3 | direction (parallel, perpendicular and detached from the facade).

The third facet defines the *intensity* of focus of the experience, whose content modulates the elements related of the experience (contrast and complexity) on a scale or order of three degrees: 1 | minimum; 2 | moderate; 3 | maximum.

In the context of the modulation of contrast and complexity in relation to the intensity of focus, one signscape with minimum contrast has smaller signs and neutral colors. The signscape with maximum contrast has bigger signs and intense colors. The signscape with moderate contrast has signs with medium size and less intense color. The signscape with minimum complexity has signs with the same format, mounted in the same location and direction. The signscape with maximum complexity has different signs in all these attributes. The signscape with moderate complexity shows a medium variation in format, location and direction of the signs, but in a smaller variation than those with maximum complexity.

As part of the definition of the facet level of experience, we chose not to designate signscape as a single spatial unit. Within this logic, subdivided into two elements, a facet of the level of experience in this research takes into account spatial and cultural interaction in relation to the *proximity* of respondents, and others more distant, being respectively scenes: 1 | national; 2 | international.

The next step is to provide information on the range of possible answers we obtained from the participants. This rationale is common to all facets and therefore the question is posed by the mapping sentence (Table 1). We considered a range of five intervals: 1 | nothing; 2 | a little; 3 | more or less; 4 | a lot; 5 | very much.

The perceived visual quality of the informative nature of urban signscapes is associated with the ease of finding the places, the persuasive nature is related to the possibility of motivating desires to purchase, and the seductive nature of urban signscapes is linked to the ease of awakening the desire to visit them. From the foregoing, respondents are asked to indicate the degree to which several urban signscapes facilitates their purpose of finding places, shopping, and visiting it.

From the mapping sentence of the evaluation of urban signscape (Table 1), the elements of the facets of content (contrast, complexity, intensity, proximity) can be organized as a combination of mathematical analysis, yielding 36 different sets (ct2 x cp3 x i3 x p2), which convey a relationship or specific situation.

The mapping sentence, as an initial reference of the research, will be analyzed in relation to empirical results which should confirm or refute this structure. After the interpretation of the data, sufficient information should have been gathered to build a new sentence as a direct result of the empirical results.

4. Methodological Issues

4.1. Instrument for data collection

The Multiple Sorting Procedure as an instrument for data collection was employed. In order to classify the data, a set of color photographs of real scenes of urban signscapes with various visual qualities were used to act as a stimulus. The structure of this research uses three directed classifications which always required additional explanations from the participant.

The generation of this set of photographs is directly related to the variables of this research, all listed in the mapping sentence of the assessment urban signscape. As the mapping sentence (Table 1) generated 36 different classifications, the number of stimulus elements also amounted to 36 colored photos of real urban signscapes, all of which portray how the elements of the facets are related.

4.2. Definition of the sample

With regards to the two groups surveyed, experts and non-experts, we started from the premise that their assessments of urban signscape vary

according to the physical components that define their image, and that these same components act on them differently because of different experiences and technical knowledge, though the actual image of urban signscape can still be agreed upon.

The research sampled the participants from the population of the Metropolitan Region of Recife, State of Pernambuco, Brazil. Initially, an exact number for sampling was not established because this survey would be a non-probabilistic sample. In the end, 68 participants were surveyed and the ratings were divided into four groups with an equal number of subjects. One group was formed of 17 architects and 17 designers, who can be considered experts in signscapes. The other group was made up of 17 residents and 17 merchants who were non-experts. From this equivalence, we sought to maintain the internal balance between the number of experts and non-experts, as well as within groups, to enhance the degree of consistency in the results.

4.3. Instrument for data analysis

The choice of methods of analysis took into account the qualitative nature of the data generated by the three addressed classifications. Given this purpose, the data from this study were analyzed using the non-metric multidimensional procedure of SSA, performed with the aid of the computer program HUDAP (Hebrew University Data Analysis Package), developed by Amar & Toledano in 1994.

5. Results

The analysis and findings of the results of the SSA are discussed together. The data obtained from the 68 participants addresses the classifications related to perceived visual quality of the informative, persuasive and seductive urban signscape features.

5.1. The informative nature of urban signscape

Of the four facets considered in the initial hypothesis of this study, only those associated with focus and level of experience, intensity and proximity, were consistent in assessing the informative nature of urban signscape. The absence of a known order or standard division between internal elements of the facets of reference of experience – contrast and complexity – is at odds with the hypothesis initially formulated in this research by revealing that both did not influence the assessment of the informative nature of urban signscape, this conforms to the results of the test on these two facets presented in the SSA diagram of this nature.

Figure 1, is the combination of the intensity facet with the proximity facet, and shows the two dimensional representation of a three-dimensional solution obtained from the SSA to the informative nature of signscape.
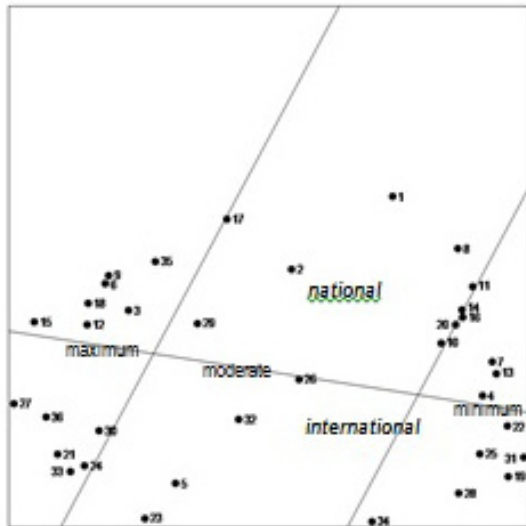

Fig. 1. Diagram INTENSITY and PROXIMITY Facets (Informative Nature)

Dimension 3. Axis 1 versus Axis 2 – C.o.A = 0.10

When exploring the facet *intensity*, we note that the groups have identified this category and formed regions of contiguity consistent with the hierarchical order initially considered. Two lines divide the space into three

distinct regions. It is an aspect which plays a clear axial role, where this set of parallel lines gives rise to ordered bands, indicating that its elements vary in a gradual order. The divided pattern indicates the strong influence of the intensity component in assessing the perceived visual quality on informative nature of urban signscape. The elements along the first track to the right of the diagram were taken as suggesting the initial hypothesis because they were seen as scenes with *minimum* contrast and complexity. This conforms to the sum of the scores assigned by participants to signscapes in this subcategory, this being the most informative band, with scene number 01 (Figure 2a) being the most informative signscape. The second track, concentrating urban signscapes with *moderate* contrast and complexity, has spread over the items and has the lowest correlations. This means that *moderate* intensity is more difficult to grasp than the extreme subcategories - minimum and maximum - in assessing the informative nature of urban signscapes. The third track, with scenes of the *maximum* intensity of contrast and complexity, are clearly defined. By adding up the scores attributed to urban signscapes during the directed classifications, this is the least informative of the three, and item number 30 (Figure 2b) was identified by respondents as the least informative urban signscape.

Signscape 01   ct1 cp1 i1 p1
Figure 2a | Signscape MOST informative
Source | Author's archive

Signscape 30   ct2 cp1 i3 p2
Figure 2b | Signscape LEAST informative
Source | Google Earth

When analyzing the *proximity* facet, it is interesting to note the formation of two regions of contiguous space at the level of experience with the *national* criteria being in the top half of the projection and *international* at the bottom, indicating that the groups recognize the different proximities, this conforms to the initial hypotheses of this research, although without having a hierarchical order between them. Regarding the pattern of division,

proximity plays a polar role in that almost all urban signscapes that relate to one of its components occupy a single sector in the diagram (Figure 1), divided by a diagonal.

5.2. The persuasive nature of urban signscape

Similarly to previous results, in the four categories of the content considered in the initial evaluation of the hypothesis, only the facets of focus, *intensity*, and level of experience, *proximity*, were consistent in the assessment of persuasive nature of urban signscape. The other two facets of the referent of experience, *contrast* and *complexity*, considered in the initial hypothesis of this research, summarized through the mapping sentence (Table 1), have proved to be inconsistent.

Figure 3, presenting the combination of the *intensity* facet with the facet *proximity*, shows the two dimensional representation of a three-dimensional solution from the SSA, and refers to the persuasive nature of urban signscape.
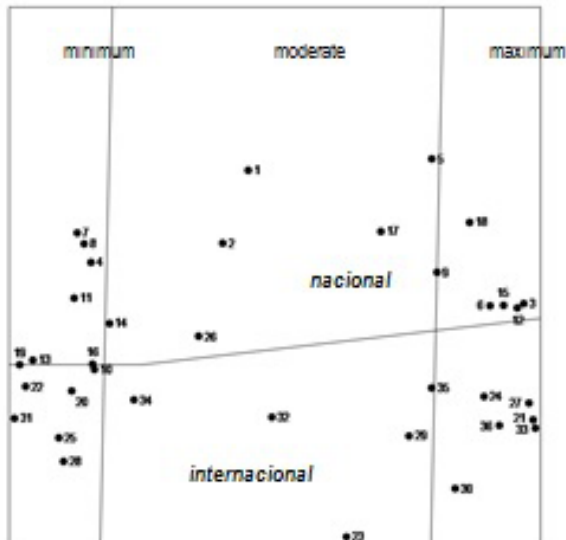

Fig. 3. Diagram of the INTENSITY and PROXIMITY Facets (Persuasive Nature)
Dimension Axis 1 versus Axis 2 – C.o.A = 0.11

The divided pattern of the *intensity* facet, despite revealing some exceptions, indicates that the groups addressed recognized the category and thereby formed contiguous regions. They also made a distinction between the coherent intensity scales - *minimal, moderate, maximum* - raised in the construction of the initial hypothesis of its content. In line with the previous result, the urban signscapes at the end regions of the diagram were more correlated than the central region, indicating that the minimum and maximum variations are captured more easily than the moderate. This pattern indicates the strong influence of this aspect in assessing the visual quality of the persuasive nature of urban signscapes, especially in view of the groups consulted because it is a facet with an axial role. In this type of partition, elements manifest themselves in linear succession, separated by parallel lines, and lacking in relationships with other facets of the mapping sentence. The diagram of the intensity facet, similar to the case of informative nature, describes two parallel lines which divide the space into three multidimensional regions, starting and assuming a direction from the left side of the SSA map, and all relating to the intensity scale - *minimal, moderate, maximum* - considered in the construction of the initial hypothesis. The first region has urban signscapes with *minimum* intensity of contrast and complexity. This conforms the scores assigned by participants to urban signscapes in this subcategory, and similar to informative nature of communication, this being the most persuasive band. Scene number 13 (Figure 4a) was recorded as the one which most facilitates the purchasing desire of research participants. It was found, according to the results, there are two different ways to capture the visual components of urban signscape in persuasive communication, those being integrated and isolated. It was also found that other environmental features, disregarded in the initial hypothesis of this research, also favor persuasion, for example, local parking, storefronts, and uncluttered streets. The second intensity facet region, brings together elements with *moderate* variation of contrast and complexity, and as in the previous result, shows items more scattered than in the extreme ranges. This means urban signscapes have the lowest correlation with the average in other regions, indicating that intensity has been more difficult to grasp in the persuasive communication. The region of *maximum* intensity of contrast and complexity, to the right of the SSA diagram, in the view of the groups, was found to be less persuasive. Scene number 03 (Figure 4b), according to their scores, was taken as the least persuasive.

Figure 4a | Signscape MOST Persuasive Source | Author's archive

Figure 4a | Signscape MOST Persuasive Source | Author's archive

In the diagram, the facet level of the referent, *proximity,* concerns spatial experience with the scenes observed, and the formation of two contiguous regions, *national* and *international*, were observed at the top and bottom of the projection respectively. The pattern of the division plays a polar role, in that the participants recognize the differences in spatial proximity within the observed scene, which accords with initial hypotheses. However, these two differences do not have a hierarchical relationship.

5.3. The seductive nature of urban signscape

The results of the SSA for evaluating the perceived visual quality of the seductive nature of urban signscape will again display the same focus and level of experience facets, *intensity* and *proximity* functioning as regional hypotheses. The other two facets of the referent of experience, *contrast* and *complexity* once again fail to deliver effectively as a condition, both being inconsistent in evaluating the perceived visual quality of the seductive nature of urban signscape.

Figure 5, while simultaneously representing contiguous regions of *intensity and proximity* facets, presents the two categories that formed hypotheses for the regional assessment model defined by the mapping sentence (Table 1).
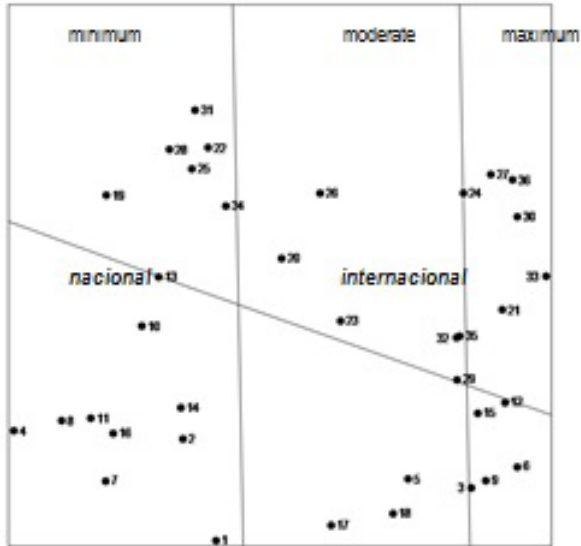
Fig. 5. Diagram of the INTENSITY and PROXIMITY Facets (Appreciative Nature)
Dimension 3. Axis 1 versus Axis 2 – C.o.A = 0.12

Exploiting the results of the *intensity* facet by referring to the degree of contrast and complexity in urban signscape, it appears that both the selected groups addressed this category as distinctions made between the hierarchical scales - *minimal, moderate, maximum* - contemplated in the initial hypothesis. This facet has two parallel lines which divide the space into three bands ordered from right to left, each representing a subset of its contents. The axial role is clearly reinforced by being an ordered facet. This pattern deserves special attention as it demonstrates the strong influence of this aspect in assessing the perceived visual quality of the seductive nature of urban signscapes in the view of the groups. The first tracks on the left were taken as suggesting the initial hypothesis because they were seen as scenes with *minimum* intensity of contrast and complexity. The scenes of the second track or the central region were understood as related to *moderate* intensity. The last tracks on the right were taken as those with *maximum* intensity. The urban signscapes are closer in extreme ranges and more dispersed in the center, indicating that the subtleties of appreciative nature were also more difficult to understand in moderate

intensities than in the minimum and maximum contrast and complexity scenes. Considering the scores for the three subset urban signscapes of the intensity facet, participants in this research visualize the minimum intensity as the most appreciated in assessing the perceived visual quality of the seductive nature of urban signscape. Indeed, scene number 13 (Figure 6a), was the most prized of all. This result confirms the stability of the preference for consistency in landscapes, as presented in this article's theoretical discussion, since reducing the contrast in the environment increases coherence, beyond the hedonic tone (pleasantness or beauty). The hedonic tone, as it relates to the appreciative nature of urban signscape, tends to be greater for moderate diversity, given that minimal diversity is dull and unpleasant, and is therefore already very stressful. Thus, as the moderate level of complexity, by definition, is regarded as the more pleasant, it is confirmed as being more inconsistent in nature. The second track of this projection also indicating the second intensity that research participants have in mind when evaluating the perceived quality of the seductive communication of urban signscape, which is moderate. In this central range, and similar to previous results related to the informative and persuasive natures of urban signscape, items show up as very scattered, unlike those located at the extreme ranges. Thus, moderate contrast and complexity in urban signscapes again proved more difficult to be recognized by the groups consulted than the minimum and maximum in the evaluation of seductive communication. Moreover, six scenes within this band (05, 08, 11, 29, 32, 35) are located outside, thus indicating the difficulty. The last right hand column includes those urban signscapes which are less appreciated, according to the scores assigned to the scenes of this subset of maximum intensity of contrast and complexity. Urban signscape number 06 (Figure 6b), still based on the same data, was classified as being less appreciative

Signscape 13   ct2 cp2 i1 p1
Figure 6a | Signscape MOST
Seductive Source | Author's archive

Signscape 06ct1   cp2 i3 p1
Figure 6b | Signscape LEAST
Seductive Source | Author's archive

As envisioned, the elements of the *proximity* facet, which are similar to other natures of urban signscape, play a polarizing role that partitions the geometric space (Figure 5) into two sectors, although without a hierarchical order between them. Each region of similarity corresponds to a field of spatial experience, with the *national* projection being at the bottom and the *international* projection on top, identified by the groups according to the initial hypotheses presented in the mapping sentence (Table 1). The consistency of this facet in evaluating the perceived visual quality of the seductive nature of urban signscapes is thus proven.

6. Conclusions

Through the SSA, used to evaluate the perceived visual quality of the informative, persuasive and seductive natures of signscape, the initial hypothesis was partially confirmed as the facets that were imagined as being influential in the internal composition of the evaluation model of urban signscapes (Table 1) were in evident in the conceptual constructs selected as the internal elements of some of these facets.

The examination of the facets on the diagram of SSA highlighted consistent categories in the evaluation of urban signscape according to the groups and outlined how these categories operate in this type of trial. This procedure is essential because the regional assumptions built up by Shye, Elizur and Hoffman (1994), once confirmed, establish a relatively stable concept under study, giving it consistency, as well as revealing the internal structure

of categories that can provide an insight into their empirically verifiable components and how these components interrelate.

Thus, of the four facets tested only two were consistent for evaluating the perceived visual quality of urban signscape, *intensity* and proximity, when related to its natures. This study shows the existence of a hierarchical order between the internal elements of intensity facet (*minimum*, moderate, *maximun*). It was found that some signs are identified separately within urban signscape to promote persuasion. Regarding the *proximity* facet, the qualitative differences between the space experiments with the scenes under observation (*national, international*) were recognized by the respondents, although no hierarchical implications were identified.

As a direct consequence of the empirical results, which contradicted some of the initial hypotheses, the two facets of the referent of experience, *contrast* and *complexity*, were excluded and were included in the internal structure of a single facet, features, giving rise to a new general structural sentence to evaluate the urban signscape:

the observer (**expert** | **non- expert**) evaluated the signscape with features of

FEATURES – F		INTENSITY – I
F1 contrast		I1 minimum
F2 complexity	varying with an intensity	I2 moderate
		I3 maximum
	PROXIMITY – P	
and experienced in scenes	P1 nacional	facilitates ⟶
	P2 international	

COMMOM RANGE	
(1) nothing	
(2) a little	
(3) more or less	the visual quality of its informative, persuasive and seductive natures
(4) a lot	of communication
(5) very much	

This reformulation reinforces the concept of urban signscape in that it takes as its focus the contrast (size, color) and complexity (format, location, direction) of its signs and reduces the number of different elements of the stimulus for data collection from 36 to 12 (2f x 3i x 2p). A formulation of these new hypotheses, however, needs to be evaluated in future empirical studies which should confirm or refute this new structure.

The SSA also enables us to compare the profile of the four sub-groups of experts and non-experts participating in this research. Another aspect of the research not presented in the current paper is that the profile of the ordinary citizens – being more influenced by the intensity of maximum contrast and complexity – diverge from the profiles of traders, architects and designers, who are influenced by moderate and minimal intensity when evaluating the visual quality of informative and seductive natures of urban signscape, and by the three intensities of contrast and complexity (minimum, moderate, maximum) when focusing on persuasive communication. Such a result breaks the paradigm of the ideal aesthetic of minimum intensity of contrast and complexity formulated in sign ordinances to control the urban signscapes.

The results presented in this paper, obtained by SSA with the aid of the computer program HUDAP, are a tribute to the power of this multidimensional technique, particularly to Facet Theory, which uses means to identify relevant relational patterns in multivariate complex phenomena, and identifies structures and similarities impossible to be fully achieved through other techniques.

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