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Article Title: Do Children Accurately Estimate Their Performance of Fundamental Movement Skills?

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Abstract

An inaccurate perception of motor competence might compromise the engagement of children in physical activities and might be a problem in terms of safety in physical education classes or at playgrounds. The relationship between estimation and actual performance in children with different levels of performance in Fundamental Movement Skills (FMS) was analyzed. Three hundred and three children (aged 6 to 10 years) were ranked according to their performance in FMS tasks: jumping, kicking, throwing, and walking backwards (WB) on a balance beam. Tertiles were created for each task according to children's performance. Prior to performing the tasks children estimated their maximum performance. Absolute percent errors (*i.e.*, deviation percentage from accurate estimations), and error tendency (*i.e.*, frequency of underestimations, right judgments, or overestimations) were calculated. All performance groups tended to overestimate their skills at all tasks, except for the upper tertile group at the WB task (underestimation tendency). After controlling for age, children in the lower tertiles were consistently less accurate than children in the upper tertiles, exhibiting greater absolute percent errors for all the tasks. The overestimation tendency that was found might positively influence children's engagement in physical activities, but unrealistic estimations might be a problem in terms of safety.

Key words: children; motor competence; motor abilities; perception.

Introduction

In order to achieve proficiency in complex motor skills, such as specialized movements employed in sport activities, children must master different Fundamental Movement Skills (FMS). These movements are commonly categorized into locomotor (*e.g.*, jumping, hopping), manipulative (*e.g.*, throwing, kicking), and stability (*e.g.*, balancing, twisting) skills, and typically follow a developmental sequence from an immature to a more mature stage (Gallahue, Ozmun, Goodway, 2014). The developmental sequence for FMS during childhood is not only dependent upon biological and neuromuscular maturation, but it is also influenced by the interaction of environmental factors, opportunities and experiences, encouragement, and instruction (Gallahue, Ozmun, Goodway, 2014). Mastering FMS and achieving higher levels of motor competence is not only important for an adequate participation in organized physical activities but also for the adoption of active lifestyles. Motor competence develops rapidly if children have opportunities for practice, positive encouragement, and quality individualized instruction (Gallahue, & Cleland-Donnelly, 2007). Motor competence is a global term that reflects several nomenclatures such as motor performance, fundamental movement/motor skills, and motor coordination (Robinson et al., 2015).

Stodden and colleagues (2008) proposed a conceptual model to explain the reciprocal and developmentally dynamic relationship between motor competence and physical activity. According to this model, motor competence drives physical activity levels, because higher levels of motor skill development during middle and late childhood will offer greater opportunities for children to engage in different physical activities and sports. However, some mediating variables, such as perceived motor competence and health-related physical fitness, might interact with the dynamic relationship between motor competence and physical activity, leading to positive or negative spirals of engagement. For example, if low-skilled children perceive themselves as having little motor competence, they will probably choose not to engage in physical activity and ultimately will be at greater risk of being obese and sedentary during adolescence and adulthood. Many studies have shown that actual and perceived motor competence are related (*e.g.*, Khodaverdi, Bahram, Stodden, & Kazemnejad, 2016; De Meester et al., 2016), while others have demonstrated relations among physical fitness, low competence in FMS (*e.g.,* Hardy, Reinten-Reynolds, Espinel, Zask, & Okely, 2012), and being overweight or obese (Gill, & Hung, 2012, 2014; Hardy, Reinten-Reynolds, Espinel, Zask, & Okely, 2012).

Perceived motor competence has been studied as a psychological construct (Harter, 1978, 1982) and different scales, based on self-reported measures, have been used to assess the perceived physical competence of children and adolescents (*e.g.,* Fox, & Corbin, 1989; Harter, 1982; Harter, & Pike, 1984; Pérez, & Sanz, 2005), providing a profile of the child's perceived physical competence or physical self-concept, based on how well they think they play sports. The scales assess the perception of physical or motor competence, discriminating between children with low and high-perceived competence. These measures indicate that children under the age of 8 often relate competence to effort and persistence, overestimating frequently their actual level of motor competence (*e.g.*, Harter, & Pike, 1984), even if they often have low motor competence, which might be positive for their engagement in physical activities according to Stodden's model. It should be noted, however, that, as mentioned before, within Harter's theory, the measure of perceived physical competence is not obtained directly by doing the physical task. In fact, some recent research examining the association between real and perceived movement skill competence used the same tasks to evaluate perceived and actual competence (Barnett et al., 2016; Barnett, Ridgers, & Salmon, 2014; Barnett, Ridgers, Zask, & Salmon, 2015; Barnett, Robinson, Webster, & Ridgers, 2015; Liong, Ridgers, & Barnett, 2015). However, the measures in these studies were based on selfreport items in which children discriminated between good and poor skill performance, reporting how good they think they would be in a certain motor skill by choosing between pictorial alternatives, but not giving an accurate estimation of their capabilities (*e.g.*, "I can jump this far").

Much of the work examining the direct link between perceived and actual action capabilities has been motivated by Gibson's ecological approach to perception (Gibson, 1977, 1979). A central concept of Gibson's theory of direct perception is *affordances*. *Affordances* are possibilities for action and are based on an individual's ability to make a match between their own capabilities and the environment. Learning to detect the information that specifies this relationship is a form of perceptual learning (Gibson & Pick, 2000) and it is a continuous process along development, since *affordances* change as a child grows and acquires new skills. Different studies indicate that, from early ages, experience is important to refine the perception of *affordances* (*e.g.*, Adolph, Eppler, & Gibson, 1993; Campos et al., 2000; Burnay & Cordovil, 2016). In addition, studies with children and adults show that there are developmental changes in the ability to perceive *affordances* (*e.g.*, Klevberg & Anderson, 2002; Plumert, 1995). Research conducted within the framework of the ecological approach has mainly focused on estimations of action capabilities or affordances for familiar actions. The concern has been whether these estimations are accurate or whether they over- or underestimate capabilities.

One previous study (Gabbard, Caçola, & Cordova, 2009) with 7-9 and 11 year-old children examined the relationship between the estimation of reachability and perceived motor competence. The authors hypothesized that children with high-perceived motor competence (measured with Harter and Pike's scale) would exhibit greater overestimation (assessed by an experimental paradigm), and that younger children would display greater overestimation bias. The results confirmed the overestimation bias for each age group, with the 7-year-old group scoring significantly higher on perceived motor competence. However, the findings indicated that overestimation bias was not significantly associated with level of general perceived motor competence, leading the authors to suggest that the perceived motor competence, as a general measure based on a psychological construct, may "*not reflect the intentions or real motor abilities*" (Gabbard, Caçola, & Cordova, 2009, pg.156). So, more studies "*tied to context-specific measures of perceived abilities in relation to the specificity of the task*" (pg. 157) were recommended. However, literature studies assessing children's real and perceived motor competence using the same skills, are scarce. Studies with more discriminative tasks are needed to better understand the association between real and estimated motor competence.

There is compelling evidence that children make inaccurate estimations of their competences. The lack of accuracy reflects a general tendency to overestimate action capabilities (*e.g.*, Plumert, 1995). The overestimation of motor capabilities, that has been reported to occur in different studies, might be good to stimulate attempts, effort and persistence, but it might also pose a problem in terms of child safety. For example, children might risk jumping impossible gaps if they are confident that they can jump farther than they actually can. The outcome of that behavior will probably be an injury.

The overestimation of motor capabilities has been reported to occur more frequently in younger ages (Harter, 1982; Harter, & Pike, 1984) and in boys (Carroll, & Loumidis, 2001; Harter, 1982; Raudsepp, & Liblik, 2002; Robinson, 2011) but, to our knowledge, the influence of the performance level of the child on the accuracy of his or her perceptual judgment has not yet been thoroughly investigated.

In the present study, we investigated the relationship between how children estimated their performance on specific FMS tasks and how they actually performed those same FMS tasks. It was hypothesized that for each task, less competent children would present a greater overestimation tendency and be less accurate in estimating their actual performance than more competent children.

Materials and Methods

Participants

Three hundred and three children between the ages of 6.48 and 10.93 (*M*= 8.63 years; *SD*=1.16) participated in this study. None of the children presented development difficulties or learning disabilities, and all attended age-appropriate classes. The initial sample was divided in tertiles for each task, considering the children's level of performance in that specific FMS task. A local ethics committee approval was attained, written informed consent was obtained from the parents and verbal agreement from the children.

Procedures

Each child was assessed individually in school physical education classes for actual performance and perception. Children were asked to predict their maximum distance for: standing long jump, throwing and kicking, and walking backwards on a balance beam, prior to performing those tasks.

Measures

Standing long jump

The standing long jump (SLJ) performance was measured following standard procedures (Chung, Chong, & Chung, 2013; Gontarev, Zivkovic, Velickovska, & Naumovski, 2014). The child was instructed to jump as far as possible from a standing start with feet slightly apart. The test was performed twice and the best of the 2 attempts (measured in cm) was used for analysis. Before performing the standing long jump, the child was asked to estimate his/her maximum jumping distance. During this estimation, the participant stood behind a line, while the evaluator starting at the feet of the child, slowly and steadily unraveled a measuring tape until the child told her to stop, indicating the maximum estimated distance of jump. The child was allowed to make fine adjustments after the order to stop if he/she found it necessary. The task was conducted in a uniform floor with no marks that could help the child to memorize the estimated location (see Almeida, Luz, Martins, & Cordovil, 2016).

Throwing and kicking

For the throwing condition, a mini soccer goal (120 cm × 80 cm) was placed 1 m above the floor on a table, and a softball was used. For the kicking condition, the mini soccer goal was placed on the floor, and a size 4 soccer ball was used. The floor was marked every 2 m, from 2 m to 20 m away from goal. In both tasks, the child stood upright in front of the goal and behind the 20 m line. From this position, the child was asked to go to the mark that he/she estimated to be the maximum distance to successfully throw/kick the ball into to the mini soccer goal. This distance was registered as the child's estimation. After that, the evaluator asked the child to throw/ kick the ball into the target. If the child succeeded, he/she was asked to throw/kick from a farther line. This procedure was repeated until the child failed to hit the target. When the child failed (in any throw/kick position), he/she was asked to throw/kick from a closer line. This procedure was repeated until the child succeeded. The final successful position was the real distance recorded (see Almeida, Luz, Martins, & Cordovil, 2016).

Walking backwards on a balance beam

Participants also performed a balance task in which they walked backwards along a balance beam, 4.5 cm wide, 3 cm high, and 3 m long, without stepping off the beam. Children estimated how far they could walk backwards before performing the task. Once the participants indicated they understood the procedure, the estimation judgment was collected.

The observer asked the children to estimate the farthest distance they could walk backwards before performing the task. The observer slowly unraveled a measuring tape until the child told her to stop. This measurement corresponded to child's estimated maximum walking backwards. The child was allowed to fine-tune the measurement until she/he was satisfied. The estimation task was performed from the starting position in the standing front upright posture, after which the child turned and performed the real action backwards. The task was performed twice and the best score (measured in cm) was used for analysis (see Almeida, Luz, Martins, & Cordovil, 2016).

Data collection and analysis

Absolute percent error (APE) and error tendency (ET) of the jumping, kicking, throwing, and walking backward tasks were analyzed. These measures were calculated according to Cordovil and Barreiros (*c.f.*, Cordovil & Barreiros, 2011). Absolute percent error (|1- estimation/real performance| × 100) is the amount of judgment error expressed as percentage of the real performance. Absolute percent error measures the error magnitude but not the under or overestimation bias. Error tendency (*i.e.*, frequency of overestimation, accuracy, and underestimation bias) indicates the direction of the error. For the jumping and walking backwards tasks, a ± 12 cm error was allowed for estimations to be considered accurate. This value was settled by taking the average variability of the standing long jump data, and the children's foot size as *criteria.* Considering this, an overestimation occurred when the estimation was more than 12 cm above that of the real performance and an underestimation occurred when the estimation was less than 12 cm from the real performance.

Descriptive statistics (mean and standard deviation) were calculated for the estimation, performance and error variables in each task. Error Tendency was analyzed through frequency distributions and chi square tests (χ^2). A pearson correlation was conducted for the whole sample to examine associations between children's estimations and their real motor performance. A simple linear regression was computed for significant associations, to predict real competence based on estimation, that is, the degree to which estimation predicts the real motor performance. Thus, estimated competence was considered as the predictor variable (independent) and the outcome (dependent variable) as the real performance. The sample was divided into tertiles to allow for comparisons among children who performed at an average level, below average, and above average. Considering children's performance level, for each task a one-way ANCOVA was conducted to determine possible statistical significant differences between the performance levels on accuracy (APE), controlling for age. The Bonferroni adjustment was used to analyze post-hoc results. The level of significance for statistical analyses was set at $p<.05$. Data analyses were conducted using SPSS (version 21).

Results

Results are summarized in Table 1, which presents the groups' mean estimation, mean real performance, and mean Absolute Percent Error (|1- estimation/real performance| × 100), for the motor tasks, among FMS groups.

Estimation and real performance for fundamental movement skills for the whole sample

Children's estimations and real performances were found to be significantly and positively associated for the four tasks. The association is weak for the standing long jump (r=.37, p<.001) and walking backwards (r=.37 p<.001), and moderate for the throwing (r=.52, p<.001) and kicking (r=.60, p<.001).

Results of the simple regression analyses *for the whole sample* are as follows:

(i) Children's estimated standing long jump significantly predicted real SLJ skill (b=.28, β=.37, t= 6.86, p<.001) accounting for 13.5% of the adjusted variance (R^2=.135, F(1,301)=47.05, p<.001); ii) children's estimated throwing significantly predicted real throwing skill (b=.41, β=. 52, t= 10.66, p<.001), accounting for 27.4% of the adjusted variance (R^2=.274, F(1,301)=113.63, p<.001); iii) children's estimated kicking significantly predicted their real kicking skill (b=.57, β=.60, t=13.02, p<.001) and accounted 36% of the adjusted variance (R^2=.360, F(1,301)=169.55, p<.001); iv) children's estimated walking backwards significantly predicted their real walking backwards skill (b=.50, β=.36, t=6.80, p<.001) and accounted 13.3% of the adjusted variance (R^2=.133, F(1,301)=46.22, p<.001).

Magnitude of error: absolute percent error

ANCOVAs on the three groups of children indicated that there were significant differences between the performance levels for the 4 tasks, after controlling for age. Children with lower scores had greater APE than children with better scores in the standing long jump task (F(2,299) = 28.50, p<.001, η_p^2=.160); in the walking backwards task (F(2,299) = 112.91, p<.001, η_p^2=.430); in the throwing task (F(2,299) = 137.82, p<.001, η_p^2= .480); and in the kicking task (F(2,299) = 54.36, p<.001, η_p^2=.267). Children in the 1st tertile displayed greater absolute percent errors than their peers in the 2nd and 3rd tertiles (see Table 1). This difference is statistically significant for all performance groups, except for the jumping and kicking tasks, between 2nd and 3rd tertiles (see Figure 1). The amount of errors expressed in percentage (APE) tend to diminish from the 1st to the 3rd tertile, that is, children with high motor performance tended to exhibit smaller errors that their peers with low performance.

Error tendency

Results concerning the percentages of error tendency among FMS groups are depicted in Table 2. Significant associations were found between error tendency and children's tertiles in each task: jumping (χ^2(4)=21.23, p<.001), throwing (χ^2(4)=73.07, p<.001), kicking (χ^2(4)=84.62, p<.001) and walking backwards (χ^2(4)=170.41, p<.001). The number of accurate estimations and underestimations tends to increase from the 1st to the 3rd tertile and the amount of overestimations tends to diminish. Children with low motor performance (1st tertile of each task) did not underestimate their performance except for the jumping task, and exhibited great frequencies of overestimations (>70% for all tasks). Children in general overestimated their performance in every task, except for the most proficient children (3rd tertile) that had 64% of underestimations in the walking backwards task. Generally, the more proficient children had greater frequencies of accurate estimations than the other groups (except for the kicking task where 2nd tertile children had the greater frequency of accurate estimations).

Discussion

Perceived motor competence has been suggested as a mediating variable for the engagement and persistence in different physical activities and sports, which are important contributors to children's motor development (Harter, 1978, 1999; Stodden at al., 2008). This variable has also been considered a key for participation in sports, especially when participants have a low level of performance (De Meester, et al., 2016). However, to our knowledge, the relationship between motor performance level and estimated motor competence, where the estimated performance exactly matches the assessment of actual skill, has not been fully explored in the literature. Most studies assess the perceived competence based on self-reported questionnaires (*e.g.*, Khodaverdi, Bahram, Stodden, & Kazemnejad, 2016; Weiss, & Amorose, 2005) and identify profiles (*e.g.*, De Meester, et al., 2016) of actual and perceived motor competence (and other outcomes).

This study investigated the relationship between estimation and real performance in children with different levels of motor competence or performance, obtained by their actual performance on the same estimated tasks, that is, whether children's estimations of their performance, were related to their performance levels.

According to our results, children with high competence tend to be more accurate (lower APE) when predicting their motor performance than children with low competence, after controlling for age. These findings suggest that more competent children have a better perception of their possibilities for action, or affordances and are in line with our initial predictions. Although the perception of affordances is a direct process (i.e., not mediated via cognitive representations), experience is needed for perceptual learning. Children need to perceive the relationship between the environment and their own capabilities and that process implies differentiating, selecting and extracting information that is present but that is not always easy to detect (E. Gibson, 2003). While experience and performance level are not the same thing, they are usually correlated (especially if the age bias is removed), since practice is necessary to improve skills. We can speculate that low competence children had fewer opportunities for "educating attention" (J. J. Gibson, 1979, p. 250) than more competent children. Children with greater motor competence may have more opportunities to participate in a greater variety of motor activities, which may result in a greater ability to accurately estimate their action capabilities. These findings are in agreement with other studies that found that children with motor disorders (assessed by M-ABC) are less able to detect changes in their action capabilities (Johnson, & Wade, 2009), being more likely to make inaccurate judgments (Johnson, & Wade, 2007). The ability to make an accurate estimate of one's motor abilities seems to be task specific, as can be seen by the levels of accuracy for the different tasks. Familiarity with the task is likely an important factor because specific experience with each task is necessary to enhance the perceptual learning process. Within this framework, the co-occurrence of low motor performance with greater difficulty in accurately perceiving the limits of action capabilities might be related with the occurrence of negative consequences of unsuccessful actions. Although in some cases experiencing negative actions might provide important information about future actions, informing a child's future perception and fostering learning, it might also be discouraging. The perception of success or failure in an action influences a child's future actions in the environment and possibly even his or her subsequent engagement in different physical activities and sports (Stodden et al., 2008).

Regarding error tendency, our findings also indicated that children in the lowest tertile were more likely to overestimate their abilities when compared to children with high performance. However, conclusions about children's overestimation should be interpreted with caution, because this study only looked at four FMS. For this reason, it is difficult to ascertain if the overestimation tendency in childhood also occurs for other FMS. Previous studies, have shown that children make judgment errors and frequently overestimate their abilities when judging several physical abilities (*e.g.,* Plumert, 1995; Rochat, 1995; Schwebel, & Bounds, 2003). This overestimation tendency can lead to failed action or injury (Plumert, & Schwebel, 1997). On the other hand, underestimation of competence might discourage from engaging in physical activity and sports (De Meester, et al., 2016). The results of the present study were obtained in a secure environment, that is, children of both groups might have high frequency of overestimation due the safe environment provided and the low possibility of injury. The only exception found to the overestimation tendency was for the group of more proficient children in the walking backwards task (greater frequency of underestimations). It is interesting to note that this task had the largest percentage of error among children with low performance. Walking backwards on a balance beam is not a common skill for children to practice in Portugal; at least it is not as common as the other skills tested in this study. It is possible that unfamiliarity with the skill might explain the greater amounts of error and different results regarding error tendency and the greater frequency of underestimations for the high performance group. Children with high performance might have been more conservative in their estimations, acknowledging the lower levels of experience they had in this task.

The results of present study showed that actual and estimated performances are positively correlated and that the estimation significantly predicts the real performance. However, the strength of the association between actual and estimated performance is weak (jumping and walking backwards) to moderate (throwing and kicking). These results are in the line with other studies (*e.g.,* De Meester et al., 2016). Although real performance was correlated with estimation, it could only account for 13.3% of variation for the walking backwards task, 13.5% for the standing long jump task, 27.4% for the throwing task, and 36% for the kicking task. It is to be noted that a high percentage of the variability needs to be accounted for by other variables. It is difficult to directly compare the results to other studies, because researches in this field have not matched assessment of real and estimated skills as we did. On the other hand, existing studies on perceived and actual FMS have looked at gender interactions (Barnett, Ridgers, & Salmon, 2014; Liong, Ridgers, & Barnett, 2015) or time spent in physical activity (Barnett, Ridgers, & Salmon, 2014) using a pictorial instrument to evaluate the perceived skills.

The results of our study support the idea that the motor performance level can influence the ability to accurately perceive the limits of action capabilities and a higher level of performance seems to be related with lower estimation errors. Due to the characteristics of our sample, which did not include children with motor impairments (*e.g.,* Haga, 2008), we did not investigate the differences between estimated and real motor competence along the whole spectrum of motor competence. This is one limitation of the present study, which implies that our findings should not be generalized to children at risk for Developmental Coordination Disorder (DCD). However, since in our sample the less competent children made less accurate judgments than their peers, it seems highly likely that children at risk for DCD would have an even greater inability to accurately perceive their action capabilities. Additional research is needed to further investigate this issue and to explore the possible mediators of the relationship between motor coordination and estimated motor competence. A second limitation relates to our decision not to ask children to make multiple estimations, as has been done in previous studies (*e.g.*, Rochat, 1995). Although children could fine-tune their final answer regarding their action capabilities for each task, multiple estimations would probably have a more accurate determinations of their perceived action limits. Besides the motor performance level, our study did not explore other variables that could explain and mediate the relationship between estimation and actual performance (*e.g.*, time spent doing physical activities). Other possible mediating variables and other FMS tasks, in particular skills that constitute the motor repertoire of childhood, should be investigated in future studies.

Although we consider that a strength of the present study was the use of direct measures of performance matching the estimated tasks, it would also be interesting to investigate if the results would be similar when considering a general construct of motor competence instead of the performance in each task. Ideally, an instrument based on three domains (locomotor, stability, and manipulative) of the theoretical construct of motor competence (*e.g.*, Luz, Rodrigues, Almeida, & Cordovil, 2015) could be used to further investigate this issue.

Conclusions

This study verified that children generally overestimate their action capabilities and those children with low motor performance display larger judgment errors than their peers. These results have important implications for the management and education of children with lower motor competence, who tend to less accurately estimate their motor abilities. Caregivers have an important role in managing environments for children, enabling them to learn about their action limits (Cordovil, Araújo, Pepping, & Barreiros, 2015), but in some cases intervention and rehabilitation programs that provide opportunities for lower motor competence children to improve the perception of their action limits will probably have an important impact in terms of child safety. A more accurate perception of action capabilities will help preventing unintentional injuries that occur during children's participation in sports and during the use of different equipment in physical education classes, at home or in playgrounds.

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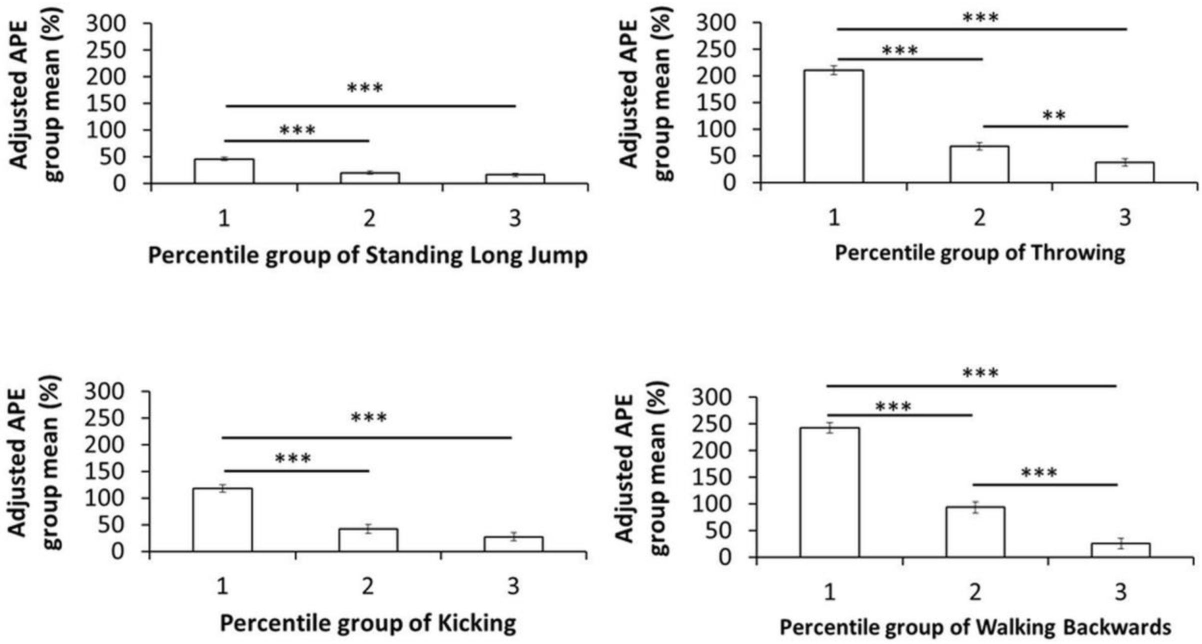

Figure 1. Differences in adjusted means for Absolute Percent Error (APE) in the percentile groups for the Fundamental Movement skills tasks. Error bars represent Std Errors. Covariates in the model were evaluated at age=8.63. Bonferroni adjustment was performed for multiple comparisons. ***p<.001; **p<.01.

Table 1 – Descriptive statistic (mean and *SD*) for the estimation, real performance, and absolute percent error of the four motor tasks among children of the 1st, 2nd and 3rd tertiles (1T; 2T; 3T) for each motor task.

		N	Estimation (cm)	Real (cm)	Absolute Percent Error (%)
Jumping	1T	99	129.20 ± 38.51	94.46 ± 13.88	44.90 ± 45.59
	2T	103	134.59 ± 26.66	122.17 ± 6.19	19.73 ± 14.51
	3T	101	158.02± 28.21	150.20 ± 13.06	15.70 ± 12.90
Throwing	1T	81	6.17 ± 2.17	2.00 ± 0.00	208.64 ±108.62
	2T	110	6. 71 ± 2.32	4.00 ± 0.00	67.73 ± 58.10
	3T	112	9.38 ± 4.22	7.61 ± 2.29	38.26 ± 46.00
Kicking	1T	127	6.66 ± 2.15	3.34 ± 0.94	117.72 ± 98.10
	2T	76	8.32 ± 3.01	6.0 ± .00	42.10 ± 47.26
	3T	100	10.66 ± 4.56	10.36 ± 3.08	27.21 ± 26.52
Walking backwards	1T	101	158.71 ± 66.70	47.44 ± 9.96	243.50± 150.21
	2T	101	183.77 ± 72.35	112.41 ± 37.60	92.37 ± 80.23
	3T	101	221.06 ± 66.43	273.83 ±35.28	24.28 ± 20.00

Table 2 - Percentages of error tendency in the estimation of the motor tasks among children of the 1st, 2nd and 3rd performance tertiles (1T; 2T; 3T;) for each motor task.

	Jumping			**Throwing**			**Kicking**			**Walking backwards**		
	Under	Ac.	Over	Under	Ac.	Over	Under	Ac.	Over	Under	Ac.	Over
1T	8.08	18.18	73.74	0	3.70	96.30	0	14.17	85.83	0	3.96	96.04
2T	16.50	31.07	52.43	0	17.27	82.73	3.95	36.84	59.21	15.84	5.94	78.22
3T	22.77	34.65	42.57	17.86	33.93	48.21	31.00	31.00	38.00	64.36	23.76	11.88

Note: Under – underestimations; Ac. – accurate estimations; Over – overestimations.