



Annunciation or Adoration? The workshop practice and the hesitations of a Portuguese mannerist painter revealed by infrared reflectography

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Abstract

The examination with infrared reflectography of the *Annunciation* and the *Adoration of the Shepherds*, two panels from a dismembered altarpiece attributed to the mannerist painter Francisco João (doc. 1558–1595), revealed the first documented example in Portuguese painting of the overlapping of two underdrawing layouts, each with a different subject, in a single panel painting. The paintings were examined under visible radiation and infrared reflectography was used to investigate the underdrawing in terms of the materials, graphic layout and function. Results from a previous study on the ground layers and underdrawing materials of these paintings, obtained with the analysis of micro-samples with microscopic and spectroscopic techniques, were used in the context of this research. Infrared images revealed that the underdrawing of the *Annunciation* mostly corresponded to the painted image but that two subjects — *Annunciation* and *Adoration* — were drawn over the prepared surface of the panel depicting the *Adoration*. This discovery is the first example of this procedure in Portuguese painting. The comparison with a third panel attributed to the painter, depicting another version of the *Annunciation*, allowed for the discussion of relevant technical procedures such as the use of cartoons, the responsibility for each main stage of painting creation and the reality of labour conditions in a regional market. The results contributed with material evidence to the scarce information of archival nature about the working methods of Portuguese mannerist painters.

Keywords Infrared reflectography · Underdrawing · Changing composition · Portuguese painting

Introduction

The study of the underdrawing, one of the first hidden stages of creation, is critical to the investigation of Portuguese sixteenth-century painting, a collective and anonymous endeavour where artworks, intended mainly for altarpiece structures, were produced by workshops and partnerships of painters and woodworkers (Serrão 2002). As paintings were rarely signed and little historical documentation about their commission remains, issues regarding the creation

process, management of large-scale artistic enterprises or labour division within a given workshop remain unclear. Originally not meant to be seen, the underdrawing is more likely to uncover the personal graphic language of an individual artist and disclose particular working methods of a given workshop (cf. e.g. Bellucci and Frosinini 2014; Billinge 2015; Bomford 2002; Dubois et al. 2018; Finaldi and Garrido 2006; Turel 2017; Wadum and Scharff 2012). For the moment, underdrawing research in Portugal was mostly achieved through isolated studies of a few paintings by major artists and existing documentation is especially focused on artworks from the first half of the sixteenth century, many part of dismembered altarpieces preserved in national museums (Abrantes and Vandevivere 1994; Caetano 2009; Cruz et al. 2017; Primitivos 2011; Valadas et al. 2016). Very little information exists on paintings belonging to the second half of the century, partly because relevant works are not easily accessible as most still remain in situ, mostly preserved in the Alentejo, southern Portugal.

In the context of an investigation on mannerist painted altarpieces in the Alentejo (1550–1620), the examination

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with infrared reflectography (IRR) of two panel paintings dated circa 1570–1580 and depicting the *Annunciation* and the *Adoration of the Shepherds* (Fig. 1a, b), uncovered an impressive and extensive underdrawing. Both works are attributed on a stylistic basis to the workshop of Francisco João, the most renowned mannerist painter active in southern Portugal between 1558 and 1595 (Melo 2012). With a painted surface of c. 128 cm × 68 cm, the panels belong to a dismembered altarpiece still on display in its original location, in the church of *São Miguel de Machede* (38°38'40.7"N 7°43'43.8"W), in a village near the city of Évora.

This technical study characterizes the underdrawing of these two mannerist paintings in terms of materials and graphic layout, examining the role of the underdrawing in the painting process and establishing its relation with the painted image. The results contribute with material data to the scarce information of archival nature that exists on the working methods of Portuguese mannerist painters (Serrão 1983).

The investigation is based on the visual inspection of the paintings' surface under visible radiation and IRR. Microsamples from these paintings were previously analysed with microscopic and spectroscopic techniques (Melo et al. 2014, 2022) and the results regarding the nature of the preparatory

layers and underdrawing material will be discussed in the context of the present investigation. Additionally, a distinct *Annunciation* (130 cm × 75 cm) attributed the Francisco João and preserved in a private collection, although not directly examined, will assist in the discussion on the use of models and transfer methods (Fig. 1c).

Methods

Underdrawing analysis requires infrared imaging techniques that have the advantage of being non-destructive. Usually, near-infrared radiation (IR) is less absorbed than visible radiation by a paint layer, which is therefore more transparent in the wavelength range between 780 and 2000 nm (Bomford 2002, Gargano et al. 2007, Striova et al. 2020). Consequently, depending on the nature and volumetric concentration of the pigments in each paint layer, and on the thickness and superposition of layers, this low energy radiation may be able to penetrate the visible surface of the painting up to the level of the ground. In this situation, with IRR, it is possible to obtain an image of the underdrawing, which results from the contrast between the reflection of IR radiation in the ground layer made of calcium carbonate or calcium sulphate and



Fig. 1 *Annunciation* (a) and *Adoration of the Shepherds* (b), 128 cm × 68 cm, attrib. Francisco João, c. 1570–1580, Church of S. Miguel de Machede, Évora, Portugal; and *Annunciation*,

130 cm × 75 cm, attrib. Francisco João, private collection, Portugal (c). © H. P. Melo (a, b), HERCULES Lab.; Image (c) used with permission of the owner, J. Cotter

its absorption by the material used in the drawing made on the ground. This occurs when the drawing was made with a carbon-based material, as it is common in fifteenth- and sixteenth-century paintings, but not when a red or ochre colour material (e.g. iron-based compounds) was used, since the latter are transparent to IR radiation. In addition, the visualisation of the underdrawing is also compromised when IR radiation absorbing pigments, such as copper-based pigments (including azurite and verdigris, among others), are part of the paint layers (Bomford 2002).

The underdrawing was recorded in situ using a high-resolution Osiris IRR camera equipped with an InGaAs sensor sensitive to IR up to 1700 nm and an internal filter Schott RG850 that blocks radiation under 850 nm. The Osiris camera creates high-quality 16 megapixels scan images that are the result of the assembly of 64 individual reflectograms. The lens was kept at a relative aperture of f/11. The IRR camera was placed at a 95-cm distance from the paint surface (measured with a laser distance metre) and moved in order to scan the whole surface, creating a total of eight IRR scans/painting. The scans were assembled to form a unique digital image of the underdrawing of each painting using Affinity Photo Software.

Results and discussion

Preparatory layers and underdrawing material

The original panels were prepared with a single white ground layer of *gesso grosso* bound in animal glue (Melo

et al. 2014). In the IR images, the underdrawing of both paintings appears as deep densely dark blackish wide lines with a broken gritty appearance that indicates the use of a dry carbon-rich medium (Fig. 2). Previous analyses regarding the identification of the underdrawing material were inconclusive (Melo et al. 2022). However, considering the date of the paintings and the appearance of the underdrawing lines under IR imaging, a material such as charcoal or black stone was most probably used.

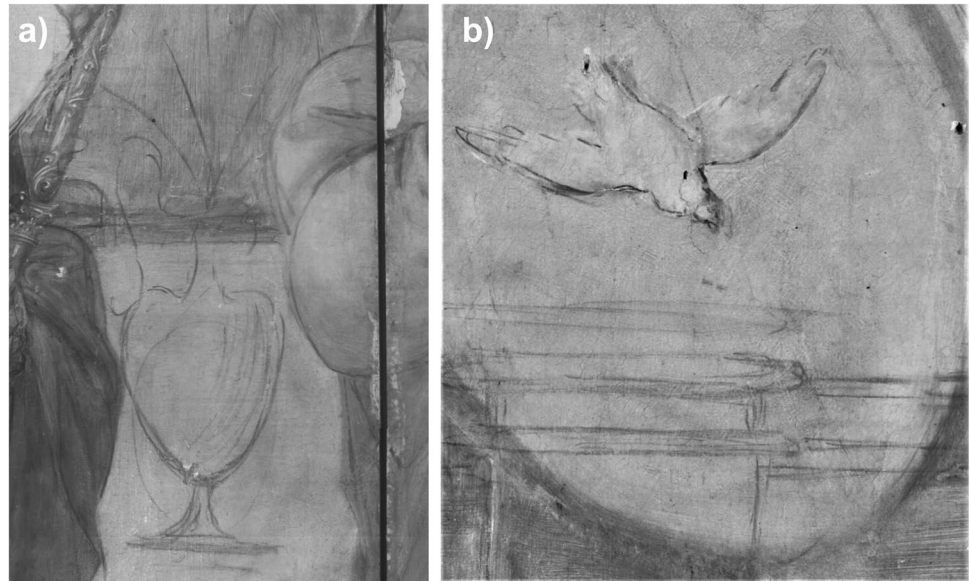
Underdrawing layout and function

The underdrawing of the *Annunciation* outlines the main elements of the composition, such as the two main figures, the Holy Spirit and objects of the setting, notably the rug, the book and the curtain behind the Virgin. The placing of the drapery's folds and the features of the faces, such as eyes, nose, mouth and ears, along with the circular marking of the wrist's protruding bones, as well as the fingernails and knuckles of the hands, conveys some notion of volume to a mostly bidimensional, i.e. flat, drawing (Fig. 2a). The shading was not systematically applied but limited to the mapping of a few deeper areas of the folds, using diagonal parallel hatching or fan-shaped lines (Fig. 2b). The drawing was vigorously executed, using strongly marked and often reworked lines (Fig. 2). Despite its sketchy character, typical of a freehand underdrawing, the layout is quite detailed and shows no hesitations. This suggests that the underdrawing followed a close preparatory model or was possibly guided by a first transfer of the main forms, whose traces are now undetected.

Fig. 2 IRR assembly of two details — angel (a) and canopy (b) — of the *Annunciation* seen in Fig. 1a



Fig. 3 IRR assembly of two details of the *Annunciation* (see Fig. 1a), where drawn elements such as the flowers vase (a) and the upper part of a set of columns (b) were later abandoned at the painting stage



The painted image generally respects the underdrawing with the necessary slight adjustments resulting from a more accurate paint brushwork. Nonetheless, some changes are noted. Besides the repositioning of the right foot of the angel, painted at a lower level than initially drawn (image not shown), the capitals that top the column behind the angel and the vase with flowers at the centre of the composition were drawn but not painted (Fig. 3). Although two capitals were underdrawn side by side, only a single column was later painted. This suggests that two columns could have been initially considered, or else, that the placement of one single column with its capital was rehearsed in different positions, at the underdrawing stage. The omission of the capitals prevented the overlap of the architecture with the halo of the Holy Spirit, contributing to the legibility of the subject. The second modification is of significant iconographical importance, as flowers, usually lilies, a symbol of Mary's purity, whether in a vase or held by the Angel Gabriel, are traditionally depicted in *Annunciation* scenes. In fact, a vase with white lilies is visible in the centre of an *Annunciation* attributed to Francisco João belonging to a private collection (Fig. 1c). Since the necessary space was available on the painted scene and the object holds such a rich symbolism in this biblical story, it is unclear why it was abandoned at the painting stage.

In the *Adoration of the Shepherds*, a confusing and heavily charged underdrawing was detected in the IR images (Fig. 4). The part of the underdrawing that relates to the painted image is characterized, as in the *Annunciation*, by a loose contour that places all elements in the scene, delineates the drapery's folds and establishes the anatomic details of the faces, along with the characteristic circular marking of the wrists, already noted. In general, the shading in the

Adoration is more extensive, with adjacent lines unevenly spaced, filling areas of the deep creases of fabric with intertwined scratches. The scribbled appearance of the underdrawing of the *Adoration* was further enhanced by the persistent reworking of the contours with multiple adjoining outlines (Fig. 4).

The many lines that showed no relation with the painted image were difficult to interpret. An extensive investigation of the IR documentation finally revealed that the subject of the *Annunciation* was fully underdrawn in the same panel as the underdrawing of the *Adoration of the Shepherds* (Fig. 5).

The dry black carbon-based underdrawing material looks visually the same under IRR and the examination of the cross-sections by optical microscopy confirmed that it lays directly over the prepared panel (Melo et al. 2022). Contrary



Fig. 4 IRR assembly of a detail of the *Adoration of the Shepherds* (see Fig. 1b)

to, at least, one analogous situation (Faries et al. 1987), no intermediate pigmented blocking paint layer was found between the two underdrawings. A few areas of the underdrawing corresponding to the *Annunciation*, notably the Virgin's face and hands, appear lighter in the IRR images, as if slightly erased. However, for the most part, the lines of both compositions exhibit a similar intensity. This and the high density of scratches of some areas make it difficult to assign the lines to a specific composition (Fig. 5). Furthermore, the coincidence between the underdrawings of certain motifs, such as the tunic covering the Mary's head in the *Annunciation* and the folds falling from the right arm's mantle of Saint

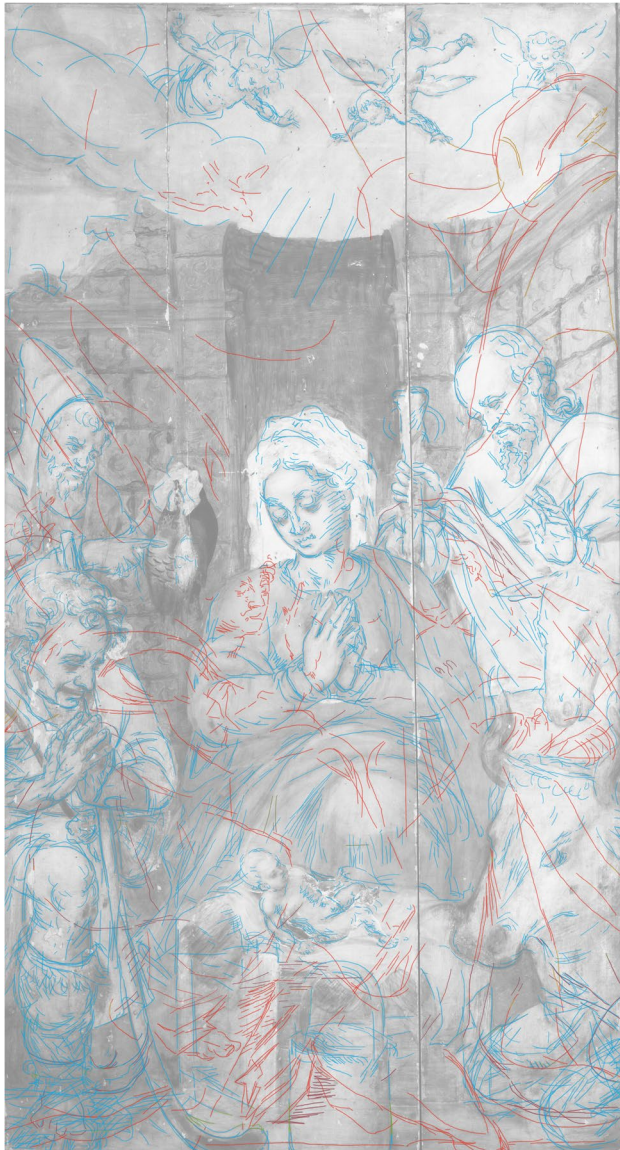


Fig. 5 Tracing of the two superimposed underdrawings over the IRR assembly of the panel of Fig. 1b. The tracing in red corresponds to the *Annunciation* and the tracing in blue to the *Adoration of the Shepherds*

Joseph in the *Adoration*, sometimes renders this distinction impossible (Fig. 5). However, it was possible to locate all elements and objects of the *Annunciation* underdrawing layout on the panel of the *Adoration of the Shepherds*, except for the main central vase that, although not visible by IRR, could be hidden in the confusing layout.

In addition to both compositions, the left hand of Saint Joseph was found loosely drawn, at the same height but in a mirror position, on the opposite left side of the panel (Fig. 6). The composition could therefore have been intended to be drawn in an inverted position or else the painter hesitated in the placing of the shepherd's right hand, later drawn and painted pointing to the scene (Fig. 6a).

Finally, the underdrawing of the tip of a foot under the kneeling shepherd of the *Adoration* (Fig. 7) showed no possible anatomical relation with either that figure or the underdrawing, in the same location, of the Angel Gabriel of the *Annunciation*. It did, however, echoed Gabriel's right foot in the mentioned *Annunciation* from a private collection (Fig. 3), illustrating the painter's hesitation concerning the position of the angel's lower body.

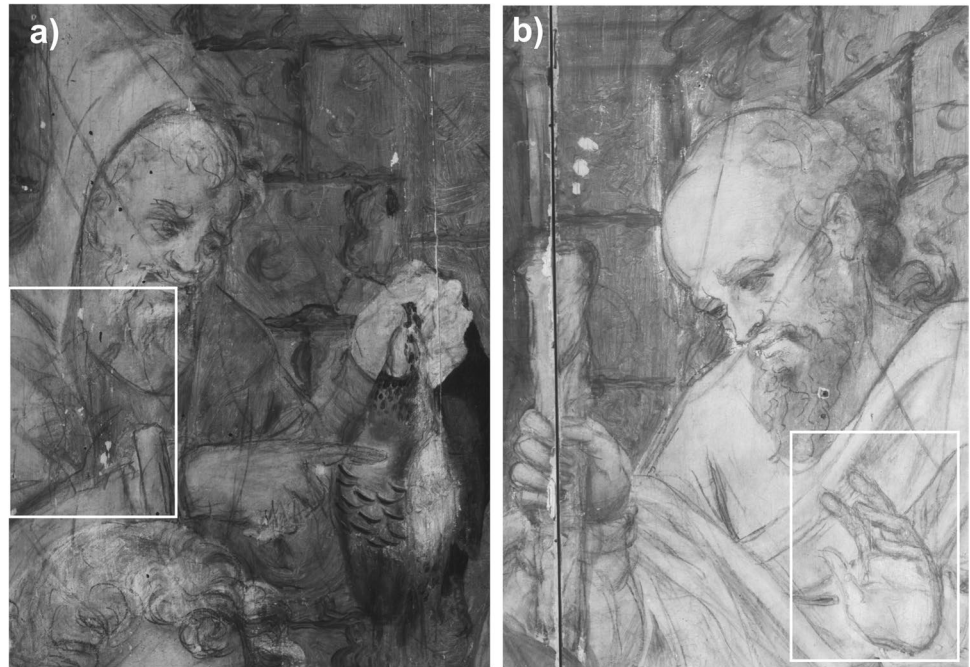
The overall similarity of the graphic language of the underdrawing of both paintings confirms they were executed by the same hand, with a more insistent redrawing of contour lines in the underdrawing of the *Adoration*, as an effort to clarify the layout to be followed in the painting stage. In each case, the underdrawing was used as a guide for painting, without any participation in the modelling of forms.

Workshop practice

Superimposing the tracing of both *Annunciation* underdrawings reveals that they have the same scale in the two panels but, as a whole, they are not coincident (Fig. 8). Mary's figure shows the closest match between underdrawings. The dove of the Holy Spirit and the curtain, although having the same size and form in both underdrawings, are positioned higher in the underdrawing of the *Annunciation* panel, leaving a wider breathing space for the figures. As for the angel, he stands farther from the Virgin in this underdrawing, possibly making room for the vase between them. The angel's face and raised right hand show the same size, orientation and form, and are placed at the exact same distance from each other in both underdrawings, but the remaining arm and draped shoulder are positioned higher and away back from the face in the *Annunciation* panel.

As a result of the sketchy character of both freehand underdrawings, no line is precisely coincident between layouts, only the major configuration of each element. Although no evidence of a transfer method was found, the exact size and shape of each main element, notably the curtain, the dove, Mary's figure, the angels head and its relation with his right hand, suggest that some form of cartoon, possibly

Fig. 6 IRR assembly of two details of the *Adoration of the Shepherds* (see Fig. 1b): shepherd with a drawn hand that was not painted (**a**, white rectangle) positioned in a mirror position to the left hand of St. Joseph (**b**, white rectangle)



not of the entire composition but of its main elements, was used. The comparison between the *Annunciation* from Machede and the one from the private collection, both with almost identical dimensions, further suggests that a single

cartoon of the Virgin, in flipped positions, could have served both compositions (Fig. 1a and 1c). The same is suggested regarding the vase, whose body has the same size and shape in both panels, although the handle and the mouthpiece were

Fig. 7 IRR assembly of a detail of the kneeling shepherd of the *Adoration of the Shepherds* (**a**); tracing (**b**) in blue (*Adoration*) and red (*Annunciation*) of the underdrawing over the IRR of detail (a); IRR detail of the underdrawn foot (**c**) located with a white rectangle in (**a**); and detail of the foot of the Angel of the *Annunciation* belonging to a private collection (**d**), presented in a flipped position across a vertical axis relative to the original painting

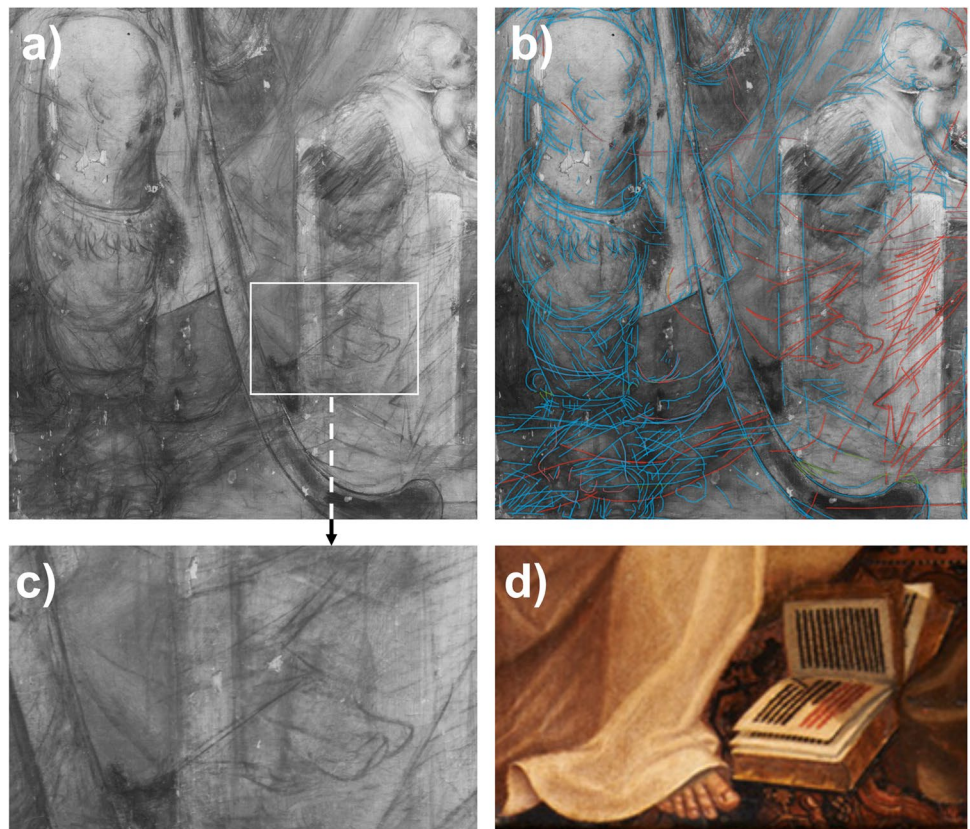




Fig. 8 Overlap of the tracings of the underdrawing layouts of the *Annunciation* from the panel of the *Adoration of the Shepherds* (in red) and from the panel of the *Annunciation* (in green)

drawn smaller in the Machede painting, possibly to accommodate the angel's forward leaning hand (Figs. 1c and 3).

The changes between the underdrawing and the painted image in the *Annunciation* from Machede, the identification of an individual drawing style and, finally, the fact that no attempt was made to conceal the abandoned underdrawing of the *Annunciation* found in the panel depicting the *Adoration*, support the conclusion that a single painter was responsible for the underdrawing and painting stages.

The reason to replace subjects can only be conjectured. One possibility is that the painter worked in situ, directly on the constructed altarpiece — a common situation described in historical documents [10] — and misplaced the *Annunciation*

in the predetermined iconographical scheme of the altarpiece, later correcting his mistake. Another hypothesis, although less probable, is that the painter realized that the face of the Virgin in the *Annunciation* would be crossed almost in the middle by the joint between adjacent boards if painted in the panel that now depicts the *Adoration*. In this case, the problem would be partially avoided by transferring the composition to the *Annunciation* panel that, although roughly the same size, has a wider board along the right margin, displacing the joint to the left, away from the centre of the Virgin's face.

In altarpiece construction, where the partnership between master painters is often documented and the help of an assistant would be expected, the material evidence gathered by this research shows that, in this case, the most relevant steps of creation were the responsibility of the master painter. Despite Francisco João's success, high social status and abundant production, it appears that the regional context of his activity limited the size of his workshop and the likelihood of sharing his workload among collaborators.

Conclusion

The study of the layout, materials and function of the underdrawing of the *Annunciation* and *The Adoration of the Shepherds*, two paintings from a dismembered altarpiece attributed to Francisco João (doc. 1558–1595) contributed with material evidence to a more comprehensive understanding of the working procedures of Portuguese mannerist workshops and of this painter in particular. In both paintings, a contour, freehand, sketchy underdrawing, essentially of a bidimensional character, was used to guide the painting stage. The underdrawing of the *Annunciation* largely corresponds to the painted image, but in the panel of the *Adoration*, both subjects, *Annunciation* and *Adoration*, were drawn over the prepared panel surface, without any intermediate pigmented paint layer between them. Despite the absence of any transfer evidence, such as pouncing dots or tracing lines, the discovery of the underdrawing of the *Annunciation* in both paintings and their comparison with a distinct painted version of the same theme attributed to Francisco João revealed the probable use of a cartoon, if not of the whole composition, possibly of its main elements. Finally, the identification of an identical drawing style, the fact that the *Adoration* was directly painted over a confusing layout resulting from the underdrawing of two different compositions and the existence of some relevant changes between the underdrawing and the painting in both works, provides evidence that the painter was actively involved in both underdrawing and painting stages. These results give a first insight into the possibly limited working conditions that painters, despite their success and status, would be subjected in regional artistic commissions.

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Author contribution HPM conceived the study and performed the visible and infrared analysis of the original paintings. HPM, AJC and SV interpreted the data. HPM wrote the first version of the manuscript that was reviewed by AJC, SV and AC. Funding acquisition: HPM and AC. All authors read and approved the final manuscript.

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Data availability The complete data generated during and/or analysed during the current study is available from the corresponding author upon reasonable request.

Code availability Not applicable.

Declarations

Competing interests The authors declare no competing interests.

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