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Realism of Face Depiction in Portraiture

This study presents an analysis of the realism of portraiture in the context of physical anthropology. Standard descriptive traits, such as the development of the upper eyelid fold, nasal profile, etc., were scored on 120 portraits. To examine the accuracy of painters' renditions, these traits were assessed on 30 pairs of portraits of the same people painted by different painters, and on 30 pairs of portraits with photographs of the same people. For each trait, the mean difference of scores was calculated. The mean differences are within the scoring error, indicating the painters' high accuracy in rendering facial features. Next, four composite portraits were generated, two relating to 15th–16th century French aristocrats, and two to the 15th–17th century Dutch population, mainly that of Amsterdam. Composite portraits for every geographic region are virtually identical, suggesting that they represent a specific population rather than just a total of individual data. Also, even though painters might have been somewhat imprecise in depicting individual faces, these inaccuracies are averaged out in composite representations. In sum, portraiture is a very informative source of anthropometric information.

Keywords: *Composite portraits, portraiture, descriptive facial features, French aristocrats, Holland.*

Introduction

For decades, anthropologists have been using images of people in their studies. Usually, single images are used to illustrate specific facial features of anthropological types, or to prove the age and presence of an anthropological type in a certain territory. Most researchers who use these single characteristic images miss the opportunity of using a series of images as a sample from an ancient population. The images are not seen as realistic in the most common sense of that word (showing the features of a certain individual), but more as a stereotype reflecting the typical characteristics of a group. The reason for this approach in working with images is the fact that "specific racial and ethnic facial features are depicted in art, although generalized and typologized, but with a significant level of accuracy at the group level" (Shpak, 2015: 116). For example, C.S. Coon in his book *Races of Europe* widely uses art, and highly values its importance saying "…the (Sumerian) sculptors have left behind them records in stone, which may piece out the evidence of the skulls" (1939: 90). In the chapter on Neolithic people of Iran and Iraq, Coon notices a varying level of realism in sculpture, and points out that while bas-reliefs reflect the canon, a typical man, "portrait busts… seem really to depict individual men rather than conventional types or ideals" (Ibid.).

V.V. Bunak in his monograph *Crania Armenica…* uses sculpture in the discussion on the ancient presence of the Armenoid type in Western Asia. He writes that "craniological studies of ancient populations of Western Asia only provide… the most general indication of the Western Asian racial type of distant eras. But the most ancient history of this region… opens another source for

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studying this problem—abundant sculptural material" (Bunak, 1927: 200). Undoubtedly, not all images are equally realistic, and in the history of the visual arts of Middle East, there were several stages, differing in the specifics of style and the canons used in the depiction of men. Nevertheless, certain features of the Western Asian ancient sculptures are so peculiar and characteristic that "they cannot be understood otherwise than as a reflection of the racial characteristics of the peoples who created these sculptures" (Ibid.: 201).

I.I. Gokhman and L.L. Barkova, in their study of an ancient population of Altai, used images of humans in quite an original way. As a source of information about the appearance of the ancient human, they used images on the Pazyryk carpet and wooden facial sculptures used as decoration on a horse tack, found in the first Pazyryk mound. Researchers believe that "all the images found on the carpet represent people of the South-European race. Faces on horse pendants are mongoloid; or mixed, with an apparent prevalence of mongoloid features" (Gokhman, Barkova, 2003: 423). Even the use of such unusual sources allows researchers to determine the race of the population.

Portraits reflect the private life of an individual at some level, including his or her health. Every image can be regarded as an independent and fully-fledged source of individual pathologies. Remarkably, images used in this kind of research include not only realistic portraits of certain people (an Italian poet of the 16th century, Teofilo Folengo, with a face disfigured by paralysis (Galassi F.M., Galassi S., 2015)), and unknown persons (a man of the mid-15th century with manifestations of Horton's disease (Galassi F.M., Galassi S., 2016)), but also religiously themed works (Madonna from 15th century with signs of goiter (Traversari, Ballestriero, Galassi, 2017)), which are usually seeing as highly idealized.

Until the beginning of the 21st century, portraits were rarely used in anthropology; and if they were, each image was seen as a reflection of typical group characteristics. Modern studies of human variability use a population approach (Vergeles, 2015; Edwards, 2003; Jorde, Wooding, 2004; Edgar, 2009; Edgar, Hunley, 2009; Gravlee, 2009), according to which a series of images from the same geographical region and time-period is viewed as a sample from a population or a group. In this case, the object of study is not an individual and his or her facial features but the characteristics of the whole group. This approach can be used only with a sufficient number of high-quality realistic images.

L.Y. Shpak, in a review article on the possibility of using ancient images (up to the first centuries AD) in anthropology, wrote that "…the development of portraiture from ancient times to the present day shows that images of men vary greatly geographically, and also in terms of realism and informational content" (2015: 124). Nevertheless, certain periods in the history of ancient art provide researchers with highly realistic and precise images. These periods include, for example, the Greco-Roman period in the history of Egypt. The research group of Moscow State University studied portraits from 1st–4th centuries AD Faiyum, and created composite portraits of this ancient population (Perevozchikov, Shpak, Shimanovskaya, 2012). Other periods with highly realistic portraiture include the sculpture and painting of the Classical and Hellenistic periods of ancient Greece, Etruscan votive sculpture, and the Roman sculpture of the republican period (Shpak, 2015).

K.E. Lock studied Russian portraiture of the 18th and 19th centuries, and the use of these images in anthropology. She studied various groups, including merchants and nobility (Lock, 2011a) and 1812 war officers (Lock et al., 2012), and wrote a Ph.D. thesis based on these studies (Lock, 2011b). Lock also paid attention to methodological problems: in particular, the realism of face depiction in portraiture from the Renaissance era until the 19th century. As a proof of the realism of portrait art, the author cited numerous examples of painters portraying small defects in appearance (warts, strabismus, etc.), and also made a comparison of the painted and photographic portraits of writer S.T. Aksakov, a comparison of several portraits of Catherine II painted by various artists, and a comparison of two portraits of A.S. Pushkin. The researcher concludes that "painters are precise and skilled in depicting anthropological features of a particular human, and differences between portraits created by various painters are usually inessential for the anthropologist" (Ibid., 2011b: 72). However, these pieces of evidence are descriptive, qualitative, and seem inadequate to legitimize the use of portraiture in physical anthropology. Additional new research on identification of the "objective" errors of a painter is needed.

This article presents a complex study of the realism of portraiture, based on standard anthropological scales for facial features on the one hand and on the method of the composite portrait on the other. Our hypothesis is that portraiture, although reflecting painters' imagination and skill, is a reliable source of information about such features as the shape of the nose, the cut of the eyes, the thickness of the lips, etc. These characteristics cannot be hugely retouched and changed in favor of the ideal, because the main goal of portraiture is creation of a lifelike, recognizable image of the person portrayed.

Portraiture as a material for anthropological studies of 15th–19th century European populations

Before considering the problem of the realism of portraiture, it is important to address the definition

of a portrait. The Oxford English Dictionary defines portraiture as "a representation or delineation of a person, especially of the face, made from life, by drawing, painting, photography, engraving, etc.; a likeness" (cited after (West, 2004: 11)). The Great Russian Encyclopedia emphasizes that "the necessary requirement for every portrait is the transfer of individual resemblance" (Portret, 2015). Every definition of the portrait will include one or another form of likeness as an essential characteristic of the genre. The customer demanded from the painter that portrait should be a recognizable likeness of the portrayed person. The likeness is not the only function of a portrait, but an essential and fundamental one. In fact, what does not reflect reality, cannot be called a portrait at all. Portrait painting originated and developed with the goal of creating a likeness, copying reality.

Any portrait is a compromise between painter and customer. Depending on the purpose of the image, change of form and even level of realism of the portrait is possible. Therefore our study only focuses on the images that were intentionally created as a likeness and that, from our point of view, realistically enough reflect the physical appearance of a certain person.

Material and methods

To prove that portraits are realistic enough to be used in anthropological research, we used two approaches: first, we compared standard descriptive characteristics of face for pairs of images, where each pair depicts the same person; second, we created composite portraits from various samples from the same population. For the first part, we used digital images of portrait paintings in oils, portrait drawings, photographs, and daguerreotypes. The total sample of 120 images was obtained from various website sources: the National Portrait Gallery in London (http://www.npg.org.uk/) and the Victoria and Albert Museum (http://collections.vam.ac.uk/), as well as the Wikipedia site: https://en.wikipedia.org/wiki/Category:French_portrait_painters, https://en.wikipedia.org/wiki/Category:English_portrait_painters, https://en.wikipedia.org/wiki/Category:Dutch_portrait_painters. Descriptive characteristics for all images were determined on an Acer AL1916W monitor with standard "graphics" settings.

Two experiments, each with 60 images, have been performed. For the first experiment we used 30 pairs of portrait paintings: each pair consisted of two portraits of the same person painted by different painters; and for the second experiment, we used 30 pairs of images, with one image being a painting, and the second a photograph or daguerreotype of the same person. The first experiment included images from the 16th–17th centuries, the second experiment the late 19th century. Most of the images used were from the UK, but some were from France and other European countries. An essential condition for sampling was the independence of the images, i.e. none of the images were copies of other paintings or photographs.

The values of the following descriptive characteristics were determined for each image: growth of beard, color of beard, hair color, hair shape, eyebrow thickness, eye color, eye width, eye length, upper eyelid fold (separately proximal, medial, and distal part), nose height, transverse profile of the nasal bridge, profile of the nasal bridge (separately for the bone and cartilage part, as well as general), tip of the nose, height of the nostrils, protrusion of the nostrils, height of the upper lip, lip thickness (separately upper and lower), and cheekbone protrusion. Characterization was carried out according to the standard procedure (Bunak, 1941), with limitations and amendments relating to two-dimensional images (Lock, 2011b). For eye color, a three-level scale was chosen: dark, mixed, and light. For any characteristic it was possible to use halves of points (0.5, 1.5, and so on). Hair color and shape, and beard color and growth were only determined for less than 50 % of cases, so they weren't used in the following analysis. The method of determining descriptive characteristics on two-dimensional portrait images has been successfully and repeatedly used in the Anuchin Research Institute and Museum of Anthropology at Lomonosov Moscow State University (for the description of anthropological features of the Amsterdam population in the 16th–17th centuries see, e.g., (Perevozchikov et al., 2015)).

The images were described in such a way that no two images of the same person followed one another. For example, for portrait-photograph pairs, first, all 30 photographs were described, and then all 30 portraits. That was done in order to avoid possible unconscious transfer of the scores of the characteristics from one image of a person to another. For every pair of images, the difference in scores has been calculated. On the basis of these modules, the mean difference has been found for every characteristic.

Results and discussion

For the majority of characteristics, the mean difference between the two images is less than 0.5 point (see *Table*). Notably, this difference is a result of several factors, which includes the "mistakes" of a painter in depicting the physical appearance of a person, and the "mistakes" of a researcher in describing a characteristic. In previous unpublished studies where we tried to determine the "mistakes" of a researcher (we compared two descriptions of the same portraits made with a time

interval), the resulting difference was 0.5 point as well. Thus, half a point difference in our experiment seems to be more dependent on the researcher's "mistakes" than on an inaccurate depiction of facial traits by the painter. However, there are some great discrepancies in the representation of certain facial traits. For example, eye color is often painted in different ways in two portraits of the same individual. Probably, the way the painter sees eye color is dependent on the lightning. A.M. Maurer (personal communication) notes that the color of eyes is often difficult to determine even when working with a modern population in the field; this characteristic requires an additional follow-up check on the photo. Surprisingly, less difference for eye color was found for portrait-photograph pairs, even though the photographs were exclusively black and white. The reason is that the color scale that we chose (dark – mixed – light) relies more on the intensity of the eye color than on the shade.

The accuracy of determination of pigmentation depends on the preservation of paint layer and the changes in the paints color over time. Painters knew about that for centuries, even before the Renaissance era, and tried to prevent fading (for a review of treatises from antiquity to the Modern Period on painting technique see, e.g., (Grenberg, 1982)). For example, painters covered the finished picture with lacquer (isolation of the paint layer from air/light), used a certain proportion of pigment and oil when mixing paints, used a bright foundation for paintings (compensation for oil paints darkening over time), reduced the number of paint layers, or mixed oil paint with lacquer (Slansky, 1962).

In both experiments (pairs of portrait paintings of the same person, made by different painters; and portraits versus photographs pairs), some characteristics showed high discordance in the determined scores: eye color, height of nostrils, thickness of lower lip. In our opinion, this fact shows not only that some traits were painted with less accuracy, but that these characteristics are less important for facial recognition. When working on a portrait, the painter pays more attention to the traits that are most important for recognition of the portrayed person—nose shape, eyelid folds, etc.—and less attention to the traits whose alteration is not going to change the overall likeness of the face.

Additional evidence of the accuracy of portraiture can be found in composite portraits created from two different samples from the same population/group. The method of composite portraits allows a group portrait of a population to be created (for history and method see (Perevozchikov, Maurer, 2009). Anthropologists have repeatedly created composite portraits based on samples of images from a single population. Examples include composite portraits of female Old Believers from the settlements along the Selenga and Chikoy rivers, created by A.M. Maurer and I.V. Perevozchikov using materials on Russian old settlers in Siberia that were obtained during an expedition of the Institute of Ethnography of the USSR Academy of Sciences in 1960–1964 (head V.V. Bunak) (Maurer, Perevozchikov, 1999). The available sample of photographs was separated into two parts (35 and 38 individual photographs); and two composite portraits have been created. The authors, noting the very high degree of similarity between the two composite portraits, even compare them to identical twins. This result indicates that "a composite portrait of more than 25 individual images reflects the similarity of the gene pool in different samples from a single population" (Ibid.: 96). To test whether it is possible to obtain a similar result using portrait paintings, we have created two composite portraits of the 15th–16th-century French aristocracy (Fig. 1, 2), and two composite portraits of 15th–17th-century Dutch people (Fig. 3, 4). For the first ones, we used individual portraits of the French aristocracy from printed books (Novoselskaya, 2004; Exposition…, 1907) and from the Wikipedia site (https://en.wikipedia.org/wiki/Category:French_

Mean difference in traits between two portraits, score*

Trait	Pair of portraits painted by different artists	Painted portrait versus photograph pair
Eyebrow thickness	0.37 (30)	0.38 (30)
Eye color	0.82 (22)	0.6 (20)
Eye width	0.28 (30)	0.25 (30)
Eye length	0.42 (30)	0.33 (30)
Upper eyelid fold		
prox	0.24 (29)	0.6 (30)
med	0.24 (29)	0.37 (30)
dist	0.26 (29)	0.45 (30)
Nose height	0.37 (30)	0.28 (30)
Transverse profile of the nasal bridge	0.35 (30)	0.25 (30)
Tip of the nose	0.37 (30)	0.24 (29)
Height of the nostrils	0.52 (30)	0.47 (30)
Protrusion of the nostrils	0.43 (30)	0.32 (30)
Height of the upper lip	0.37 (30)	0.3 (30)
Profile of the nasal bridge		
bone	0.27 (30)	0.32 (30)
cartilage	0.1 (30)	0.15 (30)
general	0.17 (30)	0.13 (30)
Upper lip thickness	0.07 (28)	0.06 (28)
Lower lip thickness	0.61 (27)	0.52 (27)
Cheekbone protrusion	0.07 (30)	0.17 (30)

*The number of cases is given in parentheses.

Fig. 1. Composite graphic portrait of 15th–16th-century French aristocracy (77 individual images).

Fig. 2. Composite painted portrait of 15th–16th-century French aristocracy (43 individual images).

Fig. 3. Composite painted portrait of 15th–17th-century Dutch people (72 individual images).

Fig. 4. Composite painted portrait of 15th–17th-century Dutch people (68 individual images).

portrait_painters). The second ones were created using images published in the exhibition catalogue of the Pushkin State Museum of Fine Arts (Gollandskiy gruppovoy portret zolotogo veka…, 2013), and at the websites of the Rijksmuseum in Amsterdam (www.rijksmuseum.nl/en) and Wikipedia (https://en.wikipedia.org/wiki/Category:Dutch_portrait_painters).

For the French aristocracy, the first composite portrait was created using 77 graphic portraits (see Fig. 1), and the second using 43 oil paintings (see Fig. 2). The resulting pair of composite images doesn't only reflect the high level of realism in face depiction, but also the indifference of the composite portrait method to the technique used for individual images. For Dutch composite portraits, only oil paintings have been used: 72 for the first one (see Fig. 3) and 68 for the second (see Fig. 4). None of the individual images was used for both portraits; the original sample of 140 images was randomly separated into two parts. Composite portraits were created using the faceONface program (Savinetsky et al., 2015). The resulting pairs of composite portraits are characterized by a high level of likeness, with minor differences that can be attributed to differences in technique and accidental fluctuations. Thus, composite portraits are the same for two different samples from one population. This shows both the high accuracy of painters in creating portraits, and that even with the possible presence of inaccuracies in the individual images, the group characteristic remains unchanged.

Conclusions

Nowadays, the study of portrait paintings and drawings using anthropological methods is actively developing and growing owing to the prevalence of the population approach, in which a series of images of one time and geographical region is considered a sample from a population or group. This approach makes it possible to create descriptions, not only of individuals, but also of the group as a whole. Portraiture, of course, is a genre of art. However, the painters were usually very accurate in depicting most of the anthropological features of face. Comparison of the descriptive features of one person in portraits painted by different painters, as well as in photographic and painted portraits, has shown that a difference between them in half a point is within the error of the method. This indicates a high degree of realism in the representation of the anthropological traits of a person in portraiture. Such characteristics as eye color, height of nostrils, and thickness of the lower lip, apparently do not affect the recognition of face, so the painters paid less attention to them and drew them less accurately.

The creation of composite portraits for representative samples from one group made it possible to establish that painted and graphic images, like photographs, display a group characteristic well, regardless of which particular images were included in a particular composite portrait.

The results of the study of portraits in terms of physical anthropology show a high degree of accuracy in the representation of facial traits by painters. Of course, not all images are suitable for anthropological research. However, with proper selection of images (excluding fantasy, unrealistic, and images of people in childhood and the elderly), one can count on obtaining objective group characteristics.

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