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The Artistic Rendering of Facial Scars: Impact on Character Perceptions and Affective Responses Among Viewers

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Human appearance has a profound impact on behavior and psychological disposition, with faces being among the most salient visual stimuli encountered. People form judgements about others' inner traits based on physical features in seconds, potentially reinforcing biases such as the "anomalous-is-bad" stereotype. In this preregistered study, we tested the hypothesis that artistic renderings of faces not only impact character attributes but also distance the viewer in a way that alters their emotional response. We predicted that the social penalties imposed upon individuals with facial scars would be alleviated by artistic rendering, as measured by (a) higher ratings of warmth and competence and (b) lower ratings of arousal with higher ratings of valence and dominance. Integrating concepts of the "anomalous-is-bad" stereotype and distancing-embracing model, we studied laypersons perceptions ($N = 601$) of character traits as well as their own affective experiences when viewing six faces with scars as unaltered photographs or as artistic versions of those images. As a whole, we did not observe differences in perceptions of warmth and competence or feelings of arousal, valence, and dominance based on the artistic intervention. However, exploratory analyses of individual faces revealed that some scars and their unique characteristics might influence judgments and affective experience—for instance, perceiving painted faces as more competent. As such, artistic representation may have a role in shifting responses to certain types of scars, although more work needs to be done to clarify the role of art in shaping first impressions of human appearance.

Keywords: art, painting, face perception, facial anomalies, scars

Supplemental materials: https://doi.org/10.1037/aca0000754.supp

Human appearance has a profound impact on behavior and psychological disposition, with faces being among the most salient visual and social stimuli encountered (Hartung et al., 2019). The "beauty-is-good" stereotype refers to the attribution of positive character traits based on physical attractiveness (Dion et al., 1972; Klebl et al., 2022; Villavisanis et al., 2022), whereas the

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"anomalous-is-bad" stereotype reflects negatively biased attitudes toward people with visible facial anomalies such as scars and palsies (Jamrozik et al., 2019; Workman et al., 2022). Importantly, the consequences of these two phenomena impact tangible aspects of day-to-day life, including educational opportunities, employability, and compensation (Frieze et al., 1991; Jaeger et al., 2020; Shahani et al., 1993). These biases lead to societal benefits rewarding those deemed to be more physically attractive (Johnson & King, 2017; Landy & Sigall, 1974; Maestripieri et al., 2017; Mobius & Rosenblat, 2006; Putz et al., 2016) and punishments inflicted upon those deemed less attractive (Fontesse et al., 2021; Whitaker et al., 1975) or people with anomalous faces (Dey et al., 2015; Zapatero et al., 2022). Since people with facial anomalies are often impacted by face-reading judgments in their everyday lives, it is important to find solutions to reduce the "anomalous-is-bad" stereotype.

This stereotype likely stems from cultural influences; for instance, popular movies tend to portray villains with more pronounced facial anomalies compared to heroes (C. S. Wagner et al., 2023). This stereotyping might not be universal. The Hadza hunter-gatherers of Tanzania, for example, do not show the same kind of stereotyping (Workman et al., 2022). This observation highlights the need for more studies exploring how culturally informed interventions might help reduce this stereotype.

Here, we consider the role of the visual arts in the depictions of faces. Produced over a decade ago, the Face to Face Portrait Project (https://www.chop.edu/centers-programs/craniofacial-program/face-to-face-portrait-project) was an interdisciplinary initiative sponsored by the Edwin and Fannie Gray Hall Center for Human Appearance at the University of Pennsylvania in collaboration with Studio Incamminati. This project, resulting in 12 realist oil paintings depicting pediatric patients with craniofacial disorders, found that children felt a sense of pride and resilience upon having their portraits painted, while viewers perceived these children in a more emotional and positive light. These observations can be traced to Aristotle's ideas of catharsis (Gilbert, 1926), where witnessing art that evokes pity or fear can help mitigate those emotions, potentially allowing viewers to process and ultimately transcend initial negative judgments. The more recent "distancing-embracing" theory (Menninghaus et al., 2017) further elaborates on this process. First, the distancing factor describes how the cognitive schemata of art, representation, and fiction keep negative emotions at a psychological distance, safeguarding the hedonic expectations of art reception against displeasure. Second, the embracing factor allows for the positive integration and regulation of these negative emotions into an overall positive experience. This balance of discomfort evoked by visible facial differences with positive, controlled emotional experiences allows viewers to embrace rather than reject the subject.

In the present preregistered study, we extend and generalize anecdotal observations of the effect of art by examining the effects of painterly renderings of facial anomalies on character perceptions and affective responses among layperson viewers. We suspect that art can have a salutary effect not only on the people being painted but also on the viewers. Such renderings might play a role in shifting prejudices against anomalous faces, keeping in mind that different scar characteristics such as size, location, and symmetry may provoke varied responses. Integrating concepts of the "anomalous-is-bad" stereotype and distancing-embracing model, we characterize layperson attributions of warmth and competence in anomalous faces as well as the viewers' own feelings of arousal, valence, and dominance (Bradley & Lang, 1994) when seeing faces with scars as unaltered photographs or artistic images. We test the hypothesis that art not only impacts character perceptions but also alters the emotional experience of the viewer seeing the depicted faces. We predict that the social penalties imposed upon individuals with facial anomalies would be alleviated by artistic rendering, as measured by (a) higher ratings of warmth and competence and (b) lower ratings of arousal with higher ratings of valence and dominance.

Materials and Method

This study was preregistered on the Open Science Framework (OSF) and can be found as the additional online materials (https://osf.io/jbmvh). The Ethical Committee of the University of Pennsylvania approved the study protocol. The database, code, and materials are available and can be found as the additional online materials (https://doi.org/10.17605/OSF.IO/ZPUWH; Wu et al., 2025).

Stimuli Selection

We designed a two-part prospective study consisting of an in-person pilot study followed by an online survey questionnaire. The two possible stimuli conditions, or independent variables, were photograph and painting. We first selected 12 unique faces from the validated ChatLab Facial Anomaly Database for use in the pilot study, ensuring an equal distribution of gender with racial diversity within the limitations of available stimuli in the database (Workman & Chatterjee, 2021). For the photograph condition, the faces were exactly as they appeared in ChatLab Facial Anomaly Database with no alterations made to the photographs. For the painting condition, an artistic rendition of each face was generated using a digital filter selected from the Fotor Photo Editing Tool (https://www.fotor.com) with selection input from all authors. Using the artificial intelligence photo to painting converter, the filter "Indian Expression" with intensity set at 40 was applied in a standardized fashion to each of the 12 photographs to create 12 corresponding "paintings."

Pilot Study Design

We first conducted an in-person laboratory pilot study proctored by research personnel. Healthy volunteers aged 18 and older with normal or corrected-to-normal vision were recruited from the Philadelphia metropolitan area. Participants were compensated $15 for an estimated study duration of 20 min. This pilot study aimed to establish the discriminability of the facial anomalies in the images that could be used in our main online study as assessed by the accuracy and reaction time of participant responses. The pilot consisted of a training set followed by a testing set administered via Qualtrics, as described below.

The goal of the training set was to habituate participants to the appearance of the paintings, which might be initially viewed as faces with blemishes or other dermatological conditions because of painterly visual attributes (e.g., tones, textures, shadows, highlights, etc.) of the filter itself. Six pairs of faces, before or after surgical correction of their anomalies, were shown on a computer screen for 20 s each with no interval questions. Each pair consisted of a photograph and a corresponding painting of the same face (Figure 1).

The goal of the testing set was to assess whether participants could recognize facial anomalies in photographs and when artistically rendered as paintings. Six pairs of faces with anomalies were shown on the computer screen for an unlimited duration. Each pair consisted

Figure 1

Example of a Stimuli Pair Used in the Training Set of the Pilot Study

Note. The pair consists of a photograph (left) and painting (right) of the same face. See the online article for the color version of this figure.

of an anomalous face before and the same face after corrective surgery (Figure 2). The order of presented stimuli was balanced for gender, and the locations (right or left) of the anomalous versus surgically corrected faces within pairs were counterbalanced throughout the set. The participant was asked to determine which face in each pair (right or left) had a greater facial anomaly. The definition of facial anomaly was provided before the stimuli were presented, as follows: "A facial anomaly is defined as a visible abnormality of the face such as a scar, blemish, palsy, or any deformity that appears to deviate from normal appearance." Based on participant responses to the stimuli presented in the pilot study, we chose the final stimuli for the main online study.

Main Study Design

We used Qualtrics to design an online questionnaire that selected testing stimuli based on data collection and analysis from the pilot

Figure 2

Example of a Stimuli Pair Used in the Testing Set of the Pilot Study

Note. The pair consists of an anomalous face prior to any corrective surgery (left) and the same face after corrective surgery (right). See the online article for the color version of this figure.

study stimuli for which 100% of participants correctly identified the presence of a facial anomaly (Figures S1–S6 in the online supplemental materials). Only one image type was used in each condition, so each participant only saw either photographs or paintings. For each condition, the six stimuli included three female and three male faces presented in a balanced fashion.

Healthy volunteers aged 18 and older from the United States were recruited through the online crowdsourcing platform Prolific to complete the survey. Participants were compensated $4 for their time, with an estimated completion time of 20 min. After providing consent and receiving instructions on how to complete the survey, participants completed the face rating task. The structure of the face rating task was adapted from prior studies (Jamrozik et al., 2019; Workman et al., 2022). Participants completed a total of six trials. Each face remained on the screen, while participants rated the face in three domains: (a) subject warmth and competence; (b) subject attractiveness and perceived age; and (c) provoked feelings of valence, arousal, and dominance (see below for details). Participants subsequently completed an Explicit Bias Questionnaire (Hartung et al., 2019) to detect participant-admitted biases against individuals with visible differences, followed by a short questionnaire to collect their sociodemographic characteristics. At the conclusion of the survey, participants were asked whether they believed their data were high-quality enough to be included in the study; survey responses were excluded if participants indicated "no." In addition, two attention check questions were embedded into the face rating task for quality control, and survey responses with failed attention checks were excluded.

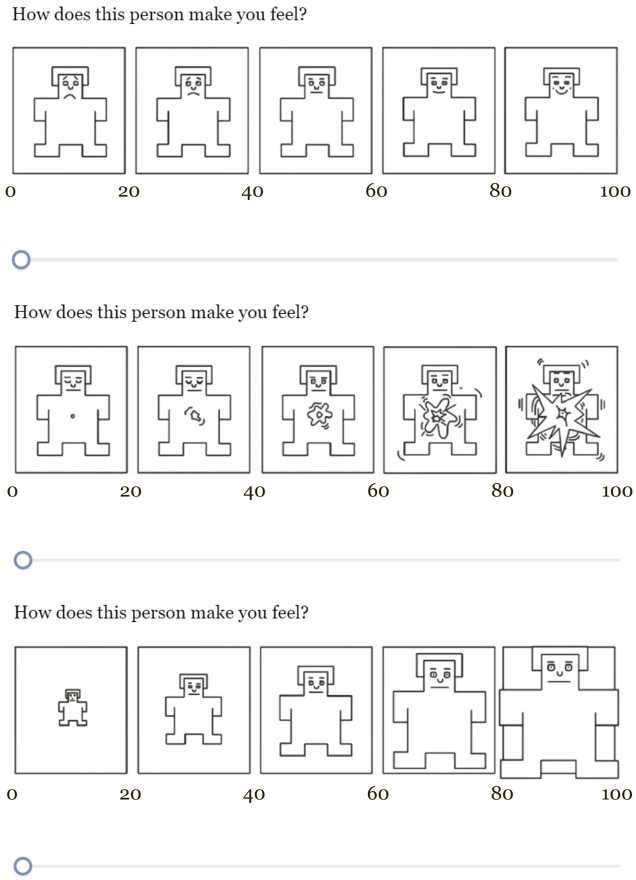
The three measured variables all used a 100-point sliding scale and are described herein. First, participants rated the faces along 31 dimensions linked to warmth and competence (0—*not at all [trait]*, 100—*extremely [trait]*): sincerity, tolerance, good naturedness, trustworthiness, friendliness, helpfulness, morality, understanding, intelligence, efficiency, skill, confidence, creativity, capability, foresightedness, cleverness, hunger, fear, pain, rage, desire, pleasure, pride, embarrassment, joy, communication, knowing others' feelings, memory, telling right from wrong, planning, and self-control. These 31 attributes were drawn from an existing social perception framework that describes the facets of warmth (sincere, tolerant, good natured, trustworthy, friendly, helpful, moral, and understanding of others) and competence (intelligent, efficient, skilled, confident, creative, capable, foresighted, and clever; Jenkins et al., 2018). When conducting our analyses, we tested differences between conditions for every trait separately as well we used the principal component analysis (PCA) to calculate warmth and competence scores (see the section about PCA). Second, participants rated the faces on attractiveness (0 = *not at all attractive*, 100 = *extremely attractive*) and perceived age in years. Third, participants rated the faces along three affective dimensions (valence, arousal, and dominance) using the Self-Assessment Manikin scale (Bradley & Lang, 1994), a nonverbal pictorial questionnaire that assesses feelings in response to viewing stimuli (Figure 3). The scale depicts cartoon characters expressing five degrees of the three emotion elements to guide ratings (0—*rater feels completely unhappy/calm/in control*, 100—*rater feels completely happy/excited/controlled*).

Preregistered Sample Size Rationale

For the pilot study, participants were recruited until a sample size of convenience of 20 was reached. For the main study, preregistered statistical power with an α level of .05 reached 80% with 601 subjects was calculated. The power analysis for linear mixed effect models was conducted by simulating the data based on intercepts and estimates observed in a prior study on assessments of warmth and competence in facial anomalies (Paruzel-Czachura et al., 2024; see the R code for power simulation at OSF). As preregistered, to account for some participants failing to pass attention checks, we continued data collection until 601 participants who passed both attention checks were reached.

Figure 3

Representation of the SAM Scale, a Nonverbal Pictorial Questionnaire That Assesses Feelings in Response to Viewing Each Face Stimuli



Note. Participants rated each face along three affective dimensions (valence, arousal, and dominance), using the cartoon characters expressing five degrees of the three emotion elements as a visual guide (0—*rater feels completely unhappy/calm/controlled*; 100—*rater feels completely happy/excited/in control*). SAM = Self-Assessment Manikin. See the online article for the color version of this figure.

Preregistered Analysis Plan

Data were analyzed using R 4.3.1 (R Foundation for Statistical Computing, Vienna, Austria). We conducted a PCA (see below description) of the 31 attributes linked to warmth and competence, isolating up to 10 factors with varimax rotation using the "psych" package in R. We preregistered using the linear mixed-effects models. Random intercepts for the subject and face were modeled. We obtained *p* values for the parameter estimates generated by each model using

Satterthwaite's approximation as implemented by the lmerTest package (Kuznetsova et al., 2017). We reported regression coefficients (β), standard errors, and *t* values generated with the effects package (Fox & Weisberg, 2018). We preregistered computing null models for comparison and using the Akaike information criterion, which estimates out-of-sample prediction error. We preregistered selecting the model with the superior Akaike information criterion.

Preregistered PCA

The PCA was conducted to reduce the dimensionality of the 31 traits assessed by participants, which were derived from Jenkins et al.'s (2018) framework on social perception that describes the facets of warmth (sincere, tolerant, good natured, trustworthy, friendly, helpful, moral, and understanding of others) and competence (intelligent, efficient, skilled, creative, capable, foresighted, and clever). PCA allowed us to empirically determine how the traits are clustered based on the correlations in our data, following other researchers (Jamrozik et al., 2019; Workman et al., 2021). The PCA served to simplify the trait structure and provide a data-driven foundation for our analyses, allowing us to identify warmth and competence. The warmth and competence identified through PCA were used as dependent variables in linear mixed-effects models.

We used the "psych" package in R (see the code at OSF for how we conducted PCA). The factor weights corresponding to the warmth and competence components are listed in Table S1 in the online supplemental materials. For use in computational modeling analyses, we calculated, for each recipient, an overall warmth and overall competence score, which consisted of the mean rating of the recipient on each of the 31 attributes, in each case multiplied by that attribute's loading on the relevant factor (warmth or competence).

Results

Pilot Study

Twenty participants (60% female) with a mean age of 33.0 ± 12.7 were enrolled in the pilot study. Participants correctly identified the image with a facial anomaly at a rate of 100% for 10 of the 12 stimuli and at a rate of 95% for the remaining two. Mean reaction time, as measured by time until page submission, was 5.24 ± 1.22 s for photographs and 7.092 ± 1.883 s for paintings ($p < .001$).

Main Study

A total of 601 participants (296 men, 301 women, and four preferred not to say) completed the main online survey: 294 in the painting condition and 307 in the photograph condition. The mean age of participants was 41.85 ± 13.00 years. The distributions of all other sociodemographic variables are reported in the database at OSF. The PCA resulted in two components based on 31 traits related to warmth and competence (see R code at OSF). To examine the effect of the artistic image on warmth and other variables (i.e., competence, arousal, valence, and dominance), linear mixed models were constructed with warmth (or another variable) as the dependent variable and image condition (photograph | painting) as a fixed factor. Random intercepts for faces and subjects were modeled. Descriptive statistics are shown in Table 1.

Upon testing our predictions regarding the effects of viewing facial anomalies as paintings versus photographs on perceptions of character attributes and affective response, we did not find an effect of image condition on ratings of warmth ($\beta = -0.1171$, $SE = 0.4902$), $t(19.9855) = -0.239$, $p = .814$, or competence ($\beta = -0.1245$, $SE = 0.2051$), $t(24.8108) = -0.607$, $p = .549$. Next, we conducted a nonpreregistered analysis, testing all traits separately to further test for differences between the two conditions. We did not find effects for any of the traits (see *p* values in Table 2 and R code at OSF for the linear mixed models for all traits).

Likewise, there was no effect of image condition on feelings of arousal ($\beta = -0.4782$, $SE = 3.3708$), $t(16.1911) = -0.142$, $p = .889$. Finally, we did not find an effect of image condition on viewers' feelings of valence ($\beta = 0.2659$, $SE = 0.2659$), $t(12.7744) = 0.047$, $p = .963$, or dominance ($\beta = 0.2659$, $SE = 5.6828$), $t(12.7744) = 0.047$, $p = 1.000$.

Next, we tested if the condition impacted the attractiveness or perceived age of faces, conducting linear mixed effect models with attractiveness (or age) as the dependent variable, condition as a fixed effect, and participant identifier and face identifier as random effects. We did not find an effect of image condition on ratings of attractiveness ($\beta = 0.9133$, $SE = 5.8278$), $t(13.7663) = 0.157$, $p = .878$, or age ($\beta = -0.8097$, $SE = 5.7945$), $t(12.1546) = -0.14$, $p = .891$.

Exploratory Analyses

Individual Stimuli

As our linear mixed models analyses demonstrated no main effects, exploratory analyses using Mann–Whitney *U* tests were performed for each face separately (Table 3). Group descriptives for the six face stimuli are presented in Table S2 in the online supplemental materials.

Significant effects were revealed for Faces 3, 4, and 6. Regarding Face 3 (Figure 4), participants who viewed a photograph of this face were more aroused ($M = 48.192$, $SD = 29.139$) than participants who viewed the same face as a painting ($M = 43.677$, $SD = 25.738$), $W(599) = 40{,}860.500$, $p = .045$, with an effect size of −0.095. Participants who viewed a photograph of Face 3 felt more negative valence ($M = 25.655$, $SD = 20.717$) than participants who viewed the same face as a painting ($M = 32.837$, $SD = 22.735$), $W(599) = 53{,}656.500$, $p < .001$, with an effect size was 0.189. Participants who viewed a photograph of this face felt less dominant ($M = 39.765$, $SD = 22.791$) than participants who viewed this face as a painting ($M = 43.398$, $SD = 20.732$), $W(599) = 49{,}695.500$, $p = .031$, with an effect size of 0.101. Moreover, the face was viewed as younger in the photograph ($M = 42.036$, $SD = 10.787$) compared to the painting ($M = 44.963$, $SD = 10.401$), $W(599) = 53{,}329.000$, $p < .001$, with an effect size of 0.182.

Regarding Face 4 (Figure 5), participants rated the face in the photograph as less competent ($M = 2.253$, $SD = 1.766$) than the same face presented as a painting ($M = 2.514$, $SD = 1.686$), $W(599) = 49{,}352.000$, $p = .047$, with an effect size of 0.094. In addition, participants assessed Face 4 in the photograph as more attractive ($M = 49.098$, $SD = 27.126$) than the same face presented as a painting ($M = 39.061$, $SD = 26.726$), $W(599) = 36{,}266.000$, $p < .001$, with an effect size of −0.196. However, participants feel less aroused when viewing the face as a photograph ($M = 28.730$, $SD = 23.023$) than as a painting ($M = 36.483$, $SD = 22.756$), $W(599) =$

Table 1
Descriptive Statistics (N = 601)

Condition	Warmth (PCA)	Competence (PCA)	Arousal	Valence	Dominance	Attractiveness	Age
Painting							
M	−13.055	2.413	37.768	41.658	44.558	40.355	45.339
SD	3.458	1.681	23.934	14.810	18.648	27.141	15.217
Photograph							
M	−13.173	2.288	37.290	41.923	44.180	41.269	44.529
SD	3.518	1.648	25.735	22.861	19.598	27.545	14.810
Range	−20.270 to −0.180	−3.430 to −8.360	0–100	0–100	0–100	0–100	0–100

Note. PCA = principal component analysis.

54,138.500, $p < .001$, with an effect size of 0.200. Participants felt more positively when viewing the face as a photograph ($M =$ 53.094, $SD = 20.180$) compared to as a painting ($M = 42.381$, $SD = 19.686$), $W(599) = 31{,}699.500$, $p < .001$, with an effect of −0.298. Finally, Face 6 (Figure 6) was perceived as younger in the photograph ($M = 57.749$, $SD = 8.728$) than in the painting ($M = 59.398$, $SD = 10.027$), $W(599) = 49{,}909.000$, $p = .024$, with an effect size of 0.106.

Explicit Bias and Sociodemographic Factors

To examine the impact of explicit bias toward people with facial anomalies, a linear mixed model was constructed with warmth (or another variable) as the dependent variable and image type (photograph | painting) and explicit bias as fixed factors. Random intercepts for faces and subjects were modeled. We found that explicit bias

Table 2
Descriptive Statistics for 31 Traits (N = 601)

Trait	Photograph, *M* (*SD*)	Painting, *M* (*SD*)	*p*
Sincere	62.29 (22.21)	59.63 (22.80)	.463
Tolerant	59.51 (23.80)	57.18 (24.71)	.635
Good natured	59.45 (23.19)	57.27 (23.35)	.654
Trustworthy	60.05 (22.98)	57.46 (23.53)	.508
Friendly	56.51 (24.50)	54.02 (24.63)	.639
Helpful	58.98 (23.35)	56.91 (23.75)	.616
Moral	61.59 (22.16)	59.54 (22.74)	.580
Understanding	60.88 (24.02)	58.51 (24.12)	.632
Intelligent	64.33 (21.07)	63.29 (20.84)	.714
Efficient	62.92 (20.98)	62.46 (21.35)	.852
Skilled	62.99 (20.64)	62.70 (20.59)	.906
Confident	54.15 (24.95)	56.68 (23.83)	.570
Creative	53.64 (22.04)	53.09 (22.74)	.883
Capable	66.78 (21.65)	67.31 (21.28)	.822
Foresighted	57.94 (21.68)	58.29 (21.83)	.882
Clever	59.22 (21.53)	59.50 (21.63)	.911
Capable of hunger	77.39 (26.28)	77.31 (26.68)	.968
Capable of fear	75.90 (26.27)	76.06 (26.57)	.956
Capable of pain	79.84 (23.68)	79.21 (24.92)	.769
Capable of rage	71.55 (26.44)	72.88 (26.48)	.694
Capable of desire	75.17 (25.16)	75.53 (25.20)	.861
Capable of pleasure	73.39 (25.88)	73.40 (26.33)	.997
Capable of pride	70.09 (27.79)	72.35 (26.53)	.468
Capable of embarrassment	71.50 (27.67)	70.59 (28.71)	.785
Capable of joy	69.88 (27.36)	70.70 (27.55)	.818
Communicative	56.60 (23.52)	56.40 (24.19)	.951
Knowledgeable about others' feelings	59.41 (23.76)	58.51 (24.67)	.848
Capable of remembering things	70.94 (22.34)	70.02 (23.37)	.673
Capable of telling right from wrong	71.53 (23.94)	70.88 (24.72)	.799
Capable of planning	69.58 (23.19)	69.07 (23.56)	.822
Capable of self-control	66.99 (24.53)	65.76 (25.15)	.695

Table 3
Independent Samples T Test (Mann–Whitney U Test) Performed for the Six Face Stimuli Separately

Face ID and assessed trait	*W*	*p*	Rank-biserial correlation	Rank-biserial correlation, *SE*
Face_1_Warmth	47,183.000	.335	.046	.047
Face_1_Competence	48,864.000	.079	.083	.047
Face 1_Attractive	46,107.000	.646	.022	.047
Face 1_Old	47,165.000	.338	.045	.047
Face 1_Valence	46,266.000	.592	.025	.047
Face 1_Arousal	44,269.500	.686	−.019	.047
Face 1_Dominance	42,488.000	.210	−.059	.047
Face_2_Warmth	46,087.000	.653	.021	.047
Face_2_Competence	47,400.000	.286	.050	.047
Face 2_Attractive	45,274.000	.946	.003	.047
Face 2_Old	48,890.000	.077	.083	.047
Face 2_Valence	43,133.500	.348	−.044	.047
Face 2_Arousal	45,335.000	.923	.005	.047
Face 2_Dominance	44,009.500	.597	−.025	.047
Face_3_Warmth	44,946.000	.932	−.004	.047
Face_3_Competence	45,875.000	.726	.017	.047
Face 3_Attractive	48,094.500	.163	.066	.047
Face 3_Old	53,329.000	**<.001**	.182	.047
Face 3_Valence	53,656.500	**<.001**	.189	.047
Face 3_Arousal	40,860.500	**.045**	−.095	.047
Face 3_Dominance	49,695.500	**.031**	.101	.047
Face_4_Warmth	48,375.000	.127	.072	.047
Face_4_Competence	49,352.000	**.047**	.094	.047
Face 4_Attractive	36,266.000	**<.001**	−.196	.047
Face 4_Old	39,882.500	**.014**	−.116	.047
Face 4_Valence	31,699.500	**<.001**	−.298	.047
Face 4_Arousal	54,138.500	**<.001**	.200	.047
Face 4_Dominance	43,603.500	.471	−.034	.047
Face_5_Warmth	44,430.000	.743	−.015	.047
Face_5_Competence	46,823.000	.426	.038	.047
Face 5_Attractive	46,383.000	.556	.028	.047
Face 5_Old	47,682.500	.229	.057	.047
Face 5_Valence	46,965.500	.388	.041	.047
Face 5_Arousal	48,207.500	.148	.068	.047
Face 5_Dominance	43,558.000	.457	−.035	.047
Face_6_Warmth	46,462.500	.531	.030	.047
Face_6_Competence	46,233.500	.604	.024	.047
Face 6_Attractive	45,218.500	.967	.002	.047
Face 6_Old	49,909.000	**.024**	.106	.047
Face 6_Valence	46,768.500	.441	.036	.047
Face 6_Arousal	43,624.000	.479	−.033	.047
Face 6_Dominance	45,769.500	.763	.014	.047

Note. For the Mann–Whitney *U* test, the effect size is given by the rank biserial correlation. All significant *p* values are bolded.

Figure 4

Face 3 in the Face Rating Task Is Shown as a Photograph (Left) and Painting (Right)

Note. See the online article for the color version of this figure.

impacted all measured variables, except for arousal (Table S3 in the online supplemental materials). Higher explicit bias was associated with higher ratings of warmth and competence and lower ratings of valence and dominance. In addition, participants with greater explicit bias perceived faces as less attractive.

To examine the impact of participant gender on responses, a linear mixed model was constructed with warmth (or another variable) as the dependent variable and image type (photograph | painting) and gender as fixed factors. Random intercepts for faces and subjects were modeled. Regarding perceptions of warmth, we found a main effect of gender ($\beta = 0.550$, $SE = 0.126$), $t(259.031) = 4.380$, $p < .001$, and a two-way interaction between gender and image type ($\beta = -0.314$, $SE = 0.126$), $t(259.031) = -2.496$, $p = .013$. Male participants perceived faces as warmer than female participants, regardless of whether the face was presented as a photograph or a painting. We found no differences in competence, arousal, dominance, or valence based on

Figure 5

Face 4 in the Face Rating Task Is Shown as a Photograph (Left) and Painting (Right)

Note. See the online article for the color version of this figure.

Figure 6

Face 6 in the Face Rating Task Is Shown as a Photograph (Left) and Painting (Right)

Note. See the online article for the color version of this figure.

participant gender. However, we found a main effect of gender for attractiveness ratings ($\beta = -2.834$, $SE = 0.889$), $t(103.475) = -3.189$, $p = .002$. Female participants perceived faces as more attractive than male participants, regardless of whether the face was presented as a photograph or a painting. We also assessed the relationship between political orientation and participant responses and found that more conservative participants had higher explicit biases, perceptions of warmth, and feelings of arousal but lower perceptions of competence, valence, and attractiveness when viewing anomalous faces (Table S4 in the online supplemental materials).

Discussion

Does art have a salutary effect by alleviating negative attribution of its subject's inner traits and enhancing the viewer's affective experience? We sought to answer this question in the psychosocial context of visible craniofacial anomalies. As facial disfigurement induces measurable social penalties, we used such stimuli to explore two interrelated aspects of artistic rendering: the anomalous-is-bad stereotype and the distancing-embracing model.

When examining the effects of artistic rendering on our measured variables while accounting for other stimuli and participant variables, we did not observe differences in perceptions of either warmth and competence or feelings of arousal, valence, and dominance based on whether faces were presented as photographs or paintings. We also tested each trait separately, again finding no differences. As such, our basic hypothesis was not confirmed. In considering potential explanations for this null result, the effect of artistic rendering on face perceptions may be more nuanced than our study was able to capture with the current stimuli set. Additionally, contextual factors, such as the brief exposure and absence of narrative context about the individual faces portrayed, may have limited participants' responses and prevented the expected difference based on image conditions.

However, when analyzing the individual face stimuli separately, some differences were evident, suggesting that artistic rendering can shift responses to certain types of scars. Specifically, the contrast between responses to Face 3 and to Face 4 is potentially revealing. Response patterns for Face 3 (Figure 4) were consistent with our hypothesis about the relationship between artistic rendering and affective response. Participants who viewed the painting of Face 3 felt less aroused, more positive valence, and more in control than those who viewed the photograph. Presumably, when viewing this artistically rendered facial scar, arousal was decreased by the activation of an art schema and how one responds to it (V. Wagner et al., 2014). These schemata imply control over one's exposure to and reception of the artwork. As a result, negative emotions such as disgust and aversion, as may be provoked by the appearance of the striking scar on Face 3, are kept at a psychological distance so that art enjoyment is not compromised and negative emotions can be safely integrated (Menninghaus et al., 2017). Importantly, concomitant negative and positive feelings are believed to render art processing richer in emotional variation (Chatterjee, 2017) and, therefore, serve to transform negative emotions into a pleasurable aesthetic experience.

The woman depicted in Face 3 (Figure 4) bears a very salient facial scar. The result of a multistage forehead flap procedure for nasal reconstruction, the scar is midline, and extends from her hairline to nose tip, covering two-thirds of her facial height. Furthermore, the defect has prominent dimensionality and asymmetry, as the flap has not yet been inset, and the wound is unclosed. The greater severity of this facial anomaly brought about more pronounced effects of artistic rendering on the viewer and differences in participant responses. This finding is consistent with previous research suggesting that people with larger anomalies closer to the center of the face experience worse social penalties (Dey et al., 2015). The response patterns for Face 4 (Figure 5) revealed an effect of artistic rendering on character perceptions that differed from

Face 3. Participants perceived the artistic version of Face 4 as more competent, as evident in ratings of intelligence, skill, confidence, and creativity compared to the photograph of this face. Evaluating the visible characteristics of the anomaly of Face 4, the man represented in the image has symmetric defects, with two relatively small linear scars on both cheeks. The cause of these marks is unclear, but they were likely intentional. Specifically, they resemble ritual scarification, a rite of passage denoting maturity and competence. In this case, artistic rendering may have heightened perceptions of competence by framing the scar in a way that further evokes cultural or symbolic associations with strength and resilience. We cannot draw definitive conclusions regarding the lack of significant effects for the remaining faces, although differences in scar characteristics or the degree to which the particular filter influenced the appearance of their scars may have played a role.

Interactions between scar location, facial subunit, and orientation to facial muscular tension lines may affect social perception. Zapatero et al. (2022) found that a scar crossing the lower eyelid perpendicular to tension lines are associated with lower perceived attractiveness, confidence, and friendliness. Extending these observations to the arts and media, dermatologic depictions of heroes versus villains in movies have been used since the silent film era (Croley et al., 2017) and are exemplified by the contrasting facial scars of "Harry Potter" and "The Joker." While cross-sectional research demonstrates that popular film villains harbor significantly more facial anomalies than heroes (Croley et al., 2017), some scars are associated with bravery and fairness, while others signify moral corruption (C. S. Wagner et al., 2023). An analysis of cinematic representations of facial differences in the United States and India revealed that linear scars make up a larger proportion of scars in heroes compared to villains, and facial differences in heroes covered fewer aesthetic subunits than in villains (C. S. Wagner et al., 2023). As such, facial scars like those in Face 4 (Figure 5) may be perceived in a more neutral or positive light. The symmetry in Face 4 renders the scar more decorative and intentional. Intentional scarification for beautification and rituals is common in Africa (Ayeni et al., 2007; Tybur et al., 2022; Weisz, 1972). For instance, the Hadza hunter-gatherers of Tanzania intentionally use a small knife to make vertical or lateral incisions on the cheeks for both aesthetic and functional purposes. In this context, the results for Faces 3 and 4 support our understanding that facial deviations from physical norms are perceived as cues to compromised health, while facial symmetry can be a sign of robust health and immunity from pathogens (Ayeni et al., 2007; Tybur et al., 2022; Weisz, 1972).

We also found that viewers who acknowledged their own explicit bias against people with facial anomalies attributed greater warmth and competence to those faces. This response would seem paradoxical. Why would someone attribute desirable traits to faces to which they explicitly harbor a negative bias? Here, the fact that they also experienced more negative valence and less control (dominance) might be critical. This pattern generates the hypothesis that when one feels displeasure and less in control, attributions of warmth and competence might reflect pity rather than compassion. These observations invite new lines of investigations of how viewers' pleasure and control form their perceptions of character even when those attributions appear positive.

Our study revisits classical aesthetics in light of contemporary psychological research. Artistic representation of facial differences across time and cultures has moral implications. Lower attractiveness is associated with physical illness, aggression, and dishonesty (Eco, 2007). At the same time, depicting less attractive figures in an expressive and visually appealing fashion, as dictated by interacting elements such as color palette and style of brushstrokes, may paradoxically result in the subject being perceived as beautiful. Therefore, contemporary artists frequently depict aspects of the human form traditionally deemed aesthetically unpleasant. For instance, contemporary British painter Jenny Saville's works highlight the imperfections of human flesh, demonstrating how the artistic rendering of traditionally unappealing facial features may interest viewers and provoke positive emotions. Our findings partially support those of V. Wagner et al. (2014), who presented photographs of repulsive objects to participants as either art photographs or documentary photographs for hygiene educational purposes. The authors found a higher positive affect in the art-framing group, although reported feelings of disgust did not differ between the two conditions. These results likewise suggested that art framing does not erase or diminish negative affect vis à vis the disgusting stimulus features, which are maintained and alternatively experienced in a different light upon artistic rendering. In other words, such framing did not eliminate feelings of disgust but allowed viewers to experience them in a manner consistent with the distancing-embracing model, ultimately enhancing their appreciation of the subject matter. Similarly, applying this model to our hypothesis suggests that viewing facial scars as paintings may enable a balanced response of distance and empathy, potentially fostering a deeper appreciation for the individuals depicted. However, we cannot draw definitive conclusions given the null results of our primary analysis.

Understanding the psychological implications of visual representation of facial anomalies offers insight into the potential effects of facial reconstructive procedures on patient well-being and quality of life. As craniofacial surgery renders facial anomalies less salient and "normalizes" appearance (Whitaker et al., 1975), surgical correction can improve the form and function of facial features and also guide perceptions of inner traits (Mazzaferro et al., 2017). Furthermore, our findings may inform intervention strategies to limit bias toward people with visible facial differences. The present study reinforces a method to potentially mitigate harmful trends such as the anomalous-is-bad stereotype via artistic representation of individuals with physical differences. Perhaps, art can play a role in checking prejudice against anomalous faces in the clinical space. For example, incorporating artistic portrayals of individuals with visible facial differences into art exhibitions, media, or educational materials could encourage the public to engage more positively with diverse appearances. This approach may help combat stereotypes by shifting societal perceptions over time. Furthermore, the more widespread integration of facial differences into art could have a positive impact on individuals with facial anomalies themselves, promoting acceptance and reducing internalized stigma.

This study has several limits. We only used six face stimuli, which likely made it challenging to assess significant differences between measured variables. More stimuli would allow for a broader range of faces, as no single face captures all possible anomalies for all demographic subtypes. Nonetheless, we maintained an equal distribution of genders and races among the selected stimuli. While a small number of stimuli were used for pragmatic experimental reasons, they do not allow for a robust examination of effects rendered by different kinds of anomalies as we saw with Faces 3 and 4. Additionally, we only used

one kind of painterly rendering, precluding an analysis of the effects of different painting styles on responses. Future research could examine other renderings and a more robust art context, such as viewing Saville's paintings in a gallery, that might be more likely to induce the detachment assumed in the distancing-embracing hypothesis. Finally, our results only focus on the immediate experiential correlates of art exposure, limiting claims about the long-term psychosocial benefits of art processing. Nonetheless, artistic representation may shift affective responses to specific types of scars.

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