JAMA Facial Plastic Surgery | Original Investigation | AAFPRS FACIAL REJUVENATION FEATURED ARTICLE

Evaluation of Personality Perception in Men Before and After Facial Cosmetic Surgery

Keon M. Parsa, MD; William Gao, MD; Jack Lally, MD; Stephen P. Davison, MD; Michael J. Reilly, MD

IMPORTANCE Facial cosmetic surgery has previously focused on improvements in perceived physical attractiveness and youthfulness. However, human beings are judged throughout life based on many other characteristics and personal qualities that are conveyed by their faces.

OBJECTIVE To examine the association of facial cosmetic surgery in men with perceptions of attractiveness, masculinity, and personality traits.

DESIGN, SETTING, AND PARTICIPANTS Cohort study with retrospective evaluation by blinded raters of preoperative and postoperative photographs of 24 male patients who underwent facial cosmetic surgery between January 1, 2009, and January 31, 2016. A total of 6 surveys were constructed with 8 sets of photographs each (4 preoperative and 4 postoperative). Each of these surveys was then sent to at least 36 lay people via the web-based survey tool Survey Monkey. Additional invites were sent for individual surveys until a minimum of 24 responses were received for each survey. Preoperative and postoperative photographs of the same patient were not placed in the same survey to avoid recall bias. Anonymous raters used a 7-point Likert scale to rate their perception of each patient's personality traits (aggressiveness, extroversion, likeability, risk seeking, sociability, and trustworthiness), attractiveness, and masculinity based on photographs in their assigned survey. Raters were blinded to study intent. Data analysis was performed between August 2018 and March 2019.

MAIN OUTCOMES AND MEASURES Ratings of personality, attractiveness, and masculinity.

RESULTS This survey study included photographs of 24 men who underwent facial cosmetic surgery; the mean (SD) age of the patients was 49.3 (16.4) years. A total of 145 participants completed the survey; the majority of respondents were men (n = 81; 56%) between the ages of 25 and 34 years (n = 116; 80%). Score increases were significant for perceived attractiveness (0.29; 95% CI, 0.13-0.46), likeability (0.41; 95% CI, 0.24-0.57), social skills (0.25; 95% CI, 0.08-0.40), and trustworthiness (0.27, 95% CI, 0.11-0.44) when evaluating all facial cosmetic procedures together (upper blepharoplasty, lower blepharoplasty, face-lift, brow-lift, neck-lift, rhinoplasty, and/or chin implant). Upper blepharoplasty was associated with positive changes in perceived likeability (0.72; 95% CI, 0.06-1.50) and trustworthiness (0.74; 95% CI, 0.22-1.25). Lower blepharoplasty was associated with decreased perception of risk seeking (−0.78; 95% CI, −1.45 to −0.10). Face-lift was associated with increased perception of likeability (0.69; 95% CI, 0.08-1.30) and trustworthiness (0.66; 95% CI, 0.05-1.27). Neck-lift was associated with increased perception of extroversion (0.60; 95% CI, 0.10-1.09) and masculinity (0.70; 95% CI, 0.21-1.19). Patients who underwent rhinoplasty had improvements in perceived attractiveness (0.51; 95% CI, 0.03-1.00) and likeability (0.40; 95% CI, 0.03-1.00). Chin augmentation did not show any significant improvements.

CONCLUSIONS AND RELEVANCE The results of this study suggest that men undergoing facial cosmetic surgery may experience changes in perceived attractiveness, masculinity, and a variety of personality traits. These findings complement those from a previous study on female patients, which together broaden the understanding of the association of cosmetic surgery with societal perceptions of persona.

LEVEL OF EVIDENCE NA.

JAMA Facial Plast Surg. doi:10.1001/jamafacial.2019.0463
Published online July 11, 2019.

Audio and Supplemental content

Author Affiliations: Georgetown University School of Medicine, Washington, DC (Parsa, Gao, Davison, Reilly); Brooke Army Medical Center, Fort Sam Houston, Texas (Lally).

Corresponding Author: Michael J. Reilly, MD, Georgetown University School of Medicine, 3800 Reservoir Rd NW, Washington, DC 20007 (michael.j.reilly@gunet.georgetown.edu).

A person's physical appearance is the personal characteristic most obvious and accessible to others in social interaction.[1,2] Although there is little evidence that these inferences accurately reflect the actual personality of the observed person, it is not surprising that subtle changes in neutral facial appearances are powerful enough to alter judgments of personality.[3-10] *Facial profiling*, as it is otherwise known, appears to be an evolutionary adaptation in response to facial qualities that are subconsciously associated with specific personality attributes. Traits that have been shown to be reproducibly judged in neutral facial evaluations include likeability, social skills, extroversion, trustworthiness, aggressiveness, and risk-seeking behavior.[11]

Research on personality has shown that perceiving a person as attractive fosters positive expectations about his or her personal characteristics. More specifically, attractiveness is strongly associated with sociability, dominance, happiness, and success.[1,3,4] Even infants have the ability to categorize based on attractiveness because they prefer to look at attractive faces.[12] Conversely, individuals with congenital or acquired facial abnormalities, which are rated as significantly less attractive, are perceived as less honest, less employable, less trustworthy, and less popular.[4,13] Thus, an individual's well-being is meaningfully tied to how others perceive their facial features.

Our previous study on women who underwent facial rejuvenation surgery showed an overall increase in postoperative perception of likeability, social skills, attractiveness, and femininity.[14] The purpose of the current study is to evaluate and quantify changes in personality perceptions of men who have undergone facial cosmetic surgery.

Key Points

Question Is facial cosmetic surgery in men associated with the perception of attractiveness, masculinity, and personality?

Findings This survey study of 145 lay participants who rated photographs of 24 men before and after facial cosmetic surgery demonstrated significant postoperative improvements in perceptions of attractiveness, likeability, social skills, and trustworthiness.

Meaning These results may broaden the understanding of cosmetic surgery's association with societal perceptions of persona.

Methods

Approval for this study was obtained from the Georgetown University Medical Center Institutional Review Board. Medical records of all white, male patients who underwent facial cosmetic surgery by 2 authors (M.J.R. and S.P.D.) between January 1, 2009, and January 31, 2016, were then reviewed. Only patients who provided written consent to have their photos used for research purposes and who had complete sets (frontal, oblique, and profile views) of preoperative and postoperative photographs in resting/neutral expression were included. Any cases without well-matched lighting and background were excluded.

There were 24 patients with adequate and appropriate preoperative and postoperative photos who were ultimately included in the study, which resulted in 48 total sets of photos. A total of 6 surveys, each consisting of 8 sets of photos (4 preoperative and 4 postoperative), were constructed. The surveys were designed such that preoperative and postoperative photographs of the same patient were not placed in the same survey in order to prevent recall bias or direct comparison by raters. Each of these surveys was then sent to at least 36 lay people via the web-based survey tool Survey Monkey. Additional invites were sent for individual surveys until a minimum of 24 responses were received for each survey. Informed consent was obtained for all web-based participants prior to proceeding to the survey, and the overall response rate was 54.5%.

Survey respondents provided basic demographic information and, using a 7-point Likert scale, rated the level to which they believed they criticized the appearance of others. They additionally rated their perception of each pictured patient's personality traits (aggressiveness, extroversion, likeability, risk seeking, sociability, and trustworthiness), attractiveness, and masculinity. The aforementioned personality traits were selected based on previous identification as having valid ratability.[5-7,13] Survey participants were blinded to the study intent. The study excluded physicians as well as other clinicians who may have had experience in facial analysis and/or facial plastic surgery.

The data has a hierarchy structure with 2 levels of variations: variation of patient and variation of raters. Because the data are clustered, a linear mixed-effect model was performed to account for the correlation between raters within each cluster (ie, patient being rated). The marginal difference of each outcome between preoperative and postoperative state was analyzed separately, and the same analysis was conducted using the surgical procedure as a covariate to control for the confounding effect of procedures. The multivariate linear mixed model was also built to correct for possible correlation between outcome variables and adjust for the effect of covariate procedure. This also served to address possible observer bias. An unpaired t test was used to evaluate the data on each patient.

Results

The survey response rate was 54.5% (145 of 266 surveys), which is consistent with published benchmark averages and trends.[15] The majority of respondents were white (n =110; 76%), men (n = 81; 56%), between the ages of 25 and 34 years (n = 116; 80%), and had a bachelor's degree or higher level of education (n = 138; 95%). The degree to which survey respondents criticized the appearance of others did not vary significantly between the 6 survey sets. Score increases were significant for perceived attractiveness (0.29; 95% CI, 0.13-0.46), likeability (0.41; 95% CI, 0.24-0.57), social skills (0.25; 95% CI, 0.08-0.40), and trustworthiness (0.27, 95% CI, 0.11-0.44) when

Table 1. Ratings for Patients Undergoing All Facial Cosmetic Procedures[a]

Outcomes	Estimate (SE)		Difference (95% CI)	*P* Value
	Preoperative	Postoperative		
Aggressiveness	3.38 (0.25)	3.24 (0.25)	−0.14 (−0.30 to 0.03)	.10
Extroversion	3.41 (0.25)	3.52 (0.25)	0.11 (−0.06 to 0.27)	.20
Likeability	3.54 (0.25)	3.94 (0.25)	0.41 (0.24 to 0.57)	<.001
Risk seeking	3.40 (0.25)	3.39 (0.25)	−0.01 (−0.17 to 0.15)	.89
Sociability	3.63 (0.25)	3.87 (0.25)	0.24 (0.08 to 0.40)	.004
Trustworthiness	3.41 (0.25)	3.68 (0.25)	0.27 (0.11 to 0.44)	.001
Attractiveness	2.76 (0.25)	3.05 (0.25)	0.29 (0.13 to 0.46)	<.001
Masculinity	4.19 (0.25)	4.32 (0.25)	0.13 (−0.03 to 0.30)	.11

[a] A multivariate linear mixed-effect model was used to adjust for procedures and correlation between outcomes.

evaluating all facial cosmetic procedures together (upper blepharoplasty, lower blepharoplasty, face-lift, brow-lift, neck-lift, rhinoplasty, and/or chin implant). There were no significant score changes noted for perceived extroversion (0.11, 95% CI, −0.06 to 0.27), risk seeking (−0.01, 95% CI, −0.17 to 0.15), aggressiveness (−0.14; 95% CI, −0.30 to 0.02), or masculinity (0.13, 95% CI, −0.03 to 0.30) (**Table 1**). Not all of the group findings were generalizable to each patient. The patient in **Figure 1** demonstrates improvements in attractiveness (1.90; $P < .001$) and social skills (0.98; $P = .01$), and he also had a statistically significant different perception in extroversion (0.83; $P = .03$), risk seeking (1.00; $P = .01$), and masculinity (2.06; $P < .001$).

When the analysis was performed on a procedure-specific basis (**Table 2**), chin augmentation was the only procedure not associated with a change in perceived attractiveness, masculinity, or personality. In contrast, upper blepharoplasty, lower blepharoplasty, brow-lift, face-lift, neck-lift, and rhinoplasty did show statistically significant changes in ratings. For upper blepharoplasty, positive changes in the perception of likeability (0.72; 95% CI, 0.06-1.50) and trustworthiness (0.74; 95% CI, 0.22-1.25) were found. Lower blepharoplasty was associated with a decrease in perceived risk seeking (−0.78; 95% CI, −1.45 to −0.10). Brow-lift was associated with an increased perception of extroversion (0.78; 95% CI, 0.06-1.50) and risk seeking (−0.9; 95% CI, −1.62 to −0.18).

For face-lift procedures, likeability (0.69; 95% CI, 0.08-1.30) and trustworthiness (0.66; 95% CI, 0.05-1.27) were perceived as having a positive change. Neck-lift was associated with an increase in perceived extroversion (0.60; 95% CI, 0.10-1.09) and masculinity (0.70; 95% CI, 0.21-1.19). Lastly, patients undergoing rhinoplasty experienced an improvement in attractiveness (0.51; 95% CI, 0.03-1.00) with increased likeability (0.40; 95% CI, 0.03-1.00). **Figure 2** demonstrates the results of a patient following rhinoplasty and chin augmentation.

For details regarding the multivariate linear mixed-effect model and the solution for fixed-effect model and random effect model, please refer to the Supplement.

Figure 1. Preoperative (Top) and Postoperative (Bottom) Photographs of a Patient and Detailed Perceived Personality Changes After Comprehensive Facial Cosmetic Surgery

Patient Characteristic	Preoperative Rating	Postoperative Rating	Net Rating Change	*P* Value
Aggressiveness	3.73	3.90	0.17	.67
Extroversion	4.32	5.15	0.83	.03
Likeability	4.09	4.65	0.56	.12
Risk seeking	3.45	4.45	1.00	.01
Sociability	4.32	5.30	0.98	.01
Trustworthiness	3.77	4.35	0.58	.14
Attractiveness	2.95	4.85	1.90	<.001
Masculinity	3.14	5.20	2.06	<.001

Discussion

The overgeneralization theory states that personality perceptions are drawn from inferences based on the hint of dynamic expression and is applicable to the findings of this study.[16,17] For each of the specific facial cosmetic procedures that were evaluated, statistically significant changes were seen in at least 1 measured domain of personality, attractiveness, and/or masculinity. Although our previous study on female patients undergoing various facial rejuvenation procedures revealed enhanced perceived femininity after face-lift and lower blepharoplasty,[14] the current study revealed increased perceived masculinity after neck-lift procedures. A well-defined jawline is a traditionally masculine trait and is seen as a sign of physical fitness and athleticism.[9,18] It is unexpected that a similar enhancement of perceived masculinity was not seen in patients undergoing chin augmentation. This is likely owing to the small number of patients in this subgroup (n = 4). Results in this subgroup appear to have been skewed by a notable decrease in perceived masculinity in a patient with a chin

Table 2. Ratings for Patients Undergoing Facial Cosmetic Surgery by Procedure

Procedure	Outcomes	Estimate (SE)		Difference (95% CI)	*P* Value
		Preoperative	Postoperative		
Brow-lift (n = 2)	Aggressiveness	3.95 (0.15)	3.44 (0.34)	−0.52 (−1.24 to 0.20)	.16
	Extroversion	3.24 (0.15)	4.02 (0.34)	0.78 (0.06 to 1.50)	.03
	Likeability	4.14 (0.15)	4.39 (0.34)	0.25 (−0.47 to 0.98)	.49
	Risk seeking	4.00 (0.15)	3.11 (0.34)	−0.90 (−1.62 to −0.18)	.01
	Sociability	4.26 (0.15)	3.77 (0.34)	−0.49 (−1.21 to 0.23)	.18
	Trustworthiness	3.98 (0.15)	4.39 (0.34)	0.41 (−0.31 to 1.13)	.26
	Attractiveness	3.38 (0.15)	3.13 (0.34)	−0.24 (−0.97 to 0.48)	.51
	Masculinity	4.73 (0.15)	4.52 (0.34)	−0.22 (−0.94 to 0.50)	.55
Upper blepharoplasty (n = 9)	Aggressiveness	3.38 (0.27)	3.06 (0.28)	−0.32 (−0.83 to 0.19)	.22
	Extroversion	3.38 (0.27)	3.64 (0.28)	0.26 (−0.26 to 0.77)	.32
	Likeability	3.47 (0.27)	4.18 (0.28)	0.72 (0.20 to 1.23)	.01
	Risk seeking	3.45 (0.27)	3.12 (0.28)	−0.33 (−0.84 to 0.18)	.20
	Sociability	3.68 (0.27)	4.07 (0.28)	0.40 (−0.12 to 0.91)	.13
	Trustworthiness	3.36 (0.27)	4.09 (0.28)	0.74 (0.22 to 1.25)	.01
	Attractiveness	2.82 (0.27)	3.15 (0.28)	0.33 (−0.19 to 0.84)	.21
	Masculinity	4.13 (0.27)	4.33 (0.28)	0.20 (−0.32 to 0.71)	.45
Lower blepharoplasty (n = 10)	Aggressiveness	3.52 (0.24)	3.00 (0.35)	−0.52 (−1.20 to 0.16)	.13
	Extroversion	3.59 (0.24)	3.46 (0.35)	−0.13 (−0.81 to 0.55)	.70
	Likeability	3.71 (0.24)	3.91 (0.35)	0.21 (−0.47 to 0.88)	.55
	Risk seeking	3.70 (0.24)	2.93 (0.35)	−0.78 (−1.45 to −0.10)	.02
	Sociability	3.90 (0.24)	3.80 (0.35)	−0.11 (−0.78 to 0.57)	.76
	Trustworthiness	3.50 (0.24)	3.89 (0.35)	0.39 (−0.29 to 1.06)	.26
	Attractiveness	3.04 (0.24)	2.83 (0.35)	−0.21 (−0.89 to 0.47)	.54
	Masculinity	4.20 (0.24)	4.26 (0.35)	0.06 (−0.62 to 0.74)	.86
Face-lift (n = 3)	Aggressiveness	3.40 (0.21)	3.55 (0.28)	0.15 (−0.45 to 0.76)	.62
	Extroversion	3.48 (0.21)	3.86 (0.28)	0.38 (−0.23 to 0.99)	.22
	Likeability	3.61 (0.21)	4.30 (0.28)	0.69 (0.08 to 1.30)	.02
	Risk seeking	3.49 (0.21)	3.40 (0.28)	−0.08 (−0.70 to 0.52)	.78
	Sociability	3.73 (0.21)	4.25 (0.28)	0.52 (−0.08 to 1.13)	.09
	Trustworthiness	3.47 (0.21)	4.13 (0.28)	0.66 (0.05 to 1.27)	.03
	Attractiveness	2.82 (0.21)	3.23 (0.28)	0.41 (−0.19 to 1.02)	.18
	Masculinity	4.21 (0.21)	4.61 (0.28)	0.40 (−0.20 to 0.77)	.19
Neck-lift (n = 5)	Aggressiveness	3.76 (0.16)	4.02 (0.24)	0.26 (−0.23 to 0.75)	.30
	Extroversion	3.76 (0.16)	4.36 (0.24)	0.60 (0.10 to 1.09)	.02
	Likeability	3.96 (0.16)	4.31 (0.24)	0.35 (−0.15 to 0.84)	.17
	Risk seeking	3.87 (0.16)	3.87 (0.24)	0 (−0.49 to 0.49)	.99
	Sociability	4.04 (0.16)	4.42 (0.24)	0.38 (−0.11 to 0.88)	.13
	Trustworthiness	3.81 (0.16)	4.19 (0.24)	0.39 (−0.11 to 0.88)	.12
	Attractiveness	3.22 (0.16)	3.50 (0.24)	0.28 (−0.22 to 0.93)	.27
	Masculinity	4.59 (0.17)	5.29 (0.24)	0.70 (0.21 to 1.19)	.01
Rhinoplasty (n = 12)	Aggressiveness	3.91 (0.17)	3.57 (0.18)	−0.34 (−0.83 to 0.14)	.16
	Extroversion	3.84 (0.17)	3.68 (0.18)	−0.16 (−0.64 to 0.33)	.52
	Likeability	3.83 (0.17)	4.22 (0.18)	0.40 (−0.08 to 0.88)	.11
	Risk seeking	3.67 (0.17)	3.92 (0.18)	0.26 (−0.22 to 0.74)	.29
	Sociability	3.81 (0.17)	4.16 (0.18)	0.35 (−0.14 to 0.83)	.16
	Trustworthiness	3.82 (0.17)	3.80 (0.18)	−0.01 (−0.50 to 0.50)	.95
	Attractiveness	2.96 (0.17)	3.47 (0.18)	0.51 (0.03 to 1.00)	.03
	Masculinity	4.77 (0.17)	4.48 (0.18)	−0.30 (−0.78 to 0.19)	.22

(continued)

implant who also underwent face-lift. Overall, the data suggest that the current repertoire and execution of facial cosmetic procedures for men are likely not as gender enhancing as they are for women.

Table 2. Ratings for Patients Undergoing Facial Cosmetic Surgery by Procedure (continued)

Procedure	Outcomes	Estimate (SE)		Difference (95% CI)	*P* Value
		Preoperative	Postoperative		
Chin augmentation (n = 4)	Aggressiveness	3.95 (0.20)	3.85 (0.27)	−0.11 (−0.65 to 0.44)	.70
	Extroversion	4.01 (0.20)	3.50 (0.27)	−0.51 (−1.06 to 0.03)	.06
	Likeability	4.13 (0.20)	3.95 (0.27)	−0.18 (−0.73 to 0.37)	.51
	Risk seeking	4.03 (0.20)	3.61 (0.27)	−0.42 (−0.96 to 0.13)	.13
	Sociability	4.24 (0.20)	3.84 (0.27)	−0.40 (−0.95 to 0.15)	.16
	Trustworthiness	4.00 (0.20)	3.99 (0.27)	−0.01 (−0.56 to 0.53)	.96
	Attractiveness	3.37 (0.20)	2.99 (0.27)	−0.38 (−0.92 to 0.17)	.18
	Masculinity	4.75 (0.20)	4.54 (0.27)	−0.21 (−0.76 to 0.34)	.45

Changes in personality perception appear to be related to specific anatomic areas of the face. The corner of the mouth and fullness of the cheeks, for example, are diagnostic regions for happy expressions and play an important role in perception of personality traits such as extroversion, likability, and social skills.[2] This may explain why the patients undergoing face-lift, which can subtly affect the position of the oral commissure, are noted to be significantly more likeable and trustworthy postoperatively. These findings are more modest than the results of our previous study on female patients undergoing face-lift, which demonstrated improvements in perceived likeability, social skills, attractiveness, and femininity. It appears that the semblance of a smile is not linked to masculinity as it is to femininity.[19,20]

The eyes have been shown to be highly diagnostic for trustworthiness and vitality.[8] Procedures that widen the palpebral aperture can help make patients look less tired and more engaged, with consequent benefits to personality perceptions.[6,12] In the present study, patients undergoing upper blepharoplasty appear more likeable and trustworthy after surgery.

Lastly, patients who underwent rhinoplasty had no significant change in personality perception or masculinity. These patients did experience a significant increase in attractiveness, which is in line with previously published literature.[21-24] The nose is not a particularly emotive part of the face, which may explain the lack of change in personality domains. This further supports the theory of overgeneralization where perceptions of personality are inferred from resting facial expressions.

It is important to note that although generally favorable, not all patients experienced a positive change in the postoperative perception of their personality traits, masculinity, and attractiveness. More research is needed to better understand the different variables that can optimize outcomes at the individual patient level.

Figure 2. Preoperative (Top) and Postoperative (Bottom) Photographs of a Patient and Detailed Lack of Perceived Personality Changes After Rhinoplasty

Patient Characteristic	Preoperative Rating	Postoperative Rating	Net Rating Change	*P* Value
Aggressiveness	3.35	3.33	-0.02	.96
Extroversion	4.76	4.78	0.02	.97
Likeability	4.94	5.22	0.28	.43
Risk seeking	4.29	4.22	-0.07	.84
Sociability	5.12	5.17	0.05	.88
Trustworthiness	3.94	4.67	0.73	.06
Attractiveness	4.18	4.83	0.65	.18
Masculinity	4.53	5.44	0.91	.07

Limitations

We acknowledge that there are several limitations to this study. The study population is from the patients of 2 surgeons, which tempers the degree to which we can generalize the findings. Selection bias may also manifest in the fact that patients in this study group agreed to have their photographs used for research purposes. This study does not assess for effect-size estimation precluding our ability to quantify how much an average individual will improve in the various domains after surgery. Lastly, though we attempted to control observer bias by assessing the degree of criticism among our survey respondents, as well as by performing a mixed-effect regression, there may have been personality differences among the raters, which could have influenced their perception of the photographs.[25]

Conclusions

This study augments the observations seen in our previous study regarding the influence of facial cosmetic surgery on personality perception in women. Taken together, these findings suggest that both men and women undergoing facial cosmetic surgery may experience changes in the perception of their attractiveness, genderedness, and personality. To optimize outcomes for patients, further research is warranted to investigate how specific anatomic alterations may affect the variety of social judgements that are drawn from facial appearance.

ARTICLE INFORMATION

Accepted for Publication: May 6, 2019.

Published Online: July 11, 2019. doi:10.1001/jamafacial.2019.0463

Author Contributions: Dr Reilly had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.
Study concept and design: Parsa, Gao, Reilly.
Acquisition, analysis, or interpretation of data: All authors.
Drafting of the manuscript: Parsa, Gao.
Critical revision of the manuscript for important intellectual content: All authors.
Statistical analysis: Parsa.
Administrative, technical, or material support: Lally, Davison.
Study supervision: Gao, Reilly.

Conflict of Interest Disclosures: None reported.

Additional Contributions: We thank the patients for granting permission to publish this information.

REFERENCES

1. Dion K, Berscheid E, Walster E. What is beautiful is good. *J Pers Soc Psychol*. 1972;24(3):285-290. doi:10.1037/h0033731

2. Knutson B. Facial expressions of emotion influence interpersonal trait inferences. *J Nonverbal Behav*. 1996;20(3):165-182. doi:10.1007/BF02281954

3. Feingold A. Good-looking people are not what we think. *Psychol Bull*. 1992;111:304-341. doi:10.1037/0033-2909.111.2.304

4. van den Elzen ME, Versnel SL, Hovius SE, Passchier J, Duivenvoorden HJ, Mathijssen IM. Adults with congenital or acquired facial disfigurement: impact of appearance on social functioning. *J Craniomaxillofac Surg*. 2012;40(8):777-782. doi:10.1016/j.jcms.2012.02.010

5. Todorov A, Said CP, Engell AD, Oosterhof NN. Understanding evaluation of faces on social dimensions. *Trends Cogn Sci*. 2008;12(12):455-460. doi:10.1016/j.tics.2008.10.001

6. Said CP, Sebe N, Todorov A. Structural resemblance to emotional expressions predicts evaluation of emotionally neutral faces. *Emotion*. 2009;9(2):260-264. doi:10.1037/a0014681

7. Todorov A, Dotsch R, Porter JM, Oosterhof NN, Falvello VB. Validation of data-driven computational models of social perception of faces. *Emotion*. 2013;13(4):724-738. doi:10.1037/a0032335

8. Smith ML, Cottrell GW, Gosselin F, Schyns PG. Transmitting and decoding facial expressions. *Psychol Sci*. 2005;16(3):184-189. doi:10.1111/j.0956-7976.2005.00801.x

9. Johnston C, Hunt O, Burden D, Stevenson M, Hepper P. The influence of mandibular prominence on facial attractiveness. *Eur J Orthod*. 2005;27(2):129-133. doi:10.1093/ejo/cjh093

10. Walker M, Vetter T. Portraits made to measure: manipulating social judgments about individuals with a statistical face model. *J Vis*. 2009;9(11):1-13. doi:10.1167/9.11.12

11. Springer IN, Wiltfang J, Kowalski JT, et al. Mirror, mirror on the wall…: self-perception of facial beauty versus judgement by others. *J Craniomaxillofac Surg*. 2012;40(8):773-776. doi:10.1016/j.jcms.2012.02.007

12. Ramsey JL, Langlois JH, Hoss RA, Rubenstein AJ, Griffin AM. Origins of a stereotype: categorization of facial attractiveness by 6-month-old infants. *Dev Sci*. 2004;7(2):201-211. doi:10.1111/j.1467-7687.2004.00339.x

13. Rankin M, Borah GL. Perceived functional impact of abnormal facial appearance. *Plast Reconstr Surg*. 2003;111(7):2140-2146. doi:10.1097/01.PRS.0000060105.63335.0C

14. Reilly MJ, Tomsic JA, Fernandez SJ, Davison SP. Effect of facial rejuvenation surgery on perceived attractiveness, femininity, and personality. *JAMA Facial Plast Surg*. 2015;17(3):202-207. doi:10.1001/jamafacial.2015.0158

15. Baruch Y, Holtom BC. Survey response rate levels and trends in organizational research. *Hum Relat*. 2008;61(8):1139-1160. doi:10.1177/0018726708094863

16. Bould E, Morris N. Role of motion signals in recognizing subtle facial expressions of emotion. *Br J Psychol*. 2008;99(pt 2):167-189. doi:10.1348/000712607X206702

17. Ambadar Z, Schooler JW, Cohn JF. Deciphering the enigmatic face: the importance of facial dynamics in interpreting subtle facial expressions. *Psychol Sci*. 2005;16(5):403-410. doi:10.1111/j.0956-7976.2005.01548.x

18. Williams KM, Park JH, Wieling MJ. The face reveals athletic flair: better National Football League quarterbacks are better looking. *Pers Individ Dif*. 2010;48(2):112-116. doi:10.1016/j.paid.2009.09.003

19. Hage JJ, Becking AG, de Graaf FH, Tuinzing DB. Gender-confirming facial surgery: considerations on the masculinity and femininity of faces. *Plast Reconstr Surg*. 1997;99(7):1799-1807. doi:10.1097/00006534-199706000-00001

20. de Maio M, Rzany B. *The Male Patient in Aesthetic Medicine*. Berlin, Germany: Springer-Verlag; 2009. doi:10.1007/978-3-540-79046-4

21. Nellis JC, Ishii M, Bater KL, et al. Association of rhinoplasty with perceived attractiveness, success, and overall health. *JAMA Facial Plast Surg*. 2018;20(2):97-102. doi:10.1001/jamafacial.2017.1453

22. Cingi C, Eskiizmir G. Deviated nose attenuates the degree of patient satisfaction and quality of life in rhinoplasty: a prospective controlled study. *Clin Otolaryngol*. 2013;38(2):136-141. doi:10.1111/coa.12099

23. Chinski H, Chinski L, Armijos J, Arias JP. Rhinoplasty and its effects on the perception of beauty. *Int Arch Otorhinolaryngol*. 2013;17(1):47-50. doi:10.7162/S1809-97772013000100008

24. Roxbury C, Ishii M, Godoy A, et al. Impact of crooked nose rhinoplasty on observer perceptions of attractiveness. *Laryngoscope*. 2012;122(4):773-778. doi:10.1002/lary.23191

25. Perlman SB, Morris JP, Vander Wyk BC, Green SR, Doyle JL, Pelphrey KA. Individual differences in personality predict how people look at faces. *PLoS One*. 2009;4(6):e5952. doi:10.1371/journal.pone.0005952