

The Public Face of Rhinoplasty: Impact on Perceived Attractiveness and Personality

Stephen M. Lu, M.D.,
M.Div.

David T. Hsu, Ph.D.

Adam D. Perry, M.D.

Lyle S. Leipziger, M.D.

Armen K. Kasabian, M.D.

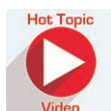
Scott P. Bartlett, M.D.

Charles H. Thorne, M.D.

P. Niclas Broer, M.D.

Neil Tanna, M.D., M.B.A.

*Stony Brook and Hempstead, N.Y.;
Philadelphia, Penn.; and
Munich, Germany*



Background: The authors assess the impact of rhinoplasty on public perception of a patient's appearance and personality.

Methods: A survey was created using standardized before-and-after photographs of 10 Caucasian women who had undergone primary rhinoplasty. Photographs of two additional women who had not undergone facial surgery were randomly included as controls, for a total of 12 survey items. Preoperative and postoperative photographs were placed side by side. The survey was administered by means of crowd-sourcing. Respondents were asked to evaluate which photograph better represented 11 traits of appearance or personality, according to a seven-point Likert scale. A score of 1 meant the preoperative photograph was much better, 7 meant the postoperative photograph was much better, and 4 meant no difference. *T* tests and analyses of variance were used to evaluate rating changes for each trait and differences between demographic groups.

Results: There were 264 responses received. Averaged scores across the 10 survey patients produced a value for each appearance or personality trait. In 10 of 11 categories (i.e., symmetry, youthfulness, facial harmony, likeability, trustworthiness, confidence, femininity, attractiveness, approachability, and intelligence), the postoperative photograph was significantly favorable compared with the preoperative photograph ($p < 0.00001$). The preoperative photograph was rated higher only in aggressiveness ($p < 0.001$). The same scores were calculated for the controls; no significant difference in any category was seen except confidence, where the right image was viewed as more confident (mean, 4.19; $p < 0.005$).

Conclusion: Aesthetic rhinoplasty improves the public perception of a person's appearance and personality in multiple aspects. (*Plast. Reconstr. Surg.* 142: 881, 2018.)

Physical beauty and attractiveness have been the subject of philosophical debate and study for millennia, with both evolutionary and cultural reasons for the “beauty advantage.”¹⁻³ Moreover, both ancient and modern cultures have assumed a connection between perceived facial appearance and personality,⁴ and this belief has been borne out in the arts and literature, where physical appearance (or its description) has implied or augmented personality traits (e.g., Chaucer's *Canterbury Tales*).⁵

From the Department of Psychiatry and Psychology, Stony Brook University; Division of Plastic and Reconstructive Surgery, Children's Hospital of Philadelphia; Technical University Teaching Hospital Munich, Munich, Germany; and the Division of Plastic and Reconstructive Surgery, Hofstra Northwell School of Medicine.

Received for publication November 11, 2017; accepted April 24, 2018.

Presented at Plastic Surgery The Meeting 2017, Annual Meeting of the American Society of Plastic Surgeons, in Orlando, Florida, October 6 through 10, 2017.

Copyright © 2018 by the American Society of Plastic Surgeons

DOI: 10.1097/PRS.00000000000004731

Physiognomy, the “art” of determining character traits based on physical features and measurements, reached its peak in the nineteenth century, when everything from ideal character to criminality was proposed to be associated with facial features.^{4,6} Over the past 100 years, physiognomy has largely been discounted, yet recent scientific studies have demonstrated the impact of facial appearance in social interactions, and that “first impressions” do matter.⁷⁻¹¹ Amazingly, an opinion of a person's attractiveness, likeability, trustworthiness, competence, and aggressiveness, based on facial appearance can be formed within a tenth of a second, and this opinion does not

Disclosure: *The authors have no financial interest to declare in relation to the content of this article.*

A “Hot Topic Video” by Editor-in-Chief Rod J. Rohrich, M.D., accompanies this article. Go to PRSJJournal.com and click on “Plastic Surgery Hot Topics” in the “Digital Media” tab to watch.

change with unrestricted time.^{9,12} Other studies suggest that characteristics such as agreeableness, conscientiousness, extraversion, and dominance can be accurately determined from first impressions.^{4,10,13,14}

However, the data have not universally supported the accuracy of first impressions^{15,16}; thus, social psychology has sought to determine the specific relationship between facial features and perceived personality traits. For example, an adult characterized as “baby-faced” is perceived as physically weak, naive, submissive, honest, kind, and warm^{4,17–20}; attractive people are perceived as competent and intelligent²¹; and “wider” faces, based on the facial height-to-width ratio, correlate to unethical and threatening behavior, dominance, and aggression.^{22,23} Other studies have found a correlation among intelligence, perceived intelligence, and facial shape, but only for men.²⁴ Perceived trustworthiness has been tied to skin smoothness²⁵ and, possibly related, real-world trustworthiness can be accurately perceived based on children’s faces.²⁶

Although these studies provide intriguing conclusions, the face is an incredibly complex entity—what constitutes a facial “feature” and its variations leads to an exponential number of possibilities. Even a reductionistic view of just the nose includes nine subunits.²⁷ Todorov et al.⁴ and Oosterhof and Todorov⁶ have recognized this difficulty and developed a “data-driven approach” using computational models based on real images to resolve faces into principal component points and vectors, which can be parametrically controlled to generate an infinite number of face images, thus allowing judgment of faces along a complete spectrum for a given characteristic. This ability to computer-generate, manipulate, and evaluate faces, along with other data-driven techniques, has led to a proliferation of studies in the past decade,^{28,29} and has progressed to allowing surgeons to simulate the results of surgery with images and software (e.g., Crisalix, Lausanne, Switzerland).

Although studies of facial appearance and perceived personality have progressed into the virtual realm, the conclusions people draw have real-world effects, influencing voting,^{30,31} sentencing decisions,^{32,33} dating preferences,³⁴ and even chief executive officer success,^{35,36} with stereotypes playing a large role. However, although some stereotypes may contain a kernel of truth, by no means are they universally accurate or true, and perceivers ought to be aware of the shortcomings of their judgments. The review by Todorov et al. of these secondary and meta-effects of social attributions based on faces points to the need for additional rigorous studies in this realm.⁴

Research has thus shown the importance of first impressions, the primacy of facial appearance, and the diversity of social attributions based on perceptions of the face. As possessors of the skill, knowledge, and ability to manipulate real faces on real people, plastic surgeons have naturally sought to define and create an aesthetic ideal.^{37,38} Determining the “ideal,” however, has typically been based on surgical outcomes evaluated from the surgeon’s or patient’s perspective.^{39–46} These views are critical for improving results and patient satisfaction but do not address an important endpoint—how laypeople in the general public perceive a patient. Aesthetic surgeons have long recognized the significance of this question, but previous research has typically used small focus groups or lacked statistical validity.^{47–50}

Studies have begun to examine the outcomes of facial aesthetic surgery from third-party perspectives,⁵¹ and with the explosion of social media over the past decade, larger scale studies using crowdsourcing methods have become important and effective tools for evaluating the impact of facial rejuvenation,^{52,53} hair transplant,⁵⁴ cleft surgery,⁵⁵ and other areas.^{56,57} The study authors here sought to assess the impact of rhinoplasty on public perception of a patient’s appearance and personality.

PATIENTS AND METHODS

A survey was created using standardized before-and-after photographs of 10 Caucasian women who had undergone primary rhinoplasty, linked from the before-and-after photograph galleries of the American Society of Plastic Surgeons and American Society for Aesthetic Plastic Surgery public websites.^{58,59} Photographs of two additional women who had not undergone facial surgery were randomly included as controls, for a total of 12 survey items. The photographs used in the survey were standardized within a given before-and-after item for background, hair style, facial expression, and makeup, but some of these factors varied between items because patients came from multiple surgeons. Control items consisted of two separate photographs taken in quick succession with minimal variations. Preoperative and postoperative frontal and lateral photographs were placed side by side. To eliminate left/right bias, half of the items had preoperative photographs on the left and half had postoperative photographs on the left (Fig. 1).

Respondents were naive to the study purpose and were asked to evaluate which photograph better represented 11 traits of appearance or personality (i.e., symmetry, youthfulness, facial harmony,

Carefully examine Figure A and Figure B. Choose which Figure represents the given characteristic MORE, and by how MUCH:



7 Symmetry*

| | | | | | | |
|-------------------------|--------------------------------|-----------------------------|-----------------------|-----------------------------|--------------------------------|-------------------------|
| (Figure A) Much more | (Figure A) Somewhat more | (Figure A) A little more | No difference | (Figure B) A little more | (Figure B) Somewhat more | (Figure B) Much more |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Youthfulness*

| | | | | | | |
|-------------------------|--------------------------------|-----------------------------|-----------------------|-----------------------------|--------------------------------|-------------------------|
| (Figure A) Much more | (Figure A) Somewhat more | (Figure A) A little more | No difference | (Figure B) A little more | (Figure B) Somewhat more | (Figure B) Much more |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Facial Harmony*

| | | | | | | |
|-------------------------|--------------------------------|-----------------------------|-----------------------|-----------------------------|--------------------------------|-------------------------|
| (Figure A) Much more | (Figure A) Somewhat more | (Figure A) A little more | No difference | (Figure B) A little more | (Figure B) Somewhat more | (Figure B) Much more |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Aggressiveness*

Fig. 1. Survey sample item.

aggressiveness, likeability, trustworthiness, confidence, femininity, attractiveness, approachability, and intelligence), according to a seven-point Likert scale. The selected traits were based on prior studies of other procedures^{24,51,54} and relevant outcomes.^{60,61} A score of 1 meant the preoperative

photograph was much better, 7 meant the postoperative photograph was much better, and 4 meant no difference.

Using a distributed online survey platform, unique anonymous respondents were recruited, excluding those younger than 18 years or

Table 1. Demographics of Evaluators

| Characteristic | No. (%) |
|----------------|------------|
| Age, yr | |
| 18–24 | 31 (11.7) |
| 25–34 | 149 (56.4) |
| 35–44 | 55 (20.8) |
| 45–54 | 19 (7.2) |
| 55–64 | 6 (2.3) |
| ≥65 | 4 (1.5) |
| Sex | |
| Male | 167 (63.3) |
| Female | 97 (36.7) |

diagnosed with schizophrenia or autism. Data were analyzed using IBM SPSS Version 22.0 (IBM Corp., Armonk, N.Y.). For each trait, two-tailed one-sample *t* tests were performed to determine whether the sample mean was significantly different from the midpoint score (H_0 , mean = 4.0; H_1 , mean \neq 4.0). In an exploratory analysis, two-tailed independent-samples *t* tests were performed to determine gender differences in ratings for each trait (H_0 , mean_{males} = mean_{females}; H_1 , mean_{males} \neq mean_{females}). An analysis of variance was also used to test differences in mean scores across the six age groups (Table 1). For all tests, differences were considered statistically significant at $p < 0.01$.

RESULTS

There were 264 responses received. The majority of evaluators were male and between the ages of 25 and 34 years (Table 1). Averaged scores across the 10 survey patients produced a value for each appearance or personality trait. In 10 of 11 categories (i.e., symmetry, youthfulness, facial harmony, likeability, trustworthiness, confidence, femininity, attractiveness, approachability, and intelligence), the postoperative photograph was considered significantly more favorable compared with the preoperative photograph ($p < 0.00001$) (Table 2). The greatest value

Table 2. Impact on Traits*

| Impact on Traits | Mean Score | <i>p</i> | 95% CI | <i>t</i> |
|------------------|------------|----------|-----------|----------|
| Symmetry | 4.30 | <0.00001 | 4.22–4.38 | 7.708 |
| Youthfulness | 4.33 | <0.00001 | 4.25–4.41 | 8.512 |
| Facial harmony | 4.33 | <0.00001 | 4.26–4.41 | 8.634 |
| Aggressiveness | 3.90 | <0.001 | 3.83–3.98 | -2.624 |
| Likeability | 4.39 | <0.00001 | 4.31–4.46 | 9.924 |
| Trustworthiness | 4.28 | <0.00001 | 4.21–4.34 | 8.821 |
| Confidence | 4.37 | <0.00001 | 4.29–4.44 | 9.985 |
| Femininity | 4.37 | <0.00001 | 4.30–4.44 | 10.073 |
| Attractiveness | 4.40 | <0.00001 | 4.32–4.48 | 9.955 |
| Approachability | 4.34 | <0.00001 | 4.27–4.41 | 9.778 |
| Intelligence | 4.19 | <0.00001 | 4.13–4.25 | 6.035 |

**df* = 263.

changes in ratings were seen in attractiveness (mean, 4.40), likeability (mean, 4.39), femininity (mean, 4.37), and confidence (mean, 4.37).

The preoperative photograph was rated higher only in aggressiveness ($p < 0.001$). The same scores were calculated for the controls; no statistically significant difference in any category was seen except confidence, where the right image was viewed as more confident (mean, 4.19; $p < 0.005$). No significant differences were found between men and women or between age groups for any trait.

DISCUSSION

The face has been an object of fascination since ancient times and has played a significant role in social interactions. Physiognomists, psychologists, physicians, and the lay public have long sought to determine which and how facial features influence perception of personality and character, with some modern studies being performed with computer-generated models. For the plastic surgeon and his or her patient, however, virtually manipulated images are no substitute for real people and tangible results. This study furthers the pursuit of understanding the face and its role in social interactions with a specific focus on the nose.

The nose in particular has long been recognized as playing a central role in the face both physically and psychologically,⁶² and therefore aesthetic rhinoplasty carries significant weight for affecting a patient's overall appearance and self-perception.⁶² How others perceive a patient no doubt contributes to his or her psychosocial well-being, but this dimension to date has not been specifically and objectively studied. This study is the first of its kind examining public perception of rhinoplasty patients.

This study affirms that rhinoplasty achieves the desired effects for Caucasian women in terms of improving the physical traits of attractiveness, femininity, confidence, youthfulness, facial harmony, and symmetry. These results were expected, given the effort that plastic surgeons have invested in studying, defining, and sculpting the ideal nose for a given patient. However, rhinoplasty also improved personality traits such as perceived intelligence and aggressiveness, and even extended to include relational characteristics such as trustworthiness, approachability, and likeability. Although past research has suggested that cosmetic rhinoplasty patients are "more psychologically disturbed than other surgery cases"^{62–65} for multiple reasons,^{66–69} these results regarding personality and

relational characteristics imply that there may be legitimate reasons for a patient's broad concerns. This study provides additional data consistent with other studies reflecting the positive impact on perception of attractiveness and personality after facial rejuvenation surgery on other areas of the face, including rhytidectomy, upper and lower blepharoplasty, brow lift, neck lift, or chin implant.⁵¹

Because of the crowd-sourcing design, strengths of this study include the good sample sizes (of both photographs and judges) such that statistical significance was seen across a variety of subjects and evaluators. The distribution of age and sex was not equal across all groups, with a majority of young male subjects, but subgroup comparisons showed no difference in outcomes across age or sex. Moreover, the majority of rhinoplasty patients are female and young^{70,71}; thus, the demographic drift of the evaluators might not be seen as unfavorable. This study could be improved with a greater number of controls, subjects, and evaluators, and the study methodology allows for expansion in these directions. A weakness of this method, however, is that the evaluators are anonymous, and demographic information is therefore limited. Including a component of known objective expert evaluators (e.g., senior aesthetic plastic surgeons) could add an additional degree of validity to the study. In addition, although this study showed a meaningful statistically significant improvement in each area, it is not clear to what degree these improvements affect or effect "real-life" changes. Therefore, these results should encourage prospective patients that rhinoplasty positively affects how she will be perceived, but at the same time she should be cautioned that the extent has not yet been quantified.

CONCLUSIONS

Aesthetic rhinoplasty has the potential to significantly improve the public perception of a person's appearance and personality in multiple traits. Small but significant and clear differences were observed and held consistently across demographic groups. This study can thus be used to counsel, encourage, and set appropriate expectations for the rhinoplasty patient.

Neil Tanna, M.D., M.B.A.
130 East 77th Street, 10th Floor
New York, N.Y. 11042
ntanna@gmail.com

PATIENT CONSENT

Patient provided written consent for the use of patient's images.

REFERENCES

1. Sands NB, Adamson PA. Global facial beauty: Approaching a unified aesthetic ideal. *Facial Plast Surg*. 2014;30:93–100.
2. Dayan SH, Arkins JP. The subliminal difference: Treating from an evolutionary perspective. *Plast Reconstr Surg*. 2012;129:189e–190e.
3. Little AC, Jones BC, DeBruine LM. Facial attractiveness: Evolutionary based research. *Philos Trans R Soc Lond B Biol Sci*. 2011;366:1638–1659.
4. Todorov A, Olivola CY, Dotsch R, Mende-Siedlecki P. Social attributions from faces: Determinants, consequences, accuracy, and functional significance. *Annu Rev Psychol*. 2015;66:519–545.
5. Friedman JB. Another look at Chaucer and the physiognomists. *Stud Philol*. 1981;78:138–152.
6. Oosterhof NN, Todorov A. The functional basis of face evaluation. *Proc Natl Acad Sci USA* 2008;105:11087–11092.
7. Wolffhechel K, Fagertun J, Jacobsen UP, et al. Interpretation of appearance: The effect of facial features on first impressions and personality. *PLoS One* 2014;9:e107721.
8. Borkenau P, Liebler A. Trait inferences: Sources of validity at zero acquaintance. *J Pers Soc Psychol*. 1992;62:645–657.
9. Bar M, Neta M, Linz H. Very first impressions. *Emotion* 2006;6:269–278.
10. Beer A, Watson D. Personality judgment at zero acquaintance: Agreement, assumed similarity, and implicit simplicity. *J Pers Assess*. 2008;90:250–260.
11. Zebrowitz LA, Montepare JM. Social psychological face perception: Why appearance matters. *Soc Personal Psychol Compass*. 2008;2:1497.
12. Willis J, Todorov A. First impressions: Making up your mind after a 100-ms exposure to a face. *Psychol Sci*. 2006;17:592–598.
13. Carney DR, Colvin CR, Hall JA. A thin slice perspective on the accuracy of first impressions. *J Res Personal*. 2007;41:1054–1072.
14. Little AC, Perrett DI. Using composite images to assess accuracy in personality attribution to faces. *Br J Psychol*. 2007;98:111–126.
15. Todorov A, Porter JM. Misleading first impressions: Different for different facial images of the same person. *Psychol Sci*. 2014;25:1404–1417.
16. Olivola CY, Todorov A. Fooled by first impressions? Reexamining the diagnostic value of appearance-based inferences. *J Exp Soc Psychol*. 2010;46:315–324.
17. Zebrowitz LA, Montepare JM. Impressions of babyfaced individuals across the life span. *Dev Psychol*. 1992;28:1143–1152.
18. Berry DS, McArthur LZ. Perceiving character in faces: The impact of age-related craniofacial changes on social perception. *Psychol Bull*. 1986;100:3–18.
19. McArthur LZ, Apatow K. Impressions of baby-faced adults. *Soc Cogn*. 1984;2:315–342.
20. Montepare JM, Zebrowitz LA. Person perception comes of age: The salience and significance of age in social judgments. *Adv Exp Soci Psychol*. 1998;30:93–161.
21. Eagly AH, Ashmore RD, Makhijani MG, Longo LC. What is beautiful is good, but . . . : A meta-analytic review of research on the physical attractiveness stereotype. *Psychol Bull*. 1991;110:109–128.
22. Carré JM, McCormick CM, Mondloch CJ. Facial structure is a reliable cue of aggressive behavior. *Psychol Sci*. 2009;20:1194–1198.
23. Geniole SN, Denson TF, Dixon BJ, Carré JM, McCormick CM. Evidence from meta-analyses of the facial width-to-height ratio as an evolved cue of threat. *PLoS One* 2015;10:e0132726.

24. Kleisner K, Chvátalová V, Flegr J. Perceived intelligence is associated with measured intelligence in men but not women. *PLoS One* 2014;9:e81237.
25. Tsankova E, Kappas A. Facial skin smoothness as an indicator of perceived trustworthiness and related traits. *Perception* 2016;45:400–408.
26. Li Q, Heyman GD, Mei J, Lee K. Judging a book by its cover: Children's facial trustworthiness as judged by strangers predicts their real-world trustworthiness and peer relationships. *Child Dev*. 2017.[Epub ahead of print.]
27. Thorne CH, Chung KC, Goasain A, et al., eds. *Grabb and Smith's Plastic Surgery*. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins Health; 2014.
28. Todorov A, Dotsch R, Porter JM, Oosterhof NN, Falvello VB. Validation of data-driven computational models of social perception of faces. *Emotion* 2013;13:724–738.
29. Walker M, Vetter T. Portraits made to measure: Manipulating social judgments about individuals with a statistical face model. *J Vis*. 2009;9:12.1–12.13.
30. Ballew CC II, Todorov A. Predicting political elections from rapid and unreflective face judgments. *Proc Natl Acad Sci USA* 2007;104:17948–17953.
31. Antonakis J, Dalgas O. Predicting elections: Child's play! *Science* 2009;323:1183.
32. Eberhardt JL, Goff PA, Purdie VJ, Davies PG. Seeing black: Race, crime, and visual processing. *J Pers Soc Psychol*. 2004;87:876–893.
33. Blair IV, Judd CM, Chapleau KM. The influence of Afrocentric facial features in criminal sentencing. *Psychol Sci*. 2004;15:674–679.
34. Olivola C, Eastwick P, Finkel E, Ariely D, Todorov A. A picture is worth a thousand inferences: Appearance-based first impressions predict leader selection and mate choice. *J Assoc Consum Res*. 2011;39:276–277.
35. Rule NO, Ambady N. She's got the look: Inferences from female chief executive officers' faces predict their success. *Sex Roles* 2009;61:644–652.
36. Rule NO, Ambady N. The face of success: Inferences from chief executive officers' appearance predict company profits. *Psychol Sci*. 2008;19:109–111.
37. Dayan SH. What is beauty, and why do we care so much about it? *Arch Facial Plast Surg*. 2011;13:66–67.
38. Dayan S. Emerging goals in aesthetic medicine. *JAMA Facial Plast Surg*. 2017;19:367–368.
39. Nouraei SA, Pulido MA, Saleh HA. Impact of rhinoplasty on objective measurement and psychophysical appreciation of facial symmetry. *Arch Facial Plast Surg*. 2009;11:198–202.
40. Byrne M, Chan JCY, O'Broin E. Perceptions and satisfaction of aesthetic outcome following secondary cleft rhinoplasty: Evaluation by patients versus health professionals. *J Craniomaxillofac Surg*. 2014;42:1062–1070.
41. Lohuis PJ, Hakim S, Duivesteyn W, Knobbe A, Tasman AJ. Benefits of a short, practical questionnaire to measure subjective perception of nasal appearance after aesthetic rhinoplasty. *Plast Reconstr Surg*. 2013;132:913e–923e.
42. Schwitzer JA, Albino FP, Mathis RK, Scott AM, Gamble L, Baker SB. Assessing demographic differences in patient-perceived improvement in facial appearance and quality of life following rhinoplasty. *Aesthet Surg J*. 2015;35:784–793.
43. Pausch NC, Unger C, Pitak-Arnop P, Subbalekha K. Nasal appearance after secondary cleft rhinoplasty: Comparison of professional rating with patient satisfaction. *Oral Maxillofac Surg*. 2016;20:195–201.
44. Cingi C, Songu M, Bal C. Outcomes research in rhinoplasty: Body image and quality of life. *Am J Rhinol Allergy* 2011;25:263–267.
45. Pitak-Arnop P, Hemprich A, Dhanuthai K, Yildirim V, Pausch NC. Patient and patient perceptions of nasal aesthetics after secondary cleft rhinoplasty with versus without columellar grafting. *J Craniomaxillofac Surg*. 2011;39:319–325.
46. Stewart EJ, Robinson K, Wilson JA. Assessment of patient's benefit from rhinoplasty. *Rhinology* 1996;34:57–59.
47. Cash TF, Horton CE. Aesthetic surgery: Effects of rhinoplasty on the social perception of patients by others. *Plast Reconstr Surg*. 1983;72:543–550.
48. Roxbury C, Ishii M, Godoy A, et al. Impact of crooked nose rhinoplasty on observer perceptions of attractiveness. *Laryngoscope* 2012;122:773–778.
49. Sepehr A, Chauhan N, Alexander A, Adamson PA. The effect of rhinoplasty on perceived age. *Arch Facial Plast Surg*. 2012;14:68–70.
50. Chinski H, Chinski L, Armijos J, Arias JP. Rhinoplasty and its effects on the perception of beauty. *Int Arch Otorhinolaryngol*. 2013;17:47–50.
51. Reilly MJ, Tomsic JA, Fernandez SJ, Davison SP. Effect of facial rejuvenation surgery on perceived attractiveness, femininity, and personality. *JAMA Facial Plast Surg*. 2015;17:202–207.
52. Nellis JC, Ishii M, Papel ID, et al. Association of face-lift surgery with social perception, age, attractiveness, health, and success. *JAMA Facial Plast Surg*. 2017;19:311–317.
53. Bater KL, Ishii LE, Papel ID, et al. Association between facial rejuvenation and observer ratings of youth, attractiveness, success, and health. *JAMA Facial Plast Surg*. 2017;19:360–367.
54. Bater KL, Ishii M, Joseph A, Su P, Nellis J, Ishii LE. Perception of hair transplant for androgenetic alopecia. *JAMA Facial Plast Surg*. 2016;18:413–418.
55. Tse RW, Oh E, Gruss JS, Hopper RA, Birgfeld CB. Crowdsourcing as a novel method to evaluate aesthetic outcomes of treatment for unilateral cleft lip. *Plast Reconstr Surg*. 2016;138:864–874.
56. Heidekrueger PI, Sinno S, Tanna N, et al. The ideal buttock size: A sociodemographic morphometric evaluation. *Plast Reconstr Surg*. 2017;140:20e–32e.
57. van Veldhuisen CL, Kamali P, Wu W, et al. Prospective, double-blind evaluation of umbilicoplasty techniques using conventional and crowdsourcing methods. *Plast Reconstr Surg*. 2017;140:1151–1162.
58. American Society of Plastic Surgeons. Before & after photos: Rhinoplasty. Available at: https://www1.plasticsurgery.org/before_and_after_photo_gallery/default.aspx?procedure=Rhinoplasty. Accessed September 18, 2017.
59. American Society for Aesthetic Plastic Surgery. Nose surgery before & after photos from ASAP surgeons. Available at: <https://www.smartbeautyguide.com/photo-gallery/head-face/nose-surgery/>. Accessed September 18, 2017.
60. Lu SM, Bartlett SP. On facial asymmetry and self-perception. *Plast Reconstr Surg*. 2014;133:873e–881e.
61. Bellinga RJ, Capitán L, Simon D, Tenório T. Technical and clinical considerations for facial feminization surgery with rhinoplasty and related procedures. *JAMA Facial Plast Surg*. 2017;19:175–181.
62. Wright MR. The psychology of rhinoplasty. *Facial Plast Surg*. 1988;5:109–113.
63. de Brito MJ, Nahas FX, Cordás TA, Tavares H, Ferreira LM. Body dysmorphic disorder in patients seeking abdominoplasty, rhinoplasty, and rhytidectomy. *Plast Reconstr Surg*. 2016;137:462–471.
64. Picavet VA, Prokopakis EP, Gabriëls L, Jorissen M, Hellings PW. High prevalence of body dysmorphic disorder symptoms in patients seeking rhinoplasty. *Plast Reconstr Surg*. 2011;128:509–517.

65. Naraghi M, Atari M. Comparison of patterns of psychopathology in aesthetic rhinoplasty patients versus functional rhinoplasty patients. *Otolaryngol Head Neck Surg*. 2015;152:244–249.
66. Constantian MB, Lin CP. Why some patients are unhappy: Part 1. Relationship of preoperative nasal deformity to number of operations and a history of abuse or neglect. *Plast Reconstr Surg*. 2014;134:823–835.
67. Constantian MB, Lin CP. Why some patients are unhappy: Part 2. Relationship of nasal shape and trauma history to surgical success. *Plast Reconstr Surg*. 2014;134:836–851.
68. Rohrich RJ, Janis JE, Kenkel JM. Male rhinoplasty. *Plast Reconstr Surg*. 2003;112:1071–1085; quiz 1086.
69. Rohrich RJ, Ahmad J. A practical approach to rhinoplasty. *Plast Reconstr Surg*. 2016;137:725e–746e.
70. Bagheri SC, Khan HA, Jahangirnia A, Rad SS, Mortazavi H. An analysis of 101 primary cosmetic rhinoplasties. *J Oral Maxillofac Surg*. 2012;70:902–909.
71. Yoo DB, Peng GL, Azizzadeh B, Nassif PS. Microbiology and antibiotic prophylaxis in rhinoplasty: A review of 363 consecutive cases. *JAMA Facial Plast Surg*. 2015;17:23–27.