Aesthetic Treatment Positively Impacts Social Perception: Analysis of Subjects From the HARMONY Study

Aesthetic Surgery Journal
2019, Vol 39(12) 1380–1389

DOI: 10.1093/asj/sjy239
www.aestheticsurgeryjournal.com
OXFORD UNIVERSITY PRESS

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Abstract

Background: The impact of facial aesthetic treatments not only enhances physical appearance but also psychological well-being. Accordingly, patient-reported outcomes are increasingly utilized as an important measure of treatment success. Observer-reported outcomes are a relevant yet often overlooked measure of treatment benefit.

Objectives: The authors aimed to evaluate the impact of panfacial aesthetic treatment on the perception of an individual in a variety of social contexts.

Methods: A total 2000 men and women (aged 18-65 years) participated in an online study designed to capture the blinded observer's social perception of pretreatment and posttreatment patients who received panfacial aesthetic treatment in the HARMONY study. Perceptions relevant to character traits, age, attractiveness, and social status were evaluated. Observers were divided into 2 groups. Single image respondents (n = 1500) viewed 6 single, randomized patient images (3 pretreatment, 3 posttreatment), and paired image respondents (n = 500) viewed 6 pretreatment and posttreatment image pairs.

Results: Single image respondents reported significantly ($P < 0.05$) higher levels of agreement that posttreatment subjects appeared to possess more positive character traits (eg, healthy and approachable), were more socially adept, younger, more attractive, more successful at attracting others, and possessed a higher social status. Paired image respondents also reported a higher level of agreement for posttreatment images being aligned with positive character traits, representative of a younger and more attractive individual, and one with a higher social status.

Conclusions: The results suggest that the positive impact of minimally invasive panfacial treatment extends beyond enhancing physical appearance and highlights the importance of social perception and observer-reported outcomes in aesthetic medicine.

Editorial Decision date: September 4, 2018; online publish-ahead-of-print September 15, 2018.

The nature and outcome of our everyday social interactions are greatly influenced by face-to-face nonverbal communication. Facial appearance influences both how an individual presents herself or himself and how that presentation is perceived by others.[1,2] Active communication like the tilt of a head or a smile help guide positive and

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negative perceptions. However, even at rest, facial appearance can still passively communicate through expression lines, wrinkles, or loss of contour.[2-4] The signs of intrinsic and extrinsic facial aging can not only make an individual look older but can also miscommunicate a mood of sadness or anger, potentially sabotaging positive personal presentation as well as social interactions, social perceptions and, ultimately, self-esteem.[5-8]

First impressions can have a far-reaching impact on how an individual is treated by others.[9-11] Individuals with attractive facial features are often regarded in a more positive light and assumed to possess positive attributes extending beyond physical appearance (eg, greater intellect, social status, and moral character).[12,13] Such encompassing benefit does much to support the real motives underlying the pursuit of aesthetic treatment; perhaps it is not so much about vanity as it is about achieving psychological well-being through enhanced social functioning.[14-16] The aesthetic clinician's consensus on patient motives reflects this sentiment; as many observe that patients are psychologically impacted by their appearance and anticipate an outcome in which their self-confidence and sense of well-being will be improved.[17,18]

The field of aesthetic medicine is still evolving, and initiatives to qualify psychosocial outcomes by patient-reported measures have gained ground over the last 5 years.[19,20] A variety of validated questionnaires now assess many of the subjective patient-reported outcomes (PROs) impacted by treatment.[21,22] However, a very important aspect of the treatment outcome that is rarely considered or measured is how the impact of treatment on the patient is perceived by others.[23] Beyond the trained eye of the clinician and the patient's self-perceptions, a change in the social perception of the patient can potentially have a meaningful impact on their life.[24] In light of what research tells us about social attitudes toward attractiveness, the observer-reported outcome (ORO) measure may provide comprehensive insight into how far-reaching the treatment impact can be.

Much of the research demonstrating treatment-associated changes in social perception of an individual stems from disparate fields of research (eg, craniomaxillofacial surgery).[25,26] More recently, studies in facial plastic surgery outcomes have begun to incorporate the evaluation of the observer's social perception.[27-30] Evidence quantifying this aspect of treatment benefit is more limited concerning nonsurgical, minimally-invasive treatments, and the few studies that have examined social perceptions have focused on the treatment outcomes of 1 to 2 areas at a time (eg, forehead lines, nasolabial folds, glabella). Nevertheless, positive first impressions and perceptions of age, health, and attractiveness posttreatment have been demonstrated.[31-33]

Just as self and social perceptions are based on the entire face and not just one feature, ORO measures might be more useful if they were also based on an all-encompassing view of the face and not tethered to one feature or quality. The current trend in a panfacial approach to minimally invasive facial rejuvenation is gaining ground, and OROs show that this approach may be more impactful on perceived age, health, and attractiveness than single treatment area approaches.[33] So far, no studies to our knowledge have evaluated the impact of minimally invasive panfacial treatment on the social perceptions that extend beyond enhancement of a youthful and attractive appearance.

HARMONY was the first study to systematically evaluate the psychosocial impacts of aesthetic treatment extending beyond physical improvement by means of a range of validated patient-reported outcome measures.[34,35] The study employed a combination of minimally invasive treatments, including hyaluronic acid dermal fillers, onabotulinumtoxinA, and an eyelash growth product. Eligible on-label treatment areas included the midface, nasolabial folds, oral commissures, perioral lines, marionette lines, radial cheek lines, crow's feet lines, glabellar complex, and eyelashes. This multi-modal approach is unique in that instead of treating individual areas of the face autonomously, it is intended to treat multiple areas in the context of overall facial appearance. In addition to the clinical benefit observed, the PROs in this study demonstrated how the panfacial approach utilized in HARMONY yielded significant physical, social, and psychological benefit to patients. Investigators reported posttreatment improvements in the severity of all treated facial areas based on validated, photonumeric scales. Correspondingly, patients reported significant improvements in a range of psychosocial endpoints using the validated FACE-Q endpoints.[35] The pool of standardized patient pretreatment and posttreatment photographs represented a valuable opportunity to further explore the benefit of panfacial aesthetic treatment by measuring its impact on a broader scale of observer-reported social perceptions.

The current study was designed to capture blinded observers' social perceptions elicited by pretreatment and posttreatment images of patients who received minimally invasive panfacial treatment in the HARMONY study. Observer's perceptions relevant to a variety of psychosocial dimensions were explored including character traits, social status, as well as more traditional characteristics such as age and attractiveness.

METHODS

Study Design and Participant Selection

An online research study conducted by the Nielsen Research Group was designed to evaluate the degree to which minimally invasive aesthetic treatment influenced the social perception of individuals based on facial appearance alone.

The images used in the study consisted of standardized baseline and 4-month posttreatment images of patients (ages 35-65 years) who completed the HARMONY study. Patient images consisted of a frontal facial view with a neutral expression. Images were excluded if substantial inconsistencies unrelated to treatment existed between the before and after images, such as the presence of makeup or changes in hairstyle or color.

The selection process resulted in the inclusion of 84 patients (168 images) for this analysis. Ninety-five percent of the patients were female (80 of 84) with a mean age of 52.4 years (range, 37-65 years). Most were Caucasian (84.5%), while the remaining were Hispanic (10.7%), Black or African American (2.4%), Asian (1.2%), and American Indian or Alaskan Native (1.2%). Invitations to participate in the online study were sent to males and females aged 18 to 65 years who were existing participants of online panels. Demographics were weighted by geographic location and gender to ensure the panel was representative of US population demographics.[36]

Interviews were initially performed to evaluate a sample of respondents' interpretation of the questions. Interviews also ensured there was an appropriate number of photographs and questions per respondent cohort to avoid fatigue and evaluate overall ease of use of the online interface. Respondents were divided into 2 unique groups: those intended to represent random, fleeting societal interactions and those representing interactions within close social circles. Respondents were asked to view images of individual's faces and complete a questionnaire indicating their perception of the individual as pertained to attributes the individual appeared to possess or lack in a variety of different social dimensions. All potential respondents were informed of the study's purpose, the voluntary nature of participation, the maintenance of confidentiality, and reimbursement for participation time. This study was approved by a central Institutional Review Board (Schulman Associates IRB, Cincinnati, OH) and was conducted in September, 2016.

Measurements

Study respondents were divided into 1 of 2 groups, each group representing a specific of model observer perception. Single image respondents viewed randomly selected HARMONY patient photographs as single images while paired image respondents viewed pretreatment and posttreatment image pairs.

Single Image Respondents

A total of 1500 respondents randomly viewed single images of 6 individuals consisting of 3 pretreatment and 3 posttreatment images, but never viewed both the pretreatment and posttreatment images of a single individual. The intention behind restricting the viewing of each face to a single unpaired image was to eliminate a baseline reference and the propensity to make choices based on comparisons. The associated questionnaire was designed to elicit perceptions that may represent fleeting, social interactions. With each image viewed, respondents were asked to indicate their level of agreement with a series of character traits using a scale of 1 (strongly disagree) to 8 (strongly agree). Character traits included a variety of attributes (eg, friendly, approachable, and healthy) as well as attractiveness (Appendix A). Respondents also assessed the age of the individual, the individual's success at attracting others, and the individual's level of education, occupation, and income (Appendix B).

Paired Image Respondents

A total of 500 respondents viewed the paired pretreatment and posttreatment images of 6 individuals and indicated in a binary way which of the images in each pair was more of a match with each trait. Character traits included a variety of attributes (eg, friendly, approachable, and healthy) as well as attractiveness (Appendix C). The intention behind permitting the viewing of pretreatment and posttreatment image pairs was to elicit perceptions under circumstances where a baseline visual would naturally be available, reflecting a sense of familiarity within close social or occupational circles. Respondents also reported which of the 2 images depicted an individual who appeared older, had greater success at attracting others, greater financial success, a higher level of education, and would be preferable to hire for a job (Appendix C).

Respondent Attitudes Toward the Social Acceptability of Facial Aesthetic Treatments

Following the image evaluations, all respondents answered an additional 8-item questionnaire designed to gauge their attitudes toward the importance of facial appearance and attractiveness in society and their views on the social acceptance of facial aesthetic treatments. Respondents indicated their level of agreement with each statement or question using a scale of 1 (strongly disagree) to 8 (strongly agree).

Data Analysis

For single image respondent data, the mean and standard deviation were calculated for proportions of both pretreatment and posttreatment image selections, and the associated delta values were presented. The P values comparing pretreatment and posttreatment results were based on t tests, and statistical significance was defined as $P < .05$. Paired image respondent data were presented descriptively

Table 1. Study Respondent Demographics

Characteristic	Respondents (N = 2000)	US population[a]
Mean age, years	41	37
Gender, %		
Female	51	51
Male	49	49
Race/ethnicity, %		
Caucasian	66	64
Hispanic	17	17
Black/African American	13	12
Marital/civil union status, %		
Married/civil union	47	52
Educational level, %		
Less than high school	11	11
High school degree/4-year college degree	58	58
≥ 4-year college degree	31	31
Employment status, %		
Employed	69	70
Unemployed/retired/student	23	31

[a]Based on US population survey data assessed March 2015.

as mean proportions of both pretreatment and posttreatment image selections.

RESULTS

Study Respondents

Study respondents were 51% female and 49% male with an average of 41 years (range, 18-65 years) (Table 1). Demographic characteristics were aligned with those of the US population and were similar between both groups of respondents.

Perceptions Based on Single Impressions

A total of 1500 single image respondents generated a total of 9000 image views, corresponding to at least 54 respondents viewing each image. Respondents spent an average of 5 minutes completing the entire online task. Results indicated with a higher level of agreement that posttreatment images were perceived as being significantly more socially adept, successful at attracting others, attractive, friendly, successful, healthy, and approachable compared with pretreatment images ($P < 0.05$) (Figure 1). Respondents did not perceive significant changes in other traits including likable, intelligent, trustworthy, and kind in the posttreatment photographs. The greatest difference in pretreatment and posttreatment ratings was for the trait, "The person in this image is someone who has social anxiety," ($P < 0.05$), which was rated with a greater level of agreement for pretreatment images.

Furthermore, posttreatment images were perceived as significantly younger ($P < 0.05$) (Figure 2, left) and having greater success at attracting others compared with pretreatment images ($P < 0.05$) (Figure 2, right). Comparatively, the individuals in posttreatment images were perceived as being younger by an average of 1.21 years ($P < 0.05$) (Figure 2, left). Posttreatment images were also perceived more frequently as college educated ($P < 0.001$) (Figure 3, left), more frequently as managerial level employees ($P < 0.001$) (Figure 3, right), as well as earners of a higher level of income ($P < 0.05$) (Figure 4).

Perceptions Based on Pretreatment and Posttreatment Comparisons

Paired image respondents consisted of 500 respondents with a total of 3000 paired image views, corresponding to at least 36 respondents viewing each image pair. Respondents spent an average of 5.3 minutes completing the entire online task. Based on paired image comparisons, the posttreatment images were selected more frequently for attractiveness and traits including approachable, someone with good social skills, intelligent, successful, kind, healthy, and trustworthy (Figure 5). Posttreatment images were also perceived as younger, more successful at attracting others (77%), more hirable (73%), more financially successful (74%), and more educated (74%) (Figure 6). The mean difference in age was perceived as 4.85 years younger for posttreatment images (Figure 6).

Respondent Attitudes Toward the Social Acceptability of Facial Aesthetic Treatments

There was a high level of agreement among respondents regarding "how physically attractive someone is affects how successful they will be professionally" and "facial aesthetic treatments are a socially acceptable way to improve or maintain physical attractiveness" (5.5 out of 8.0) and that physical attractiveness is important for most people in their day-to-day social interactions (5.9 out of 8.0), and "society places a lot of emphasis on physical appearance" (6.8 out of 8.0) (Figure 7). A lower level of agreement was expressed for statements regarding

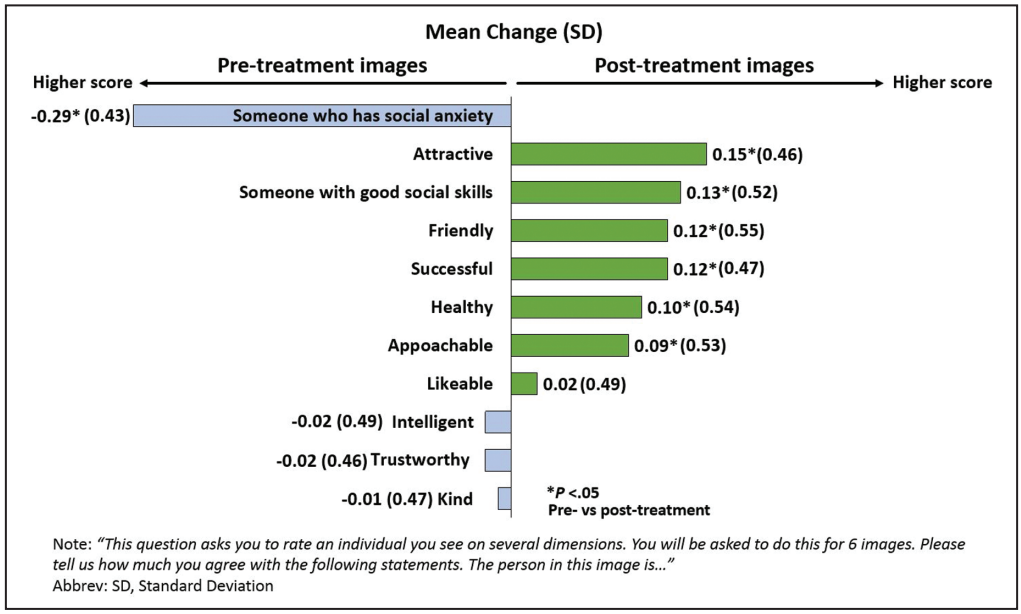

Figure 1. Single image respondents' perceptions of character traits reflected by pretreatment and posttreatment score differences.

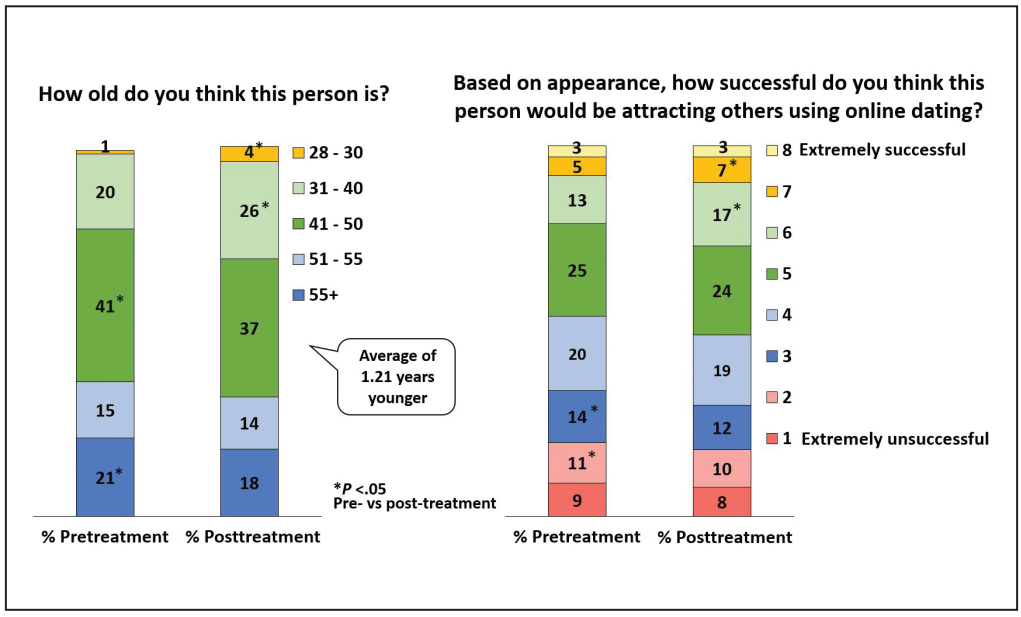

Figure 2. Single image respondents' perceptions of age and attractiveness reflected by pretreatment and posttreatment score differences.

"physical attractiveness becomes less important" for men and women as they age (4.8 and 4.1 out of 8.0, respectively) and "only vain people get facial aesthetic treatments" (4.1 out of 8.0). Respondents indicated that the average age at which a woman is considered "old" is 55.8 years of age, while a man is considered "old" at 58.5 years of age (Figure 7).

DISCUSSION

The psychosocial impacts of facial aesthetic treatment are determined by a combination of self-perception, how that perception affects self-confidence, and, ultimately, social perception. To our knowledge, this is the first study of its kind, in scale and by design,

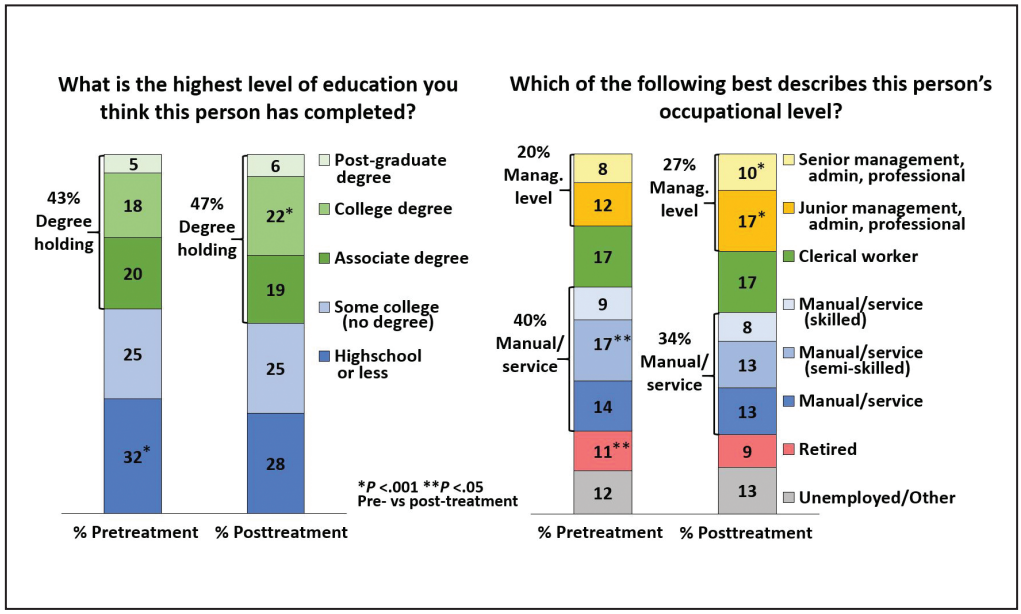

Figure 3. Single image respondents' perceptions of educational and occupational levels reflected by pretreatment and posttreatment score differences.

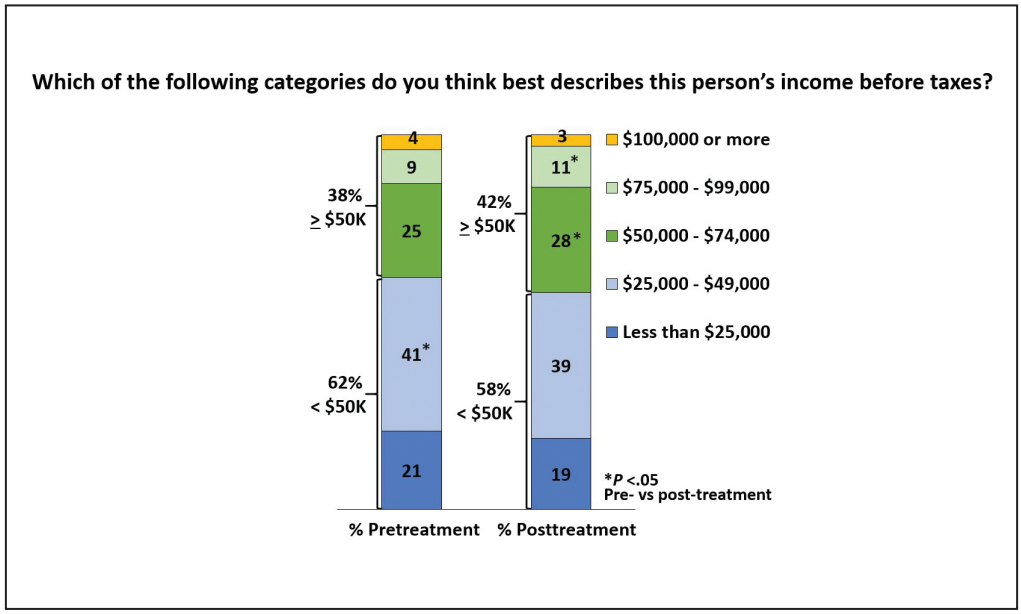

Figure 4. Single image respondents' perceptions of income levels reflected by pretreatment and posttreatment score differences.

which quantified the positive and significant impact that panfacial aesthetic treatment had on social perceptions that extend beyond age and attractiveness. This study recruited 2000 blinded study respondents who reported their perception of individuals based solely on their static, neutral facial appearance captured in pretreatment and posttreatment images. The HARMONY study provided standardized images of patients whose treatment benefit was established by both objective and subjective outcome measures through significant clinical effect and improvement in PROs.[35]

By capturing the unique perspectives of 2 different models of perceptions, the study design was intended to provide insight into real-world social settings where inferences are made in close social circles and in random encounters in society at large. The reported social

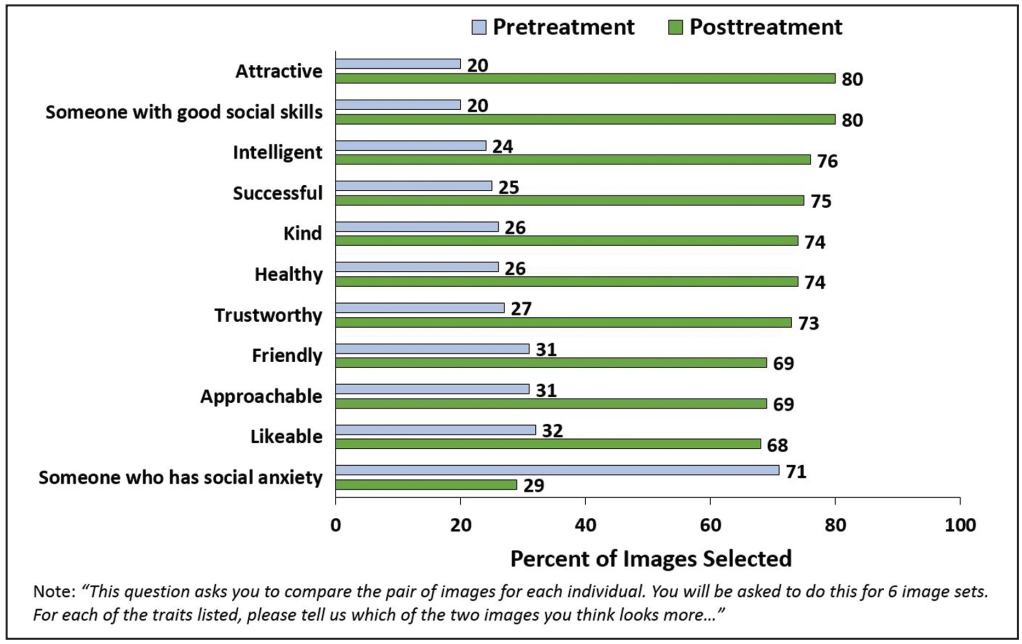

Figure 5. Paired image respondents' perceptions of character traits comparing pretreatment and posttreatment images.

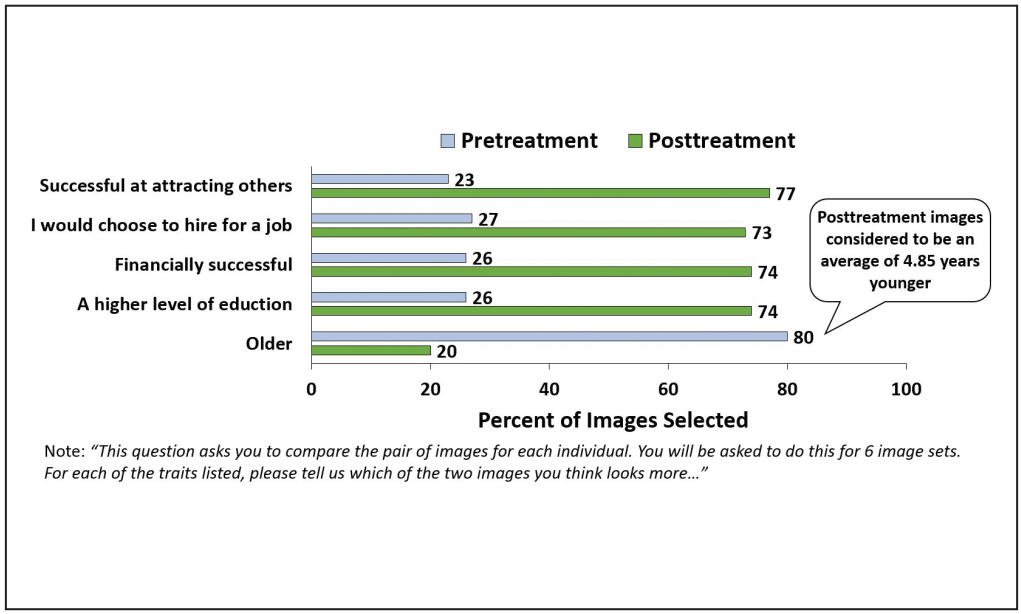

Figure 6. Paired image respondents' perceptions comparing pretreatment and posttreatment images.

perceptions were remarkably consistent between the 2 social perception models whether respondents were limited to single images or afforded a pretreatment and posttreatment image sets. The images of posttreatment subjects were consistently deemed more attractive, approachable, more socially adept, more friendly, healthier, younger, and more successful at attracting others. Posttreatment images were also perceived as more educated, more financially successful, and having achieved a greater occupational level compared with pretreatment images.

Although both groups were aligned regarding improved perceptions of specific traits including approachable, good social skills, friendly, successful, healthy, more attractive, and less socially anxious, other character traits such as likable, intelligent, trustworthy, and kind were not as aligned. Such differences may indicate that these latter traits require

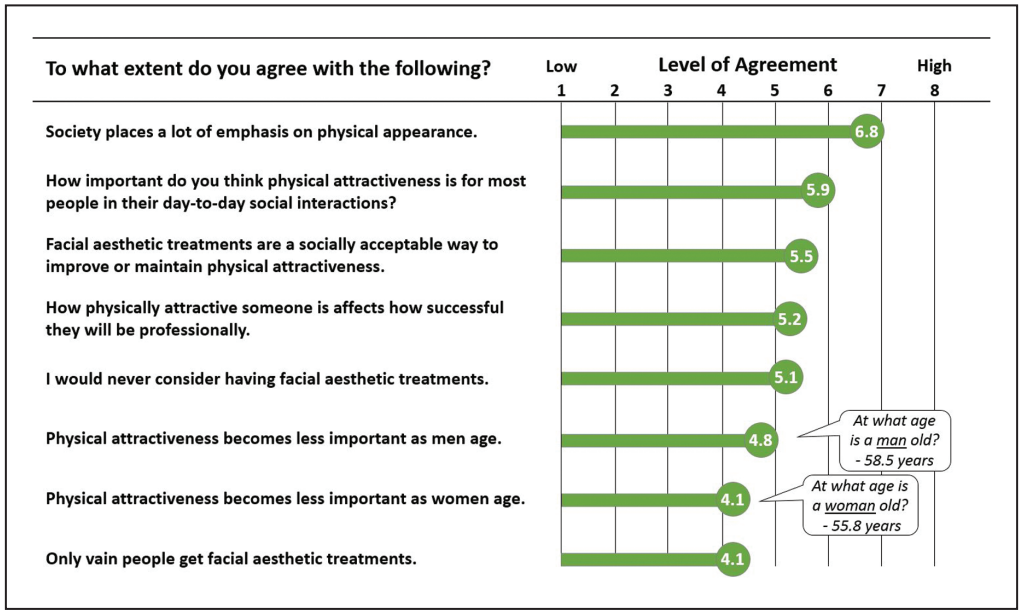

Figure 7. Study respondents' attitudes toward social importance of facial aesthetics reflected by mean scores of agreement.

more comprehensive input (verbal or more dynamic nonverbal cues) to evaluate. Furthermore, the ability of paired image respondents to compare paired pretreatment and posttreatment images may have facilitated the formation of an overall positive perception that may have then been applied across individual traits (eg, attractive). In doing so, corresponding perceptions may have been more influenced by the "halo effect," a well-established phenomenon that describes how judgments of an individual's appearance can form the basis of perceptions unrelated to their appearance such as character traits, educational level, and professional status.[12,13]

The halo effect describes how individuals considered attractive are also more likely to be perceived as having more affable personalities, greater intelligence, an enhanced social and professional standing, and greater likeability and trustworthiness.[37-39] Alternatively, paired image respondents may have performed feature-by-feature comparisons across paired images. However, as both groups took approximately the same amount of time to complete their online tasks (5.0 and 5.3 minutes for single and paired image respondents, respectively), this seems less likely. The results of paired image perceptions do bring to light the potential influence of the halo effect even with minimally invasive facial aesthetic treatments.

In the paired image analysis, paired image respondents reported that individuals appeared to be an average of 4.85 years younger following panfacial aesthetic treatment. Those same patients self-reported that they looked 4.3 years younger than their actual age posttreatment during the HARMONY study. The improved perception of age was not an unexpected finding, but it does give credence to the validity of the observer's perception of age, which was nearly equal in magnitude to the self-reported perception of the HARMONY patients using the validated FACE-Q outcome measure. The magnitude of change in the observer-assessed perception of patient age in the HARMONY study is slightly greater than those reported in prior studies utilizing a similar design to compare patients' presurgical and postsurgical facial rejuvenation (facelift or facelift and blepharoplasty). In these prior studies of surgical interventions, posttreatment images were perceived as 3.1 and 3.69 years younger.[27,29] Our data suggest that, in certain comparisons, the impact of minimally invasive panfacial aesthetic treatment may be comparable to that of surgical treatments.

From a clinical perspective, there may be an assumption that patients are focused on looking younger. However, although a change in perceived age as assessed by ORO in the current study was apparent, HARMONY was the first study, to our knowledge, to demonstrate that following panfacial treatment, not only were subjects highly satisfied with the treatment results but how they are perceived in a social context was positively and significantly impacted. This suggests that an improvement in appearance encompasses more than just looking younger. Rather, it suggests that improving appearance may bring about much more meaningful improvements reflected by a positive change in both self and social perceptions.

The findings presented here demonstrate that social perceptions of an individual are measurable outcomes that can be positively influenced by panfacial aesthetic treatment. By examining OROs following panfacial treatment,

this analysis improves upon prior studies that showed the impact of facial aesthetic treatment on only 1 or 2 facial areas.[32,33] The magnitude of the positive and significant changes found in the present study reinforces the potential for greater impact with panfacial treatments.

In the field of aesthetic medicine, PROs can provide important patient-centric evidence of treatment benefit. Treatment impacts the patient's self-perception, how their perception is manifested in their self-confidence, and, ultimately, how others perceive them. Therefore, the PRO and ORO are inherently linked companion measures, and the ORO represents a potential source of valuable insight for both the patient and clinician. This study demonstrated how individuals were perceived as more successful occupationally, socially, and personally while improving perceived attractiveness and age following panfacial treatment. The results of this study are a meaningful contribution to the evolving role of subjective outcome measures in the field of aesthetic medicine and may serve as a useful tool for clinicians while counseling prospective patients on what to expect from minimally invasive facial aesthetic treatments. Panfacial treatment may provide the best option for achieving not only the patient's goals but for positively impacting how society perceives the individual.

These results are limited in that they may not be generalizable to the global population, because the demographic profile of the participants was representative of the US population only. Furthermore, the demographic profile of the HARMONY subjects was relatively homogenous; therefore, future studies are required to test OROs for validity and reliability. Additionally, these data were based on static images with neutral facial expressions. Future studies may benefit from including subject videos that capture more subliminal details such as dynamic nonverbal cues that respondents may need to form more comprehensive judgments of whether an individual is likable, intelligent, trustworthy, or kind.

CONCLUSIONS

The concept of the ORO may represent an interesting dimension of treatment impact that could supplement existing study endpoints. The findings presented here demonstrate that social perceptions of an individual can be positively influenced by panfacial aesthetic treatment. The field of aesthetic medicine is embracing the relevance of meaningful subjective outcome measures, but it remains a work in progress identifying the most relevant methods by which to measure them.

The positive, significant impact that panfacial treatment had on the social perceptions evaluated in this study supports the ORO as a relevant component of the treatment impact paradigm. These findings are a meaningful contribution to the evolving role of subjective outcome measures in the field of aesthetic medicine and, based on the discretion of the injector, may serve as a useful tool for clinicians while counseling prospective patients on wide-ranging impacts of minimally invasive facial aesthetic treatments.

Supplementary Material

This article contains supplementary material located online at www.aestheticsurgeryjournal.com.

Acknowledgments

The authors thank Nancy L. Etcoff, PhD, of Harvard Medical School and Massachusetts General Hospital, Boston, MA, for her critical review of previous versions of this manuscript. They also gratefully acknowledge the investigators of the HARMONY study: W. Philip Werschler, MD; Ava Shamban, MD; Vic A. Narurkar, MD; Michael S. Kaminer, MD; Joel L. Cohen, MD; and the Nielsen Research Group for their collaboration during the study.

Disclosures

Dr Dayan serves as an investigator consultant and speaker and has received research support from Allergan plc. Dr Rivkin serves as an investigator and consultant and owns stock in Allergan plc. Dr Sykes serves as an investigator and speaker for Allergan plc. Dr Teller serves as an investigator and advisory board member and has received research support from Allergan, plc. Dr Weinkle serves as an investigator for Allergan plc. Mr Shumate is an employee of Allergan plc and may own stock/options in the company. Dr Gallagher was an employee of Allergan plc and may have owned stock/options in the company at the time of the study.

Funding

Writing and editorial support was provided by Dr Erika von Grote, Allergan plc (Irvine, CA) and Dr Adrienne Drinkwater (Peloton Advantage, Parsippany, NJ) and was funded by Allergan plc.

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