Original Contributions

Smile prevails over other facial components of male facial esthetics

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ABSTRACT

Background. The aim of this study was to assess whether scores assigned to the eyes, nose, mouth, and chin regions work as predictors of full smiling face scores.

Methods. In this cross-sectional study, the authors used the facial photographs of 86 smiling men. Photographs yielded 5 components: 1 of the face itself and 4 subcomponents (eyes, nose, mouth, and chin region). Raters assigned the photographs beauty scores that the authors measured morphometrically. The authors analyzed the predictive ability of the subcomponents against that of the full face.

Results. The subcomponents were statistically significant predictors of facial beauty (mouth: $r^2 = 0.38$, $P < .0001$; eyes: $r^2 = 0.14$, $P < .0001$; chin region: $r^2 = 0.09$, $P < .0001$; nose: $r^2 = 0.02$, $P = .05$). The more beautiful people had several statistically significant characteristics, such as narrower faces.

Conclusions. Facial subcomponents are predictive factors of the male smiling face and contribute in the following descending order of importance: mouth, eyes, chin region, and nose.

Practical Implications. The results suggest that for many people improvement in smile esthetics also likely will exert a more positive effect on facial beauty than will other procedures (for example, rhinoplasty).

Key Words. Face; facial esthetics; facial beauty; beauty; smile esthetics; smiles; predictors.

JADA 2018:■(■):■-■
https://doi.org/10.1016/j.adaj.2018.03.019

Despite the fact that beauty is an important element in social life and that the face is the most important factor of a person's beauty,[1-3] precisely how facial attractiveness develops and is perceived among people is still the subject of much controversy.[4-7] Some people tend to believe that beauty is in the eye of the beholder,[1,5] which suggests that physical appearance in and of itself may not explain a person's beauty satisfactorily. Therefore, one may assume that the extent to which a person bonds affectively to another plays a key role in the perception of facial beauty, thus explaining why certain faces look beautiful to some and not to others.[1] Some have suggested that the perception of beauty is assimilated from early childhood through cultural stereotypes, for example, via family images and remarks, media, and film.[8]

However, there is a growing body of evidence showing that the perception of beauty is innate in its origin,[6,8] and there is even agreement as to what (or who) supersedes what (or whom) in comparing sexes, ethnic groups, and ages.[1,3,5,9,10] Even babies 2 or 3 months old were able to judge faces previously analyzed by adults as beautiful or unsightly, with a high level of agreement,[11,12] which suggests that the perception of facial beauty has an important biological foundation.[8,13-15]

Understanding the elements associated with higher facial beauty scores plays an important part in a wide range of health care areas, because there is an obvious increase in demand for esthetic treatments. Put simply, this demand occurs in an attempt not only to make the face—and the smile—increasingly beautiful but also to repair or rebuild these structures when they are impaired by disease or deformity.

In this study, thus, we aimed to evaluate the esthetics of young male adults' smiling faces and determine the predictive ability in assigning beauty scores to the eye, nose, mouth, and chin regions by applying an overall facial beauty score. The specific aims were to evaluate among these subcomponents which morphologic traits were associated more intimately with higher beauty scores.

METHODS

The Ethics Committee of the University of Brasilia, Brasilia, Distrito Federal, Brazil, approved this study (no. CEP-FM 004/2006). The participants were 86 white men aged 19 to 30 years, all nondental undergraduate students enrolled at universities in Brasilia, Distrito Federal, Brazil.

Exclusion criteria were presence of clinically identifiable Class II or Class III dentofacial deformities; history of cleft lip or palate; and presence of fixed orthodontic appliances, beard, mustache, or relevant skin blemishes, such as large scars or lesions. We did not photograph anyone wearing glasses. Each participant received and signed an informed consent form providing their age in years.

We covered the participants' hair with standardized white caps and placed their heads in a natural rest position on a cephalostat (Figure 1A). We told the participants to smile voluntarily while we photographed their smiling faces orthogonally at a standardized frontal view by using a macro 50-millimeter lens (Canon EF 50mm F, Canon) and a digital single-lens reflex camera (Canon EOS 300D, Canon) placed over a tripod at a 1-meter distance. We attached a calibration sphere with a diameter of 2.0 centimeters to the cephalostat over each person's forehead (Figure 1A).

We adjusted the pictures by using a computer program (Photo-Paint X7, Corel). We converted the images into 16-bit gray scale and then cropped them to obtain full smiling face photographs (Figure 1B), thereby excluding confounding areas. Thereafter, we once again cut out the matrix photographs so that each could generate 4 photographs of facial subcomponents: eyes, nose, mouth, and chin region (Figures 1C-1F). In the final analysis, we used all photographs, except for the matrices with no cutouts. (Figures 1B-1F).

The size of the cutouts was the same for all participants. We selected those who had the largest dimensions for each given subcomponent of the face for that particular subcomponent.

Thus, the cutouts to obtain the photographs of the smiles used as the benchmark the biggest mouth among all the people of the sample. In this person, the upper limit constituted the region immediately below the columella region, the lateral limits consisted of the oral comissures, and the lower limit consisted of the lower edge of the lower lip. On the sides and bottom portions, we included a slight margin of the face to frame the area. We applied the dimensions of this rectangle to all faces, even if this caused the face to be displayed only slightly around the area of interest. We used the same methodology for the cutouts of the nose and chin so that in the resulting photographs of the noses the areas of the eyes were covered by a mask to avoid affecting the analysis in the nasal region.

We measured linear morphometric variables on the matrix photographs by using a computer program (Image-Pro, Media Cybernetics) (Figure 2). We used the 2-cm sphere to calibrate the program during the measurements (Figure 1A). We calculated 4 other variables by using the data from Figure 2: the ratio of the interzygomatic distance to the cheek width, the ratio of the middle one-third of the face to the lower one-third of the face, the ratio of the face height to the interzygomatic distance, and the ratio of the intercanthal distance to the eye width. We obtained 2 other variables by means of visual inspection: the round, square, or triangular shape of the lower edge of the chin and the presence or absence of a double chin.

We invited a convenience sample of 15 women aged 20 to 60 years to rate the photographs. They were laypeople and senior students in economics ($n = 5$), business administration ($n = 5$), and biology ($n = 5$) at the University of Brasilia. All raters signed an informed consent form.

We developed a Web site specifically for the evaluation of the photographs. Each rater received an e-mail with a password to access the Web site, as well as instructions on how to use the Web site tools and rate the photographs. Each photograph was shown randomly on the computer screen, along with a visual categorical scale with numbers ranging from 0 (not handsome) to 10 (very handsome). Each rater clicked on the number that corresponded to her perception of the beauty of the face or subcomponent. We also asked the raters to estimate the person's age in years when exposed to the facial photograph.

We analyzed the data statistically by using software (SAS Version 8.1, SAS Institute). We obtained descriptive statistics from the variables. We used a stepwise multiple regression analysis ($\alpha = .05$) to test the effect of the scores given to the eyes, nose, mouth, and chin region on the beauty of the face as a whole. The premises of normality, linearity, and homoscedasticity of residuals were not violated. We screened univariate and multivariate outliers.

ABBREVIATION KEY

NA: Not applicable.