

The current preferred female lip ratio



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ABSTRACT

Background: Perception of beauty is influenced by the individual's demographic background and characteristics. However, objective measurements and ratios remain the foundation for aesthetic evaluations. This study aimed to elucidate if there exists a universally applicable ideal upper to lower lip ratio.

Methods: An interactive online survey was designed. Modifiable ranges of lip ratios were achieved via digital alteration, enabling participants to change the ratio of a single female model's lips. The questionnaire was translated into multiple languages and sent to more than 9000 plastic surgeons and the general public worldwide. Demographic data were collected and analysis of variance was used to investigate respective lip ratio preferences.

Results: A total of 1011 responses from 35 different countries (response rate of 14%) was gathered. The majority of survey takers (60%) chose the 1.0:1.0 lip ratio as most attractive. No differences were found in respect to lip ratio preference and the self-reported ethnicity. However, interesting preferences prevailed when analyzing the subgroups regarding lower lip size.

Conclusion: Age, gender, country of residence, and profession significantly impact individual upper to lower lip ratio preferences. However, a 1.0:1.0 lip ratio can apparently be considered most pleasing in females.

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1. Introduction

Defining ideal dimensions and proportions of the human body has been tried for centuries. “Man is the measure of all things”, the Greek philosopher Protagoras noted around 500 B. C. But what is the measure of man? This question has been asked in essentially all cultures. The term “Anthropometry” refers to the “study of human body measurements, especially on a comparative basis” ([Merriam Webster Dictionary, 2016](#)).

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1.1. Importance of the lips

The lips with their central position in the face capture the observers' attention and are of utmost aesthetic, functional and sensual importance ([Reis et al., 2006](#)).

In 1984, Farkas et al. defined proportion standards by using classical anthropometric landmarks in the perioral area ([Laeng et al., 2013](#)). In recent years, much effort has been focused on analyzing ideal facial proportions and symmetry of the face ([Springer et al., 2007](#); [Mommaerts and Moerenhout, 2011](#); [Milutinovic et al., 2014](#)) and many studies have identified different attractive aspects of the eye and nose ([Grundl et al., 2008](#); [Springer et al., 2008](#); [Broer et al., 2012](#); [Grundl et al., 2012](#); [Rhee et al., 2012](#); [Cakir et al., 2013](#)).

However, only a few studies exist which evaluate objective criteria by which an “attractive” lip might be defined. Sforza et al. showed in their study about facial morphometric analysis that

certain features, such as full lips, are generally considered to be attractive (Sforza et al., 2007). Furthermore, Penna et al. (2015) were able to define distinct parameters of the lips and perioral region that seem to add to the attractiveness of female and male individuals. Their findings proved that gender-related differences exist regarding form and shape of an attractive lower third of the face.

However, although objective and validated measures are useful, aesthetics are not defined simply by metrics alone. There is a strong psychological component to patient satisfaction as it relates to body image. Cosmetic proportion, balance and harmony as well as fulfilling personal expectations of the individual undergoing the procedure and the surgeon performing it, are critical factors that must be considered when determining satisfaction and benefit. This survey project was aimed to find out if certain, most pleasing lip proportions regarding the upper to lower lip ratio prevail across different cultures. Demographic factors such as age, sex, social status (of the general public), and type of surgical practice (academic vs. private) were also included in the analysis. The two groups of laypeople and plastic surgeons were chosen to evaluate whether a surgeon's eye and ideas of perfect relations differ from the general population (which can be regarded as a potential patient population). If a surgeon who has the abilities to change lip size and shape has different goals in mind than a patient, this is of importance and could even lead to dissatisfaction on both sides.

2. Material and methods

2.1. Survey design

This study was approved by the Technical University Munich School of Medicine Human Investigation Committee (HIC# 310/15). An interactive, online survey displaying computerized images of a Caucasian woman's face was designed. The volunteer model was photographed from an anterior view. Various ranges of upper to lower lip ratios were achieved via digital alteration using imaging software (Adobe Photoshop CS5, Adobe Systems, San José, CA, USA).

Socio-demographic information including sex, age, country of residence/practice, ethnic background, yearly income (laypeople) and type of practice (academic vs. private) was collected on every respondent (Fig. 1).

By choosing one of several images, each of which had different lip sizes, participants were able to change the upper to lower lip ratio of the model's face. Specifically, these modifications allowed the survey taker to apply augmentation or reduction to lip fullness to create a ratio of upper to lower lip of 1.5:1.0, 1.25:1.0, 1.0:1.0, 1.0:1.25 and 1.0:1.5 (Fig. 2a–e). The respective areas of modification in overall volume and upper to lower lip ratio were chosen because they were felt to be critical for achieving the desired aesthetic outcome in both non-surgical and surgical procedures. As a last question, all respondents were asked to judge their own selection as appearing rather natural or artificial.

2.2. Participant recruitment

Between September and December 2015, the survey was sent to over nine thousand people, including plastic surgeons and the general public, in 35 countries by using a professional e-mail marketing service (Mailchimp, Atlanta, GA, USA). Additionally, plastic surgeons were contacted through their official national societies and the general public was randomly selected via social networks (LinkedIn, Mountain View, CA, USA; Instagram, Facebook, Facebook Inc., Menlo Park, CA, USA; Twitter, Twitter Inc., San

Lip Aesthetics

Goal of this study is to analyze aesthetic preferences regarding the most attractive lip size among plastic surgeons. We would greatly appreciate your opinion. Responses are anonymous and no personally identifiable information is recorded. This survey was approved by the Technical University Munich School of Medicine Human Investigation Committee under HIC# 310/15, PI P. Niclas Broer.

What is your gender?

- ☐ male
☐ female

How old are you?

(years old)

- ☐ 20 - 29
☐ 30 - 39
☐ 40 - 49
☐ 50 - 59
☐ 60 - 69
☐ > 69

In what country do you live?

What is your ethnic background?

Please select...

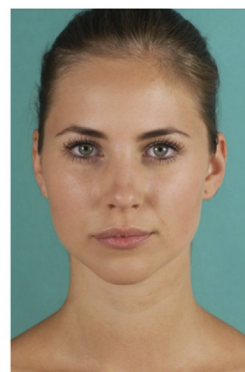
Is your practice primarily academic or private?

- ☐ academic
☐ private

How many lip augmentations do you perform per year?

- ☐ none
☐ < 25
☐ 25 - 50
☐ 50 - 75
☐ 75 - 100

Please select the most attractive upper to lower lip ratio (with the grey buttons "decrease" and "increase"):



< decrease

increase >

How natural would you consider your selection?

- ☐ rather artificial
☐ rather natural

Comments:

Send

Fig. 1. The online questionnaire for plastic surgeons (with an upper to lower lip ratio of 1.0:1.0).

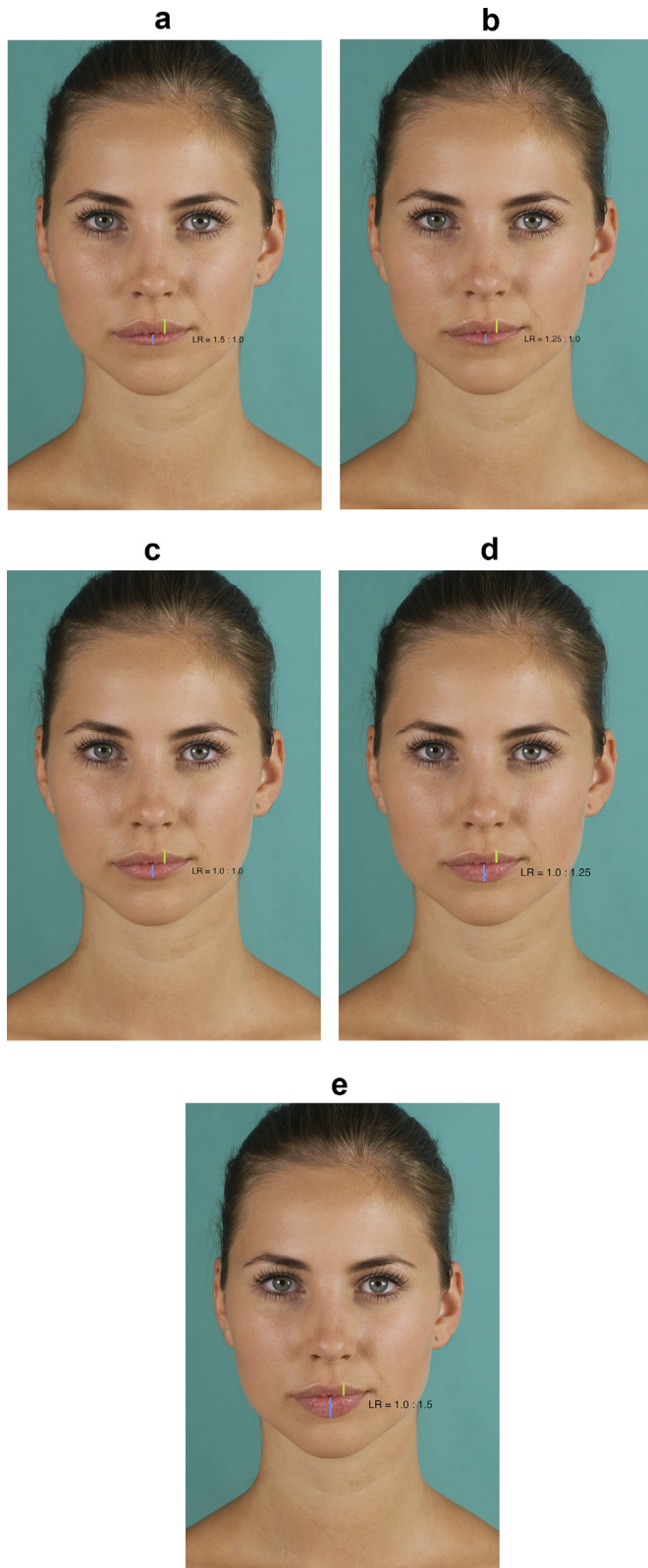


Fig. 2. a). Models' face displaying the upper to lower lip ratio of 1.5:1.0; (b). Models' face displaying the upper to lower lip ratio of 1.25:1.0; (c). Models' face displaying the upper to lower lip ratio of 1.0:1.0; (d). Models' face displaying the upper to lower lip ratio of 1.0:1.25; (e). Models' face displaying the upper to lower lip ratio of 1.0:1.5.

Francisco, CA, USA). Three rounds of reminders were sent out during the three months time period to non-responders. The survey was closed at the end of 2015.

To maximize international participation, the questionnaire was designed and sent out in English, German, French, Portuguese, and Spanish. The professional societies were chosen based on the size of their listed members (>500 members) to provide for adequate distribution. Societies without public listings of their members were contacted directly to inquire about members and their respective e-mail addresses. The recruitment e-mail contained a header in the national language of the country, as well as a description of the nature of the study and links to the survey website.

Data were collected in North America (Canada, United States of America), Latin America and the Caribbean (Argentina, Aruba, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Puerto Rico), Western Europe (Austria, Belgium, France, Germany, Italy, Norway, Portugal, Spain, Sweden, Switzerland, the Netherlands, Ireland, and the United Kingdom), Oceania (Australia), Eastern Asia (China, Japan, Taiwan, and Republic of Korea), Southern Asia (India and Iran), South-East Asia (Laos, Malaysia, Myanmar, Singapore, and Thailand), Western Asia (Israel, Jordan, Lebanon, Turkey, and United Arab Emirates), Western Africa (Ivory Coast), Eastern Africa (Burundi and Rwanda), and Southern Africa (Republic of South Africa).

To enhance statistical power, single countries were grouped by major geographic region based on definitions according to the United Nations. Only regions for which more than 20 responses were available were included in the analysis: North America ($n = 279$), Latin America ($n = 122$), Asia/Middle East ($n = 86$), and Europe ($n = 524$) (United Nations, 2011).

2.3. Statistical analysis

When processing the data, less than 1% was found to be missing. In the interest of data retention, the authors imputed the respective arithmetic means. One-way Analysis of Variance (ANOVA) was used to distill differences of lip shape preferences across countries, sex and age, and ethnicity, social status (laypeople), and practice type. Normality assumptions of lip shape preferences were met. Statistical analyses were performed using the SPSS Advanced Statistical software package (IBM SPSS Statistics version 24, SPSS Inc., Chicago, IL, USA).

3. Results

During a period of 12 weeks, a total of 1,011 responses was gathered from plastic surgeons (564 responses, 121 females and 443 males) and laypersons (447 responses, 242 females and 205 males) residing in 35 countries. A total response rate of 11.1 % was obtained. Due to relatively high bounce rates of the recipients' email servers of up to 25%, this rate needs to be adjusted. Taking the mean bounce rate into consideration, a response rate of approximately 14% was achieved. The age of survey takers ranged from 20 to over 69 years.

Distribution of upper to lower lip ratio preferences ranged from 1.5:1.0 to 1:0 to 1:5.

Overall, 60% (611 of 1,011 respondents) of survey takers chose the 1.0:1.0 upper to lower lip ratio (Fig. 3) and 24% (244 of 1011 respondents) the 1.0:1.25 upper to lower lip ratio to be most

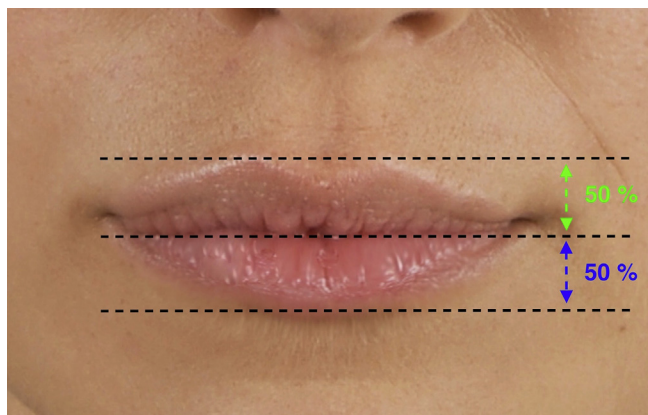


Fig. 3. Upper to lower lip ratio 1.0:1.0.

pleasing. Both ratios 1.5:1.0 and 1.25:1.0 were chosen by 6% of all respondents (Fig. 4), while the ratio 1.0:1.5 was chosen by only 3%.

Significant differences were found when analyzing the subgroups regarding their preferences of the lower lip size.

3.1. Plastic surgeons

3.1.1. Impact of surgeons' age on upper to lower lip ratio preferences

Significant differences in opinion regarding ideal lip ratios were found among surgeons of different age groups ($F(5, 558) = 4.685$, $\eta^2 = .040$). Surgeons in their 30s preferred a larger lower lip to upper lip ratio (mean 3.34), while those in their 70s preferred much smaller lower lips to upper lips ratios (mean 2.854) (Table 1).

3.1.2. Impact of surgeons' country of residence/practice on upper to lower lip ratio preferences

To assess the impact of the variable "country of residence/practice" of plastic surgeons on aesthetic preferences, surgeon responses were grouped accordingly.

Preference for upper to lower lip ratio differed significantly across geographic region of practice ($F(3, 560) = 2.728$, $p = .043$, $\eta^2 = .014$). Overall, surgeons in Europe preferred the largest lower to upper lip ratios (mean 3.15), followed by those in Latin America (mean 2.98) and those in North America (mean 2.95). Surgeons living in Asia preferred the smallest lower to upper lips ratios (mean 2.93) (Table 2).

3.1.3. Impact of surgeons' type of practice on upper to lower lip ratio preferences

Another significant difference in preference for upper to lower lip ratio was found across surgeons' type of practice ($F(1,$

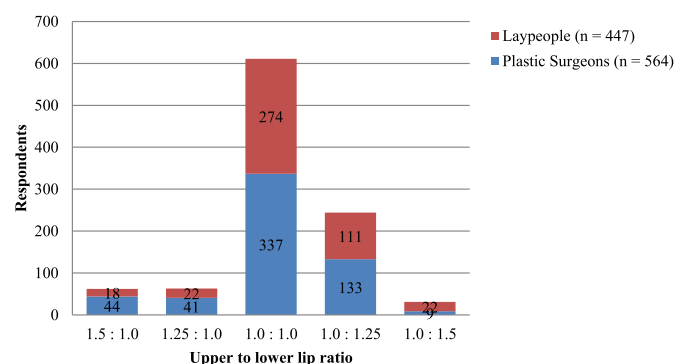


Fig. 4. Distribution of upper to lower lip ratio preferences in the total survey population (n = 1011).

Table 1

Impact of surgeons' age on upper to lower lip ratio preferences.

| Age (y) | Mean | Std. deviation | N |
|---------|--------|----------------|-----|
| 20s | 3.2000 | .76777 | 20 |
| 30s | 3.3404 | .57834 | 94 |
| 40s | 3.1136 | .66134 | 132 |
| 50s | 2.8974 | .91707 | 156 |
| 60s | 2.9474 | .89088 | 114 |
| 70s | 2.8542 | 1.03121 | 48 |
| Total | 3.0390 | .82710 | 564 |

Dependent variable: upper to lower lip ratio: 1 = upper > lower; 5 = lower > upper (higher the number – bigger lower lip).

562) = 4.017, $p = .046$, $\eta^2 = .007$). Overall, surgeons in academic practice prefer larger lower lips than those in private practice (Table 3).

Preference for upper to lower lip ratio did not differ significantly across gender ($F(1, 562) = .08$, $p = .778$) or the respondents' self-reported identification with a specific ethnic group ($F(1, 562) = .473$, $p = .492$).

3.2. General population

3.2.1. Impact of laypeople's age on upper to lower lip ratio preferences

Lip ratio preferences significantly differed across age groups ($F(5, 441) = 3.091$, $p = .009$, $\eta^2 = .034$). Younger laypeople preferred the largest lower lips, with those in their 20s preferring the largest lower lips. Those in their 70s preferred the smallest lower lips (Table 4).

3.2.2. Impact of laypeople's gender on upper to lower lip ratio preferences

Significant differences in opinion regarding ideal lip ratio were also found among laypeople's gender ($F(1, 445) = 4.043$, $p = .045$, $\eta^2 = .009$). Females apparently prefer bigger lower lips than males (Table 5).

3.2.3. Impact of laypeople's country of residence on upper to lower lip ratio preferences

Lip ratio preferences among laypeople across the different regions was only marginally significant, $F(3, 443) = 2.224$, $p = .085$, $\eta^2 = .015$ and did not significantly differ across ethnic groups ($F(1, 445) = .743$, $p = .389$).

Multiple regression analyses were performed with gender, age, ethnicity, region, and income as predictors of the outcome variable "lip ratio". Overall, the regression was significant ($F(5, 441) = 2.891$, $p = .014$). Age ($b = -.154$, $p = .002$) and gender ($b = .090$, $p = .057$) emerged as a significant predictor when controlling for ethnicity, region, and income. Age was identified to be the stronger predictor. With regard to age, older respondents preferred smaller lower lips, while younger people preferred bigger lower lips, suggesting cohort differences (Table 6).

Table 2

Impact of surgeons' country of residence on upper to lower lip ratio preferences.

| Region | Mean | Std. deviation | N |
|---------------|--------|----------------|-----|
| North America | 2.9479 | .88465 | 192 |
| Europe | 3.1523 | .71399 | 243 |
| Latin America | 2.9765 | .92552 | 85 |
| Asia | 2.9318 | .89955 | 44 |
| Total | 3.0390 | .82710 | 564 |

Dependent variable: upper to lower lip ratio: 1 = upper > lower; 5 = lower > upper (higher the number – bigger lower lip).

Table 3
Impact of surgeons' type of practice.

| Practice type | Mean | Std. deviation | N |
|---------------|--------|----------------|-----|
| Academic | 3.1304 | .72232 | 207 |
| Private | 2.9860 | .87879 | 357 |
| Total | 3.0390 | .82710 | 564 |

Dependent variable: upper to lower lip ratio: 1 = upper > lower; 5 = lower > upper (higher the number – bigger lower lip).

4. Discussion

Some of the first proofs of the concept of ideal proportions derive from early Egyptian art. The existence of a canon of proportions to sculpt and paint human bodies becomes clearly evident when analyzing Egyptian mural paintings and sculptures. Applying laws of proportion has been a central theme of this art, which evolved around 3000 B.C.

Measurements and their application to the human body had a second peak during the Greek classic era, around 500 B.C.

The beauty of the body is, in the opinion of most physicians and philosophers of that time, founded in the symmetry and ideal proportions of the body. Platon regarded geometry as an aesthetic as well as scientific fact.

The Egypt and Greek principles persisted and revived much later during the Renaissance. One of the foremost figures during that time, Leonardo da Vinci, exemplifies this. His doctrines entailed that he did not simply draw what he saw, but what he recognized from it. The continuous mathematization in relation to the world led da Vinci to pursue his search for laws which followed the phenomena and interactions in the manifestations of nature. He also applied his findings in the form of rules and geometric relations to architecture and mechanics (Leonardo da Vinci Ausstellungskatalog, 2014).

As such, ideal proportions and measurements which define an attractive lip and have been suggested in arts and science for a long time, have been the subject of several medical publications (Sforza et al., 2007; Penna et al., 2015). However, many studies focusing on this subject are limited due to the fact that several different models are used, which may introduce a bias given that confounding factors like skin quality and color differ in each model and can therefore influence the individual's perception of attractiveness. Furthermore, most of the cited studies were performed in a confined geographic location. Yet, for the aforementioned reasons, caution should be exercised when applying the findings universally, particularly across different cultures and ethnic groups.

Hence one of the questions we sought to answer with this study was to see if previous definitions of beauty also apply on a cross-cultural basis, because if not, caution should be practiced if these standards were to be applied both on the part of the surgeon and that of the patient.

Table 4
Impact of laypeople's age on upper to lower lip ratio preferences.

| Age (y) | Mean | Std. error | 95% Confidence interval | |
|---------|-------|------------|-------------------------|-------------|
| | | | Lower bound | Upper bound |
| 20s | 3.322 | .059 | 3.207 | 3.437 |
| 30s | 3.185 | .060 | 3.067 | 3.302 |
| 40s | 3.226 | .106 | 3.018 | 3.435 |
| 50s | 3.043 | .161 | 2.727 | 3.360 |
| 60s | 3.091 | .165 | 2.767 | 3.414 |
| 70s | 2.286 | .292 | 1.712 | 2.859 |

Dependent variable: upper to lower lip ratio: 1 = upper > lower; 5 = lower > upper (higher the number – bigger lower lip).

Table 5
Impact of laypeople's gender on upper to lower lip ratio preferences.

| Gender | Mean | Std. error | 95% Confidence interval | |
|--------|-------|------------|-------------------------|-------------|
| | | | Lower bound | Upper bound |
| Male | 3.137 | .054 | 3.030 | 3.243 |
| Female | 3.285 | .050 | 3.187 | 3.383 |

Dependent variable: upper to lower lip ratio: 1 = upper > lower; 5 = lower > upper (higher the number – bigger lower lip).

Several interesting findings from this study shed some additional light onto the subject.

One of the main hypotheses was that despite the known fact that inter-cultural variables exist regarding aesthetic preferences, there might still be a ratio from the upper to the lower lip which appears most pleasing across most cultures and geographic locations.

We found that, overall in this study, this was the case for the 1.0:1.0 ratio. Further, several distinct differences regarding the ratios presented themselves when taking respective demographic factors into consideration.

Surgeons in Europe expressed a preference for larger lower lips, and those in Asia preferred smaller lower lips. Lip ratio preferences did also differ significantly across surgeons' type of practice as surgeons in academic practice preferred larger lower lips than those in private practice. Arguably, throughout their career, each generation of plastic surgeons has been exposed to different sociocultural influences, including visual media, which might have influenced these findings. The same assumption might explain intercultural preferences in laypersons.

When comparing the cohort of plastic surgeons with the general population, similar results were found when analyzing the respective age groups. In both groups, younger people preferred larger lower lips, while older respondents preferred smaller lower lips. Interestingly, it was also found that upper to lower lip ratio preferences differed significantly across laypeople's gender. Female participants preferred bigger lower lips than males.

In the total survey population, lip ratio preferences did not differ significantly across self-reported ethnicity, which points toward the fact that a global ideal upper to lower lip ratio from 1.0:1.0 exists independent from ethnicity. This is in accordance with findings from Perrett et al. (1994) where the authors had faces judged by observers in Japan and by Caucasians and found that, contrary to the *averageness hypothesis*, highly attractive faces are systematically different in shape from average, a finding which prevailed across different cultures. In a subsequent study, where Scottish and South African evaluators were asked to rate attractiveness of Caucasian and African faces, the authors again found that there seems to be a cross-cultural agreement in facial attractiveness preferences, again a finding which supports our main hypothesis that certain facial

Table 6
Multiple regression of independent variables on outcomes.

| Independent variable | Unstandardized coefficients | | Standardized coefficients | t | Sig. |
|----------------------|-----------------------------|------------|---------------------------|--------|------|
| | B | Std. error | | | |
| 1 Constant | 3.451 | .144 | | 23.945 | .000 |
| Gender | .142 | .074 | .090 | 1.907 | .057 |
| Age | -.010 | .003 | -.154 | -3.066 | .002 |
| Ethnicity | .065 | .093 | .036 | .699 | .485 |
| Region | -.013 | .053 | -.013 | -.242 | .809 |
| Income | 9.246E-7 | .000 | .043 | .804 | .422 |

Dependent variable: upper to lower lip ratio: 1 = upper > lower; 5 = lower > upper (bigger the number bigger lower lip).

relations and features appears most attractive across a very wide range of ethnicities and cultures (Coetzee et al., 2014).

It is important to note that the findings of our study represent current trends in aesthetics, are therefore only a snapshot in time, and may as such be subject to change, much like fashion for instance. Further, media and suggested ideals in fashion and body habitus are different in every country, which undoubtedly impacts beauty preferences.

The study certainly has several limitations. Because this study was based on voluntary participation in an online survey, a certain degree of selection bias might prevail. Another point worth mentioning is the fact that the survey displayed only one face, which was artificially altered using digital software, a technique, which may be less ideal than comparing different “real” faces with different features. Also, using only one model of certain ethnic heritage certainly imposes bias, especially since answers were gathered internationally. Many studies exist which used multiple faces of multiple ethnicities where the evaluators were then asked to choose the most pleasing one. However, many of those studies used multiple faces, but only a few (often regional) evaluators. When using multiple faces there also exist multiple confounding factors like skin color, texture, facial proportions, hair patterns etc., which we tried to eliminate by using only one model. Also, using different models also means that the actual proportions of lip size and shape would have to be calculated each time, as big lips in a larger person might evoke the same sense of “ideal” proportion as a smaller lips in a smaller person for instance. Using modern technology and changing only certain features of the lips with an otherwise fixed body frame allowed a change in lip sizes and thereby alter the entire facial proportions.

In summary, while golden ratios and “ideal” proportions are generally not universally applicable and certainly need to be seen in context, the 1.0: 1.0 upper to lower lip ratio can be considered most pleasing across a wide range of people.

This study may change a surgeon's modus operandi because it sensitizes the aesthetic perception of plastic surgeons. It emphasizes that many factors need to be taken into consideration in respect to the aesthetic evaluation of our patients (country of residence/practice, sex, age, social status, and ethnic background) as the patients' aesthetic desires are the ultimate gold standard. However, knowing that a 1.0:1.0 upper to lower lip ratio is desirable in most cases, can serve as a helpful guideline when augmenting lips for cosmetic purposes.

Future research should consider investigating whether surgeons' opinions lead to nonsurgical and surgical behavior change across different countries. For example, by having augmented many women's lips, have plastic surgeons affected the way society thinks lips should look and the way they are portrayed in the media?

5. Conclusion

Aesthetic perception is influenced by a wide range of factors including intercultural differences as well as surgeons' and general

populations' age, gender, and geographic background. However, particularly in the field of plastic and reconstructive surgery, globalization suggests more and more unified surgical goals. According to our findings, with respect to lip aesthetics, a 1.0:1.0 upper to lower lip ratio can be considered most pleasing in females under most circumstances.

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Conflict of interest statement

None of the authors has a financial interest in any of the products, devices, or drugs mentioned in this manuscript. The authors declare that there are no conflicts of interest.

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