The Ideal Buttock Size: A Sociodemographic Morphometric Evaluation

Paul I. Heidekrueger, M.D.
Sammy Sinno, M.D.
Neil Tanna, M.D.
Caroline Szpalski, M.D., Ph.D.
Sabrina Juran, Ph.D.
Daniel Schmauss, M.D., Ph.D.
Denis Ehrl, M.D.
Reuben Ng, M.A., M.Sc., Ph.D.
Milomir Ninkovic, M.D., Ph.D.
P. Niclas Broer, M.D., Ph.D.

Munich, Germany; New York, N.Y.; Houston, Texas; and New Haven, Conn.

Background: Perception of beauty is influenced by geographic, ethnic, cultural, and demographic factors. However, objective measurements remain the foundation for aesthetic evaluations. In the quest to better define the "ideal" female buttock, this study assumes interdependence among variables such as country of residence, sex, age, occupation, and aesthetic perception, yielding a waist-to-hip ratio that appears most pleasing across most cultures and geographic locations.
Methods: An online survey was designed. Modifiable ranges of buttock sizes were achieved by means of digital alteration, enabling participants to interactively change the size and waist-to-hip ratio of a single model's buttocks. The questionnaire was translated into multiple languages and sent to more than 9000 plastic surgeons and to the general public worldwide. Demographic data were collected, and analysis of variance was used to elucidate buttock shape preferences.
Results: A total of 1032 responses were gathered from over 40 different countries. Significant differences regarding preferences for buttock size were identified across the respondents. Overall, 404 of 1032 of survey takers (39 percent) chose the 0.7 waist-to-hip ratio to be their ideal. Significant relationships were distilled between sex, age, self-reported ethnicity, plastic surgeons' country of residence, and ethnic background. For example, surgeons in Latin America preferred the largest buttocks, followed by surgeons in Asia, North America, and Europe, with non-Caucasians preferring larger buttocks than Caucasians.
Conclusion: There seems to exist a global consensus regarding the ideal waist-to-hip ratio; however, multiple other factors impact the aesthetic perception of the buttocks significantly. (*Plast. Reconstr. Surg.* 140: 20e, 2017.)

The definition of the ideal body has changed tremendously throughout the centuries, and concepts of beauty undergo ever-changing connotations. In today's world, where Internet and social media influence people's vision of beauty, new trends emerge on a constant basis. Especially fashion, with an increased focus on body image, has fueled a greater interest in evaluating and defining ideal morphometric proportions.[1,2]

Although beauty lies in the eyes of the beholder, it is also influenced by the individual's geographic, ethnic, and cultural background and characteristics.[1] However, it remains largely unknown to what extent the aesthetic sense is influenced by these demographic factors.[3–10] Such

From the Department for Plastic, Reconstructive, Hand, and Burn Surgery, StKM-Klinikum Bogenhausen, Academic Teaching Hospital, Technical University Munich; the Department for Plastic Surgery and Hand Surgery, Klinikum Rechts der Isar, Technical University Hospital Munich; the Department of Plastic Surgery, New York University School of Medicine; the Department of Plastic Surgery, North Shore LIJ Hospital; the United Nations Population Fund, Technical Division, Population and Development Branch; the Department of Plastic Surgery, The University of Texas M. D. Anderson Cancer Center; and the Division of Chronic Disease Epidemiology, Yale University School of Public Health.
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knowledge has significant implications for both patients seeking and surgeons performing cosmetic and reconstructive surgery, because cultural differences and international variability must be acknowledged when new techniques and aesthetic outcomes are being defined and published.

Analyzing female physical attractiveness has gained much attention in the past and, besides certain facial features, the focus generally lies on three determinants of beauty: waist-to-hip ratio, body mass index, and curvaceousness. Fisher and Voracek performed a review on the topic and contemplated that the three determinants influence a woman's attractiveness; however, they interact, and the relative importance of each factor compared with the others is still unknown. The authors also stated that as of yet no stable indicators of bodily attractiveness have been clearly defined and so far no attributes could be identified that have withstood the test of time and cross-cultural applicability, thus noting that despite the long-standing research, explorations into the shapes of beauty are only in their beginning.[11]

Of all body parts, across many cultures and time, the buttocks have endured as a key body element of female beauty,[12] and gluteoplasty is now one of the fastest growing procedures in the field of plastic surgery. In the United States, the number of buttock augmentations (with implants and fat transfer) has increased by more than 20 percent between 2014 and 2015.[13]

Singh has extensively investigated the role of body proportions and waist-to-hip ratios when defining female attractiveness.[14,15] The author found that ideal female shape is influenced more by the waist-to-hip ratio than by overall body size.[16] Despite what is already known regarding attractive bodily features, there remains no clear standard with respect to ideal female buttock size and form. In the past, different studies have evaluated waist-to-hip ratios and contemplated a ratio between 0.7 and 0.67 to be ideal.[14,17] However, caution should be exercised when applying such ratios universally, because although objective and validated measures are useful, aesthetics are not defined simply by metrics alone. Consequently, ideal proportions and measurements that define an attractive buttock, as suggested in the plastic surgery literature, might not apply on a cross-cultural basis.

The main hypothesis of the presented study was that despite the known fact that intercultural variables prevail regarding aesthetic preferences, there might still exist a waist-to-hip ratio which appears most pleasing across most cultures and geographic locations. Aim was further to demonstrate that "ideal" dimensions of female buttocks are indeed very different; that depending on ethnic and geographic background, certain preferences can be elucidated across certain groups of plastic surgeons and the general public; and that, as such, in the international plastic surgery literature, often-cited ideal dimensions and measurements of the body have to be interpreted with caution.

MATERIALS AND METHODS

The study was approved by the ethical committee of the Technical University Munich, School of Medicine (Human Investigation Committee number 311/15). An interactive, online survey displaying computerized images of a Caucasian woman's buttocks was designed. The 27-year-old volunteer model was photographed from anterior and lateral views. Various ranges of buttock volume were achieved by means of digital alteration using imaging software (Adobe Photoshop CS5; Adobe Systems, Inc., San Jose, Calif.).

By choosing one of several images, each of which reduced or augmented buttock size, participants were able to change the shape of the model's buttocks. Specifically, these modifications allowed the survey taker to, in 10 percent increments, apply augmentation or reduction to the buttocks on a range of either three scales up or three scales down, and to create a waist-to-hip ratio of 0.68, 0.69, 0.70, 0.71, 0.72, 0.73, and 0.74 (Figs. 1 through 7). [**See Figure, Supplemental Digital Content 1**, which shows the online questionnaire for plastic surgeons, with neutral (0) buttock size, ***http://links.lww.com/PRS/C194***.]

Demographic information including sex, age, country of residence/practice, ethnic background, yearly income (general public), and type of practice (academic versus private practice plastic surgeons) was collected. All respondents were further asked to judge their own selection as appearing rather natural or artificial.

Participant Recruitment

Between December of 2015 and April of 2016, the survey was sent to over 9000 people, including plastic surgeons and the general public, in over 40 countries by using a professional e-mail marketing service (Mailchimp, Atlanta, Ga.). In addition, plastic surgeons were contacted by e-mail correspondence through contact listings in national and international specialty societies (Table 1). To maximize international participation, the questionnaire was designed in English, German, French, Portuguese, and Spanish.

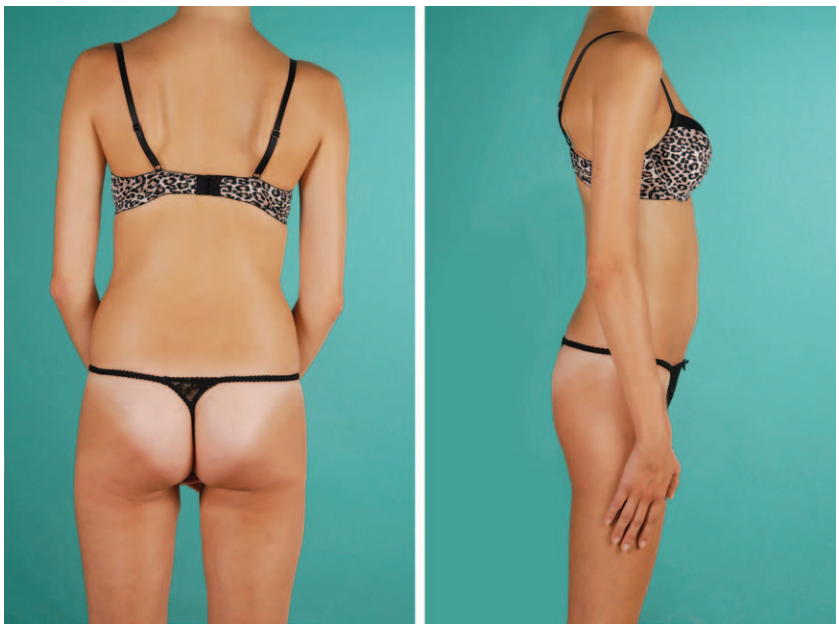

Fig. 1. The model's body (27-year-old woman) with the smallest (−3) buttock size (frontal and lateral views).

Fig. 2. The second smallest (−2) buttock size (frontal and lateral views).

The societies were chosen based on the size of their listed members (>500 members). Societies without public listings of their members were contacted directly to inquire about members and their respective e-mail addresses. The general public was reached out to by means of social networks [LinkedIn (Mountain View, Calif.); Instagram (Menlo Park, Calif.); Facebook (Facebook, Inc., Menlo Park, Calif.); and Twitter (Twitter, Inc., San Francisco, Calif.)]. Three rounds of reminders were sent out during the 5-month period to nonresponders. Data were collected in North and South America, Europe, Oceania, Asia, and Africa (Table 1).

To enhance statistical power, the single countries were grouped by major geographic region based on regional definitions by the United Nations.[18] Only regions from which more than 20 responses were obtained were included in the analysis: North America, Latin America, Europe, and Asia.

Fig. 3. The third smallest (–1) buttock size (frontal and lateral views).

Fig. 4. Neutral (0) buttock size (frontal and lateral views).

The two groups of the general public and plastic surgeons were chosen to evaluate whether a surgeon's eye and ideas of perfect relations differ from those of the general public. If a surgeon, who has the abilities to change buttock size and shape, has different goals in mind than a patient, this is of importance and could even lead to dissatisfaction on both sides.

Statistical Analysis

When processing the data, less than 1 percent were found to be missing. In the interest of data retention, the authors imputed the respective arithmetic means. One-way analysis of variance was used to distill differences of buttock size preferences across countries, sex and age, ethnicity, yearly income (general public), and practice type

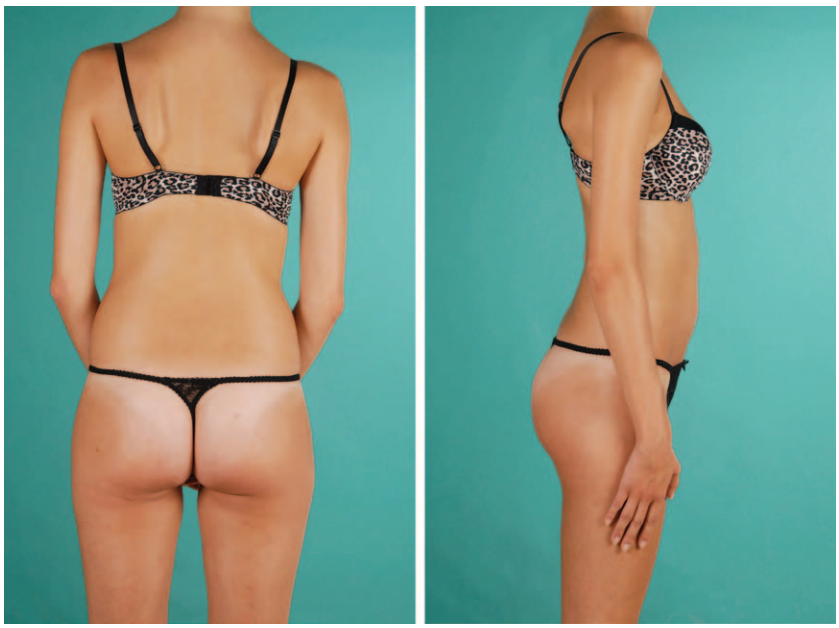

Fig. 5. The third largest (+1) buttock size (frontal and lateral views).

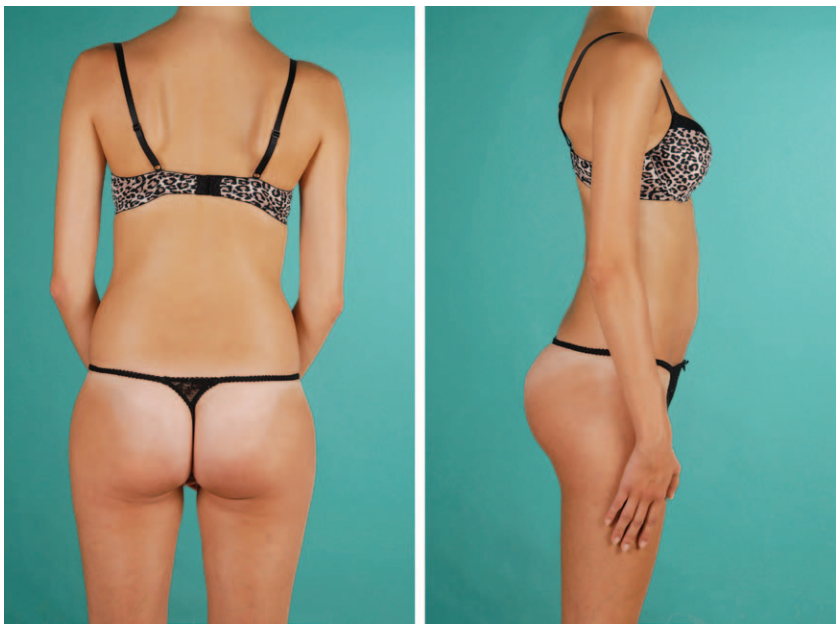

Fig. 6. The second largest (+2) buttock size (frontal and lateral views).

(plastic surgeons). Normality assumptions of buttock shape preferences were met. Statistical analyses were performed using the SPSS Advanced Statistical software package (IBM SPSS Version 24; IBM Corp., Armonk, N.Y.).

RESULTS

A total of 1032 responses were gathered from plastic surgeons (583 responses; 104 women and 479 men) and the general public (449 responses; 246 women and 203 men) living in 35 countries. A total response rate of 11.5 percent was obtained; however, this rate needs to be adjusted because of high bounce rates of the recipients' e-mail servers of up to 25 percent. Taking the mean bounce rate into consideration, a response rate of approximately 14 percent was achieved. The response rates for each of the four e-mail campaigns were 7, 3, 2, and 2 percent. The age of survey takers ranged

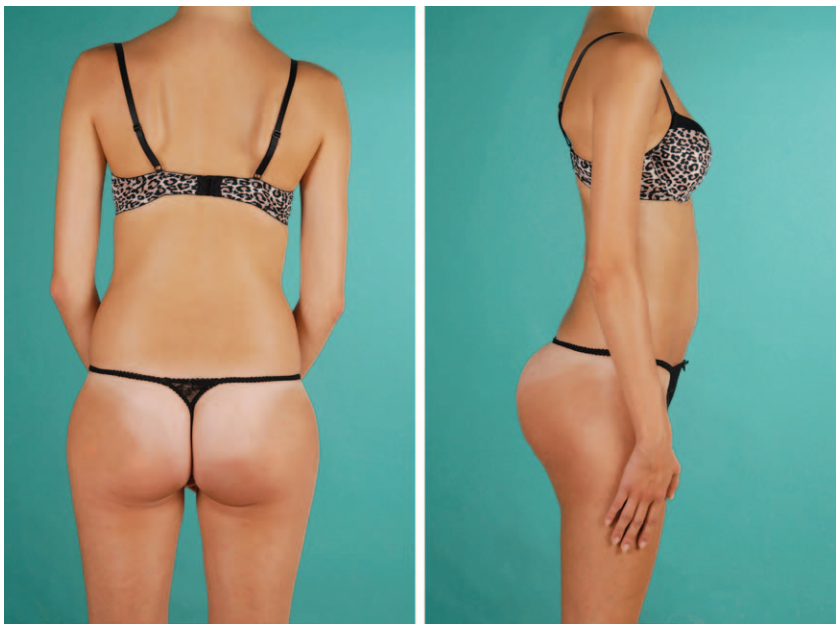

Fig. 7. The largest (+3) buttock size (frontal and lateral views).

Table 1. Countries of Collected Data and Contacted International Plastic Surgery Societies

Region	Countries	Contacted Societies
North America	United States, Canada	American Society of Plastic Surgeons
Latin America and the Caribbean	Argentina, Brazil, Mexico, Chile, Venezuela, Mexico, and Peru	Brazilian Society of Plastic Surgery (Sociedade Brasileira da Cirurgia Plastica), Colombian Society of Aesthetic and Reconstructive Plastic Surgery (Sociedad Colombiana de Cirugia Plastica Estetica y Reconstructiva)
Western Europe	Austria, Belgium, Luxembourg, France, Germany, Italy, Norway, Portugal, Spain, Sweden, Lithuania, Switzerland, The Netherlands, Ireland, and the United Kingdom	Austrian Society of Aesthetic and Reconstructive Plastic Surgery (Österreichische Gesellschaft für Plastische, Ästhetische und Rekonstruktive Chirurgie), French Society of Aesthetic and Reconstructive Plastic Surgery (La Société Française de Chirurgie Plastique Reconstructrice et Esthétique), German Association of Plastic Surgeons (Vereinigung der Deutschen Ästhetisch-Plastischen Chirurgen), Italian Society of Plastic Reconstructive and Aesthetic Surgery (Società Italiana di Chirurgia Plastica Ricostruttiva ed Estetica), Spanish Society of Plastic Reconstructive and Aesthetic Surgery (Sociedad Española de Cirugia Plastica Reparadora y Estètica), Swiss Society of Plastic Reconstructive and Aesthetic Surgery (Schweizerische Gesellschaft für Plastische, Rekonstruktive und Ästhetische Chirurgie), British Association of Plastic Reconstructive and Aesthetic Surgeons
Eastern Europe	Czech Republic, Serbia	
Oceania	Australia	
Eastern Asia	China, Japan, Philippines, and Republic of Korea	Japanese Society of Plastic and Reconstructive Surgery, Korean Society for Aesthetic Plastic Surgery
Southern Asia	India	Indian Association of Aesthetic Plastic Surgeons
Southeastern Asia	Thailand, Myanmar, Laos, Singapore, Indonesia, and Malaysia	Society of Aesthetic Plastic Surgeons of Thailand
Western Asia	Israel, Jordan, Lebanon, Turkey, and United Arab Emirates	Oriental Society of Aesthetic Plastic Surgery, Turkish Society of Plastic-Reconstructive and Aesthetic Surgeons
North Africa	Algeria	
Eastern Africa	Egypt	
Southern Africa	Republic of South Africa	

from 20 years to over 69 years. Detailed respondent demographics are listed in Table 2. Only questionnaires that were filled out completely were included in the analysis.

Distribution of waist-to-hip ratio preferences ranged from 0.68 to 0.74. Overall, 404 of 1032 respondents (39 percent) chose the 0.7 waist-to-hip ratio (Fig. 8), 220 of 1032 respondents (21 percent) chose

Table 2. Demographic Data of the Respondents (*n* = 1032)

Demographic Characteristic	Plastic Surgeons	General Public
Sex		
Male	479	203
Female	104	246
Age		
20–29 yr	10	213
30–39 yr	78	184
40–49 yr	163	28
50–59 yr	169	14
60–69 yr	109	7
>69 yr	54	3
Geographic origin		
North America	231	42
Latin America	98	1
Europe	206	392
Asia	48	14
Ethnicity		
African American	7	5
Caucasian	431	371
Hispanic	54	9
Middle Eastern	30	34
East Asian	20	15
South Asian	31	6
Other*	10	9
Total	583	449

*Included respondents who identified themselves as "mixed" or "multiracial."

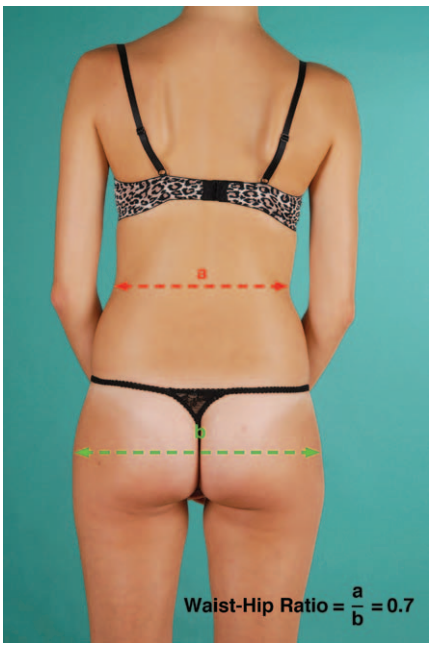

Fig. 8. The most often-selected buttock size (39 percent of all survey takers) was the third largest (+1) buttock size (frontal view), and the most often-selected waist-to-hip ratio was 0.7.

the 0.71 ratio, 191 of 1032 respondents (19 percent) chose the 0.69 ratio, and 112 of 1032 respondents (11 percent) chose the 0.72 ratio as their ideal. The other ratios (0.68, 0.73, and 0.74) were chosen by less than 5 percent of all respondents (Fig. 9). Significant differences were found when analyzing the group regarding their preferences of buttock size.

Total Survey Population

Ethnicity

Buttock size preferences significantly differed across participants' ethnicity ($F_{1,1030} = 8.856$, $p = 0.003$, $\eta^2 = 0.009$), showing that non-Caucasians prefer larger buttocks compared with Caucasians (Table 3).

Regression analysis was also performed with gender, age, ethnicity, and profession (lay people or surgeons) as predictors and buttock size preference as the outcome variable. Overall, the regression was significant ($F_{5,1026} = 6.678$, $p < 0.001$), and the predictors accounted for 17.8 percent of the variance. Gender (b = –0.043, $p = 0.005$), age (b = –0.014, $p < 0.001$), and ethnicity (b = 0.216, $p = 0.026$) emerged as the significant predictors, controlling for profession and region. Considered together, these results show that regardless of profession (surgeon or lay person) and region, gender, age, and ethnicity impacted attractiveness perceptions regarding the respective ideal buttock sizes (Table 4). Buttock size preferences did not differ significantly across peoples' profession (surgeon or lay people), gender, and country of residence.

Plastic Surgeons

Gender

Buttock size preferences differed marginally significantly across surgeons' gender ($F_{1,581} = 3.299$, $p = 0.07$, $\eta^2 = 0.006$), showing that male surgeons prefer larger buttocks compared with female surgeons (Table 3).

Age

Buttock size preferences significantly differed across surgeons' age groups ($F_{3,579} = 2.811$, $p = 0.039$, $\eta^2 = 0.014$). Interestingly, surgeons in their 40s stood out by preferring the largest buttocks, followed by surgeons in their 20s, 30s, 50s, 60s, and older (Table 3).

Country of Residence

Buttock size preferences differed significantly across surgeons' region of practice ($F_{3,579} = 15.371$, $p < 0.001$, $\eta^2 = 0.074$). Surgeons in Latin American preferred the largest buttocks, followed by surgeons in Asia, North America, and Europe (Table 3 and Fig. 10).

Ethnicity

Buttock size preferences differed significantly across surgeons' ethnicity ($F_{1,581} = 5.510$,

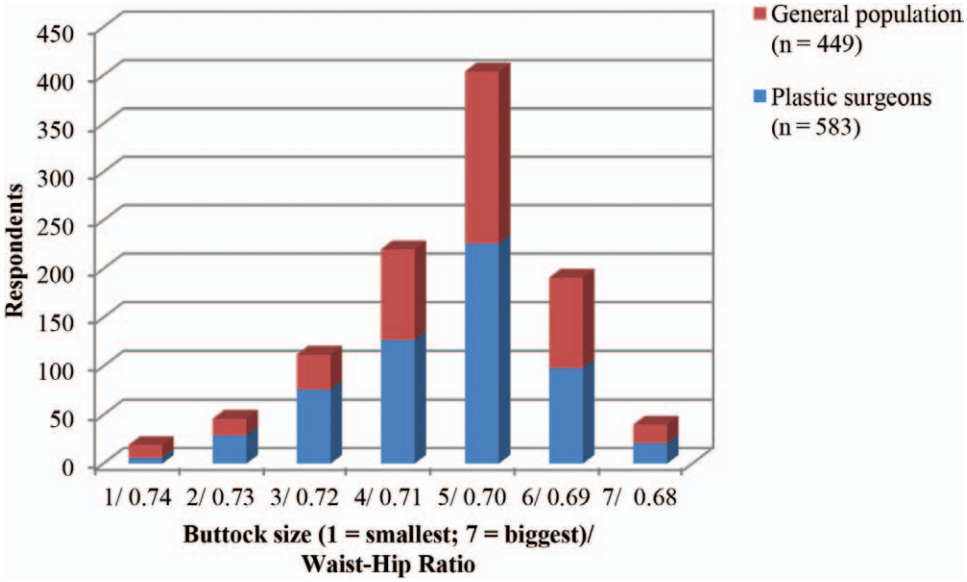

Fig. 9. Distribution of buttock size and waist-to-hip ratio preferences in the total survey population (n = 1032).

Table 3. Impact of the Characteristics of Surgeons and the General Public on Buttock Size Preferences*

Characteristic	Mean	SD	No.
Total study population			
Ethnicity			
Caucasian	4.56	1.211	802
Non-Caucasian	4.84	1.327	230
Total	4.62	1.243	1032
Plastic surgeons			
Sex			
Male	4.61	1.199	479
Female	4.38	1.286	104
Age			
20s, 30s	4.50	1.174	88
40s	4.80	1.222	163
50s	4.49	1.193	170
>60s	4.46	1.242	162
Country of residence			
North America	4.42	1.224	231
Europe	4.42	1.169	206
Latin America	5.31	1.030	98
Asia	4.44	1.236	48
Ethnicity			
Caucasian	4.50	1.197	431
Non-Caucasian	4.77	1.258	152
Perception of beauty			
Artificial	5.20	.862	
Natural	4.55	1.222	
Total	4.57	1.218	583
General public			
Age			
20s	4.87	1.170	213
30s	4.68	1.275	184
40s	4.02	1.448	52
Ethnicity			
Caucasian	4.64	1.226	371
Non-Caucasian	4.97	1.450	78
Total	4.69	1.272	449

*Dependent variable: buttock size (1 = smallest; 7 = largest).

Table 4. Impact of Buttock Size Preferences of Surgeons and the General Public, Controlling for Covariates

Variable	Unstandardized Coefficient	Standard Error	p
Total survey population*			
Profession[1]	−0.043	0.113	0.705
Gender[2]	−0.043	0.088	0.005
Age	−0.014	0.004	<0.001
Ethnicity[3]	0.216	0.097	0.026
Region[4]	0.171	0.097	0.078
Plastic surgeons†			
Region of practice[1]	0.146	0.060	0.019
Gender[2]	−0.266	0.133	0.046
Age	−0.004	0.005	0.396
Ethnicity[3]	0.122	0.127	0.336
Practice[4]	0.062	0.120	0.608
General public‡			
Gender[1]	−0.191	0.120	0.114
Age	−0.030	0.007	<0.001
Ethnicity[2]	0.361	0.161	0.025
Region[3]	−0.139	0.187	0.457
Income[4]	0.027	0.037	0.468

*Reference groups for each variable: 1 = lay; 2 = male; 3 = Caucasian; 4 = Europe.
†Reference groups for each variable: 1 = North America; 2 = male; 3 = Caucasian; 4 = academic.
‡Reference groups for each variable: 1 = male; 2 = Caucasian; 3 = Europe; 4 = $15,000/yr or less.

p = 0.019, η^2 = 0.009). Non-Caucasian surgeons preferred larger buttocks compared with Caucasians (Table 3 and Fig. 11).

Perception of Beauty

Interestingly, surgeons who thought their buttock size preference was artificial tended to prefer

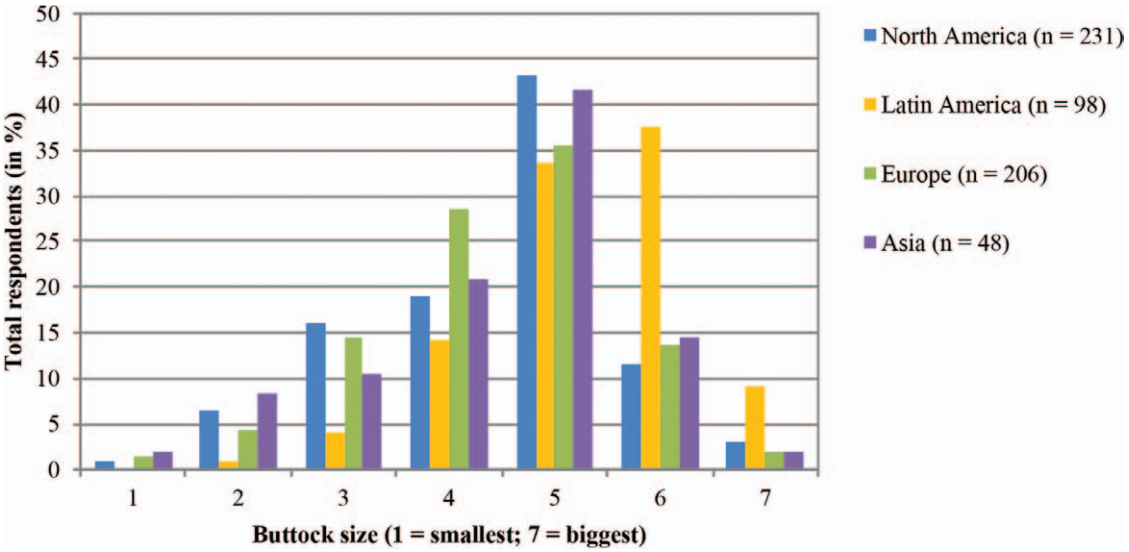

Fig. 10. Impact of surgeons' country of residence/practice on buttock size preferences.

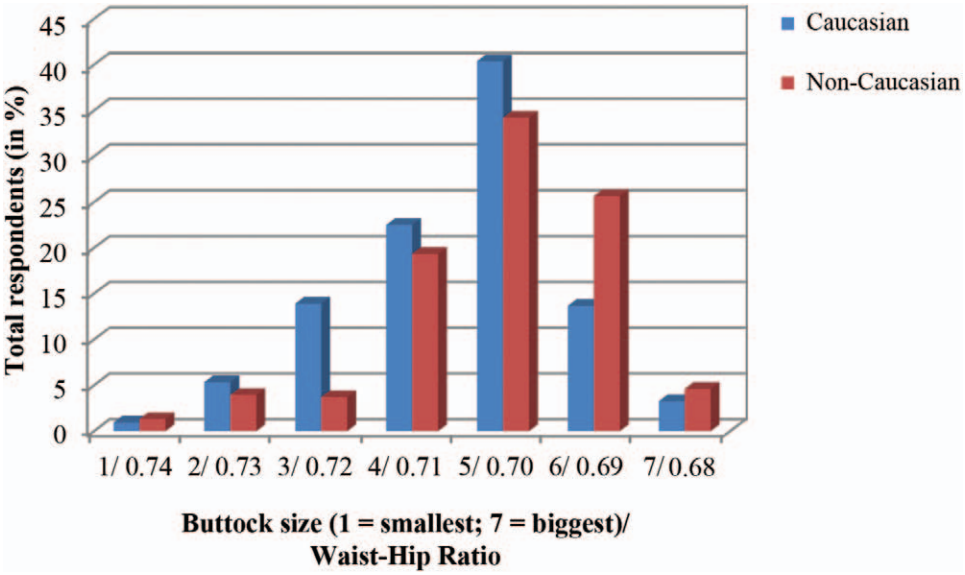

Fig. 11. Impact of surgeons' ethnicity on buttock size and waist-to-hip ratio preferences.

larger buttocks ($F_{1,581} = 4.129$, $p = 0.043$, $\eta^2 = 0.007$) (Table 3).

Interaction Effects

There was a significant interaction effect between gender and region of practice on surgeons' buttock size preferences ($F_{3,575} = 3.375$, $p = 0.018$, $\eta^2 = 0.017$). Male and female surgeons espoused different buttock preferences depending on where they were practicing (Table 5 and Fig. 12). In Latin America, North America, and Asia, male surgeons tend to prefer larger buttocks compared with female surgeons. The opposite finding was seen in Europe, where female surgeons prefer larger buttock sizes compared with male surgeons.

Regression analyses were also performed with gender, age, practice type, ethnicity, and region of practice as predictors and buttock size preference as the outcome variable. Overall, the regression was significant ($F_{5,577} = 3.352$, $p = 0.005$), and the predictors accounted for 17 percent of the variance. Gender (b = –0.266, $p = 0.046$) and region of practice (b = 0.146, $p = 0.019$) emerged as significant predictors, controlling for age, practice type, and ethnicity. Considered together, these results show surgeons' region of practice and gender impacted their attractiveness perceptions of

Table 5. Interaction Effects between Sex and Region of Practice on Surgeons' Buttock Size Preferences

Region	Mean	SD
Male		
North America	4.53	1.187
Europe	4.37	1.169
Latin America	5.39	0.934
Asia	4.52	1.273
Total	4.61	1.199
Female		
North America	3.90	1.277
Europe	4.62	1.163
Latin America	5.00	1.304
Asia	3.83	0.753
Total	4.38	1.286

buttock size (Table 4). Buttock size preferences did not differ significantly across plastic surgeons' type of practice (academic versus private).

General Public

Age

Buttock size preferences differed significantly across ages among the general public ($F_{2,446} = 9.684$, $p < 0.001$, $\eta^2 = 0.042$). Younger people prefer larger buttocks (Table 3).

Ethnicity

Buttock size preferences differed significantly across ethnicity among the general public ($F_{1,447} = 4.592$, $p = 0.033$, $\eta^2 = 0.010$). Non-Caucasians prefer larger buttocks compared with Caucasians (Table 3).

Regression analyses were performed with gender, age, ethnicity, region, and income as predictors and buttock size preference as the outcome variable. Overall, the regression was significant ($F_{5,443} = 5.583$, $p < 0.001$), and the predictors accounted for 24 percent of the variance. Age (b = −0.030, $p < 0.001$) and ethnicity (b = −0.361, $p = 0.025$) emerged as significant predictors, controlling for gender, region, and income. These results show that age and ethnicity of the general public significantly influenced their buttock size preferences (Table 4). Buttock size preferences did not differ significantly across gender, region of origin, or yearly income among the general public.

DISCUSSION

Given the potential discordances regarding the definition and recognition of attractive buttocks, the presented study investigates the presence of such differences and how these are related to ethnic background and nationality, as well as, demographic factors including age, sex, social status (general public versus plastic surgeons), and type of surgical practice (academic versus private). Several interesting findings emerged from the analysis of the data.

Recently, Wong et al. evaluated buttock preferences among several ethnicities and concluded that new ideal waist-to-hip ratios of 0.6 and 0.65 update the previous standards and indicate a more curvy ideal, signaling a preference shift.[19] The study, as the authors point out, was limited in that more than 90 percent of the respondents live in the United States and by the fact that there were highly disproportionate numbers of Caucasian respondents. Wong et al. consequently anticipated more culture-specific findings in future studies with a more proportionate number of

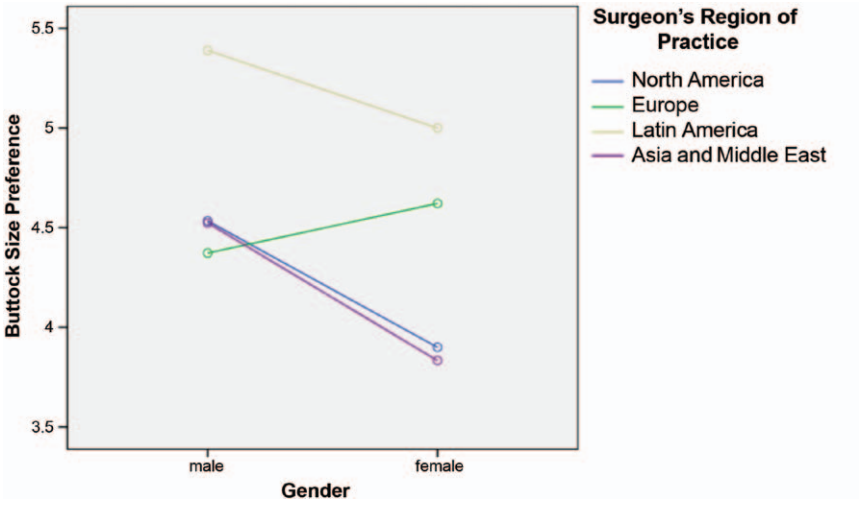

Fig. 12. Interaction effects between sex and region of practice on surgeon's buttock size preferences.

respondents from other ethnic groups and geographic locations.[19] We hope that the findings of apparently simultaneous data acquisition can address some of the outlined limitations and add valuable information to the interesting findings of our colleagues.

In the presented study and supporting our initial hypothesis, the majority of survey takers preferred the 0.7 waist-to-hip ratio as their ideal. Regarding buttock size, in the total survey population, size preferences differed significantly across participants' ethnicity, showing that non-Caucasians prefer larger buttocks compared with Caucasians. After regression analysis, the results showed that regardless of profession (surgeon or lay people) and region, sex, age, and ethnicity impacted their attractiveness perceptions of buttock size. Specifically, men prefer larger buttocks controlling for other covariates (profession, age, ethnicity, region), younger people perceived larger buttocks to be more attractive, and non-Caucasians perceived larger buttocks to be more attractive compared with Caucasians. Furthermore, participants in non-European regions perceived larger buttocks to be more attractive compared with those in Europe, although this was only marginally significant.

Several distinct differences regarding the ratios and buttock sizes were further seen when taking demographic factors into consideration. Regarding the respondents' age and buttock size preference, it appears that surgeons in their 40s and lay people in their 20s prefer significantly larger buttock sizes. This may be because current beauty and fashion trends emerge from the media and tend to manifest themselves among the younger age groups. Also, there are actually very few plastic surgeons younger than 30 years (n = 10 in this analysis), so one could postulate that, generally, younger people tend to prefer larger buttocks. However, the cohort of plastic surgeons between 40 and 50 years of age was also the second largest group, which might have influenced these findings. Overall, the data demonstrate transgenerational stability in use and meaning of waist-to-hip ratios, while strengthening the contention that female physical attractiveness is adaptive.

With respect to self-reported ethnicity, non-Caucasians preferred significantly larger buttocks independent of profession. Regarding region of practice, surgeons in Latin America (followed by Asia and North America/Europe) preferred the largest buttock size. This is in accordance with the current phenomenon of the "Brazilian buttock."

Another factor that seems to play a major role in influencing why certain procedures and body shapes are more popular in one region compared with another is the weather.[20] In countries with warmer weather (e.g., Latin America), people tend to wear less clothing year round, which might lead to more body consciousness and increased demand for aesthetic procedures. Therefore, individual preferences and aesthetic perception depend not only on the individual's cultural and ethnic background, but also on geographic factors.[20] As recent studies have shown, the impact of ethnic characteristics on aesthetic preferences and the ethnic distribution within a certain region further factor into surgical decision-making.[20,21]

Regarding the sex of respondents, male surgeons prefer significantly larger buttocks compared with female surgeons, while there were no significant differences in the general public. However, this statement does not hold true for every country, as the opposite finding was observed in the group of plastic surgeons in Europe, where female surgeons preferred the larger buttock sizes.

In the cohort of plastic surgeons, regression analysis revealed that surgeons' region of practice and gender impacted their attractiveness perceptions of buttock size the strongest. In the general public, lay people's age and ethnicity were the most important factors regarding their buttock size preferences.

Overall, the analysis showed that ideal proportions are not universally applicable. Although most plastic surgeons will acknowledge these facts given their experience, it is very hard to prove it numerically.

The study certainly has several limitations. Arguably, throughout their career, each generation of plastic surgeons has been exposed to different sociocultural influences, including visual media, which might have influenced the findings. The same assumption might explain intercultural preferences in the general public. The media and suggested ideals in fashion and body habitus are different in every country and therefore undoubtedly impact beauty preferences. It is also important to note that the findings represent current trends in aesthetics, are therefore only a snapshot in time, and may as such be subject to change. Because this study was based on voluntary participation in an online survey, a certain degree of selection bias might also prevail. It may further be critiqued in that the survey displayed images of only one Caucasian model, which were altered

artificially using digital software, a technique that may be less ideal than comparing different "real" models with different ethnicities and features. Furthermore, other body proportions that play a role when defining attractiveness were not included in this analysis.

Singh has already described that the linkage between waist-to-hip ratio and body fat distribution may largely influence the perception of female attractiveness.[16] In three separate studies, the author found that body fat and its distribution are critical when judging female attractiveness and health, whereas a female figure of normal body weight and low waist-to-hip ratio were perceived as healthy, youthful, and of high reproductive potential. Singh further hypothesized that an attractive waist-to-hip ratio should be culturally invariant in its significance.[16] Regarding cross-cultural validity, several studies exist that evaluated attractiveness on the basis of multiple body portraits that were of different ethnic background, and where the evaluators were asked to choose the most attractive appearance.[22–24] However, by only using one model for the evaluation, many potential confounding factors such as skin color, age of the models/patients, and remaining habitus do not need to be taken into consideration. Using different models also means that the actual proportions of buttock size and shape would have to be calculated and changed each time. Using modern technology and changing only certain bodily features within an otherwise fixed body frame, and thereby actually changing proportions, golden ratios and ideal proportions are apparently not universally applicable and must be seen in context. Despite the artificial character of the model, the fact that all survey takers used the same images for their assessment increases the validity of the findings. This is in concordance with findings from Perrett et al., where the authors had faces judged by observers and found that, contrary to the averageness hypothesis, highly attractive faces are systematically different in shape from average, a finding that prevailed across different cultures.[25] In a subsequent study, where evaluators were asked to rate attractiveness of Caucasian and African faces, the authors found that there seems to be a cross-cultural agreement in facial attractiveness preferences, again a finding that supports our main hypothesis that certain body proportions and features appear most attractive across a very wide range of ethnicities and cultures.[23]

In summary, although golden ratios and ideal proportions are generally not universally applicable, the 0.7 waist-to-hip ratio can be considered most attractive across a wide range of people. This study may change a surgeon's modi operandi because it sensitizes the aesthetic perception of plastic surgeons. It emphasizes that many factors need to be taken into consideration when evaluating body shapes, with the patient's aesthetic desires remaining the ultimate gold standard, even if it may be different from the surgeon's perceived ideal.

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

CONCLUSIONS

Aesthetic perception is influenced by a wide range of factors. This study illustrated that intercultural and ethnic differences, in addition to the ethnic and geographic background of surgeons and the general public, play major roles in this regard. Particularly in the field of plastic and reconstructive surgery, globalization suggests more and more unified surgical goals, and, with respect to buttock aesthetics, apparently a waist-to-hip ratio of 0.7 is rated to be attractive by a wide range of people. However, the authors of this study urge all plastic surgeons to take all compounding factors into consideration when defining surgical goals with their patients, which will ultimately aid in achieving optimal aesthetic outcomes, satisfying both surgeon and patient alike.

Paul I. Heidekrueger, M.D.
Department of Plastic, Reconstructive, Hand, and Burn Surgery
StKM-Klinikum Bogenhausen
Academic Teaching Hospital Technical University Munich
Englschalkinger Strasse 77
81925 Munich, Germany
paul@heidekrueger.net

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