Original Research Article

Investigation on the relationship between personal characteristics with lip, jaw and philtrum dimensions

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ABSTRACT

Background: The relationship between the sizes of the structures that form our face, such as lips, philtrum, and the jaw, and our personality characteristics are unknown. In this study, it was scientifically researched whether lip, jaw and philtrum anatomy can give us clues on personality characteristics or not.
Methods: The photographs of the university students were taken using digital camera in two positions. The students who were photographed were asked to simultaneously complete personality test. The photographs were transferred to the computer and, using photoshop program installed on the computer, measurements were made. The mouth widths, upper and lower lip thicknesses, the distance between lip spots, philtrum length and width, lateral mouth width, jaw heights were recorded, and lip type and philtrum depth were identified. The results were compared to the personality characteristics of the students.
Results: Lip thicknesses were found to be correlated positively only with the 'openness to experience' trait from among personality characteristics. A positive correlation between lip type and 'conscientiousness' was also found. There was a negative correlation between philtrum length and 'negative valence'.
Conclusions: This study shows that lip thickness and philtrum length can give us an idea regarding personality characteristics.

Keywords: Anatomy of lip, Jaw, Personality characteristics, Philtrum

INTRODUCTION

Our facial expression is one of the basic elements that show our emotional status. Our personality characteristics reflect on our facial expression.[1] The relationship between facial expression and personality characteristics have been studied in previous papers.[2,3]

However, the relationship between personality characteristics and the anatomical structures on the face have not been previously researched. Can characteristics such as thick or thin lips, lip type, deep or shallow philtrum, or jaw height be related to our personality characteristics? The groove between the upper lip and the nose is called philtrum or sulcus nasooralis. In this study, the aim was to determine the relationship between personality characteristics and lip size, width, and types, philtrum sizes, depths, and upper and lower jaw heights.

METHODS

Permission from the Abant Izzet Baysal University Clinical Board of Ethics was taken for the study (Ethics Approval No: 2017/24). About 74 female volunteer students with a mean age of 20.47 ± 1.98 and 78 male volunteer students with a mean age of 21.79 ± 1.59 studying at the Abant Izzet Baysal University participated in our study. The photographs of the students were taken

using a Sony α100 digital camera with a Minolta (28.80) lens by placing on a tripod in daylight. The face photographs, taken in two positions (in a standing stance from directly across and from the profile) with a 50 mm setting, were transferred to the computer. Then, using the Adobe Photoshop 14.0 program installed on the computer, the mouth widths, upper and lower lip thicknesses, the distance between lip spots, philtrum length and width, mouth side width, and upper and lower jaw heights were recorded on an excel spreadsheet (Figures 1 and 2). The lip type was evaluated by choosing from 8 figures. The philtrum depth was evaluated over 5 types (1: deepest, 5: most shallow). Further recorded on an excel spreadsheet six of the lip types were encountered, and two of the lip types weren't present at all in female, five of the lip types were encountered, three of the lip types weren't present at all in male.
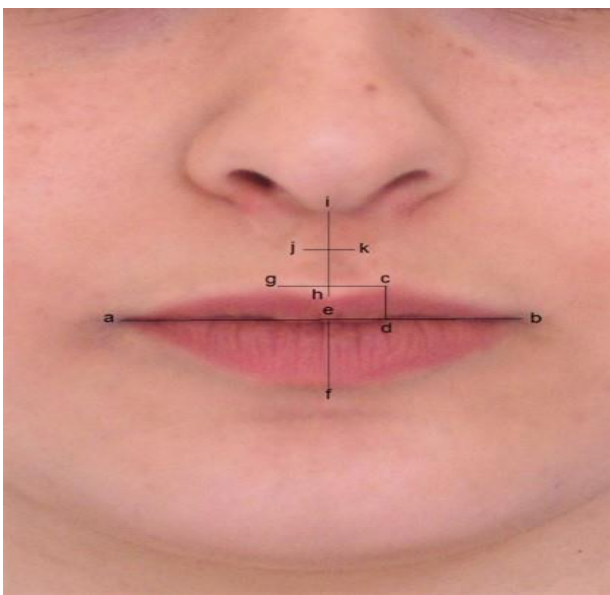
ab: mouth width, cd: upper lip thickness, ef: lower lip thickness gc: distance between lip points, hi: philtrum length, jk: philtrum width

Figure 1: Measurement from the anterior aspect.

lm: upper jaw height, no: lower jaw width, mn: lateral mouth width

Figure 2: Measurement from the lateral aspect.

Philtrum depth: The classification used was developed and patented in 2015 by Susan Astley (University of Washington). The philtrum was scored from 1 to 5 from deepest to most shallow.[4] The lip type was selected from among eight types (Figure 3).[5]

The students who were photographed were asked to simultaneously complete a 45 item personality test. The advanced basic personality characteristics inventory for the Turkish culture developed by Prof. Dr. Tulin Gencoz was used for this purpose.[6]

This test evaluated the sub dimensions of Extraversion, Conscientiousness, Agreeableness, Openness to Experience, Negative Valence, and Neuroticism.
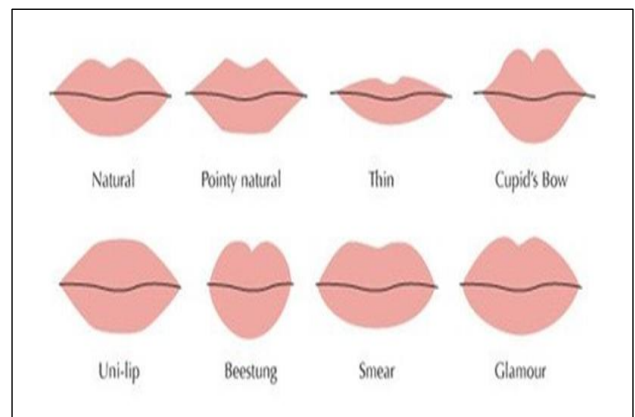

Figure 3: Classification of the lip shapes.

Statistical analysis

The mean values and the standard deviations of the measurements were calculated. The compliance of the variables to normal distribution was examined using the Shapiro-Wilk test. The variables of extraversion, conscientiousness, negative valence, philtrum depth, and lip type defied normal distribution, while all other parameters were normally distributed. In order to demonstrate the strength and direction of the relationship between the variables, the Pearson correlation test for variables showing normal distribution and the Spearman Ranked correlation test for those that didn't were used. For statistical analyses and calculations, the IBM SPSS Statistics 22.0 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.) program was used. In statistical decisions, the level of $p<0.05$ was accepted as the indicator of difference.

RESULTS

The mean age of the female students was 20.47 ± 1.98, and that of the male students was 21.79 ± 1.59. The mean values of the measurements taken in millimeters are as shown below (Table 1).

Table 1: Descriptive results for face dimensions (mm).

	Female	Male
Mouth distance	55.07±5.46	59.67±7.02
Philtrum length	18.31±3.27	20.13±3.17
Philtrum width.	9.55±1.60	13.12±2.10
Lip point distance	13.64±2.70	16.96±3.52
Upper jaw height	25.31±3.35	24.27±3.40
Lower jaw height	52.77±5.69	58.84±6.74
Lateral mouth width	18.84±3.74	21.21±4.06
Upper lip thickness	8.82±1.72	10.40±2.08
Lower lip thickness	11.53±2.07	11.86±2.79

The lip type distribution of the females showed presence of six lip types as natural 43.2%, pointy natural 37.8%, thin 5.4%, unilip 5.4%, smear 2.7%, and glamour 5.4%. The lip type distribution of the males showed presence of five lip types as natural 19.2%, pointy natural 32.1%, thin 2.6%, smear 24.4%, and glamour 21.8%. The most prevalent lip types were natural in females and pointy natural in males (Table 2).

Table 2: Percentage distribution according to philtrum depth types.

Philtrum type	Female	Male
1	%24.3	%30.8
2	%41.9	%30.8
3	%17.6	%25.6
4	%14.9	%12.8
5	%1.4	-

The advanced basic personality characteristics inventory for the Turkish Culture developed by Prof. Dr. Tülin Gençöz is a personality test with 45 items.6. The test is resolved in 6 titles, namely extraversion, conscientiousness, agreeableness, openness to experience, negative valence, and neuroticism.

Table 3: Statistically significant correlations for females.

	Mouth distance	Philtrum length	Philtrum width	Lip point distance	Upper jaw height	Lower jaw height	Lateral mouth width	Upper lip thickness	Lower lip thickness
Mouth distance		r=0.342	r=0.455	r=0.569	r=0.414	r=0.528	r=0.291		r=0.354
		p=0.003	p=0.000	p=0.000	p=0.000	p=0.000	p=0.012		p=0.002
Philtrum length	r=0.342		r=0.279	r=0.262	r=0.745	r=0.332			
	p=0.003		p=0.018	p=0.028	p=0.000	p=0.004			
Philtrum width	r=0.455	r=0.279		r=0.623					
	p=0.000	p=0.016		p=0.000					
Lip point distance	r=0.569	r=0.262	r=0.623		r=0.276			r=0.274	r=0.269
	p=0.000	p=0.028	p=0.000		p=0.021			p=0.022	p=0.015
Upper jaw height	r=0.414	r=0.745		r=0.276		r=0.527	r=0.319	r=0.360	r=0.399
	p=0.000	p=0.000		p=0.021		p=0.000	p=0.006	p=0.002	p=0.000
Lower jaw height	r=0.528	r=0.322			r=0.527		r=0.381	r=0.270	r=0.364
	p=0.000	p=0.004			p=0.000		p=0.001	p=0.020	p=0.001
Lateral mouth width	r=0.291				r=0.319	r=0.381			
	p=0.012				p=0.006	p=0.001			
Upper lip thickness				r=0.274	r=0.360				r=0.598
				p=0.022	p=0.002				p=0.000
Lower lip thickness	r=0.354			r=0.269	r=0.399	r=0.364		r=0.598	
	p=0.002			p=0.015	p=0.000	p=0.001		p=0.000	

The results of the female students

The correlations between the measurements and personality characteristics were examined. The Openness to Experience value showed positive correlation with increasing upper lip thickness (r=0.281, p=0.15). The Openness to Experience value showed positive correlation with increasing lower lip thickness as well (r=0.313, p=0.007). A positive correlation between lip type and conscientiousness was found (r=0.238, p=0.041), however since the sample numbers distributed among lip types were insufficient, on which lip type the difference was significant couldn't be statistically found (Table 5). No correlations between personality characteristics and other measurements could be found.

Table 4: Statistically significant correlations for males.

	Mouth distance	Philtrum length	Philtrum width	Lip point distance	Upper jaw height	Lower jaw height	Lateral mouth width	Upper lip thickness	Lower lip thickness
Mouth distance		r=0.482	r=0.582	r=0.639	r=0.284	r=0.649	r=0.474	r=0.287	r=0.383
		p=0.000	p=0.000	p=0.000	p=0.012	p=0.000	p=0.000	p=0.011	p=0.001
Philtrum length	r=0.482		r=0.384	r=0.414	r=0.599	r=0.481			
	p=0.000		p=0.001	p=0.000	p=0.000	p=0.000			
Philtrum width	r=0.582	r=0.384		r=0.685	r=0.258	r=0.279	r=0.312		r=0.416
	p=0.000	p=0.001		p=0.000	p=0.022	p=0.013	p=0.005		p=0.000
Lip point distance	r=0.639	r=0.414	r=0.685		r=0.298	r=0.394	r=0.334	r=0.258	r=0.380
	p=0.000	p=0.000	p=0.000		p=0.008	p=0.000	p=0.003	p=0.023	p=0.001
Upper jaw height	r=0.284	r=0.599	r=0.258	r=0.298		r=0.404		r=0.399	
	p=0.012	p=0.000	p=0.022	p=0.008		p=0.000		p=0.000	
Lower jaw height	r=0.649	r=0.481		r=0.394	r=0.404		r=0.410	r=0.395	r=0.289
	p=0.000	p=0.000		p=0.000	p=0.000		p=0.000	p=0.010	p=0.010
Lateral mouth width	r=0.474		r=0.312	r=0.334		r=0.410			r=0.281
	p=0.000		p=0.005	p=0.003		p=0.000			p=0.013
Upper lip thickness	r=0.287			r=0.258	r=0.399	r=0.395			r=0.578
	p=0.011			p=0.023	p=0.000	p=0.010			p=0.000
Lower lip thickness	r=0.383		r=0.416	r=0.380		r=0.289	r=0.281	r=0.578	
	p=0.001		p=0.000	p=0.001		p=0.010	p=0.013	p=0.000	

Table 5: Correlation of personal traits and face dimensions.

	Mouth distance	Philtrum length	Upper lip thickness	Lower lip thickness	Lip shape
Extraversion					
Conscienciousness					r=0.238, p=0.041 ♀
Negative Valence		r=-0.273, p=0.01 ♂			
Agreeableness					
Neuroticism					
Openness to Experience			r=0.281, p=0.015♀	r=0.313, p=0.0	

♂: male, ♀: female

Other findings: A correlation between philtrum depth and upper and lower lip thicknesses was found. As the philtrum got shallow, lip thickness decreased, and vice versa. Philtrum length, mouth width, philtrum width, lip point distances, and upper and lower jaw heights were correlated. As the upper and lower lip got thicker, lip point distance as well as upper and lower jaw height increased (Tables 4, 5).

The results of male students

When the correlations between personality characteristics and the measurements were examined, only a negative correlation between philtrum length and negative valence was found (r=-0.273, p=0.001). Negative valence decreased with increasing philtrum length (Table 5).

No correlations between personality characteristics and other measurements could be found.

Other Findings: A positive correlation between lip type and upper lip thickness (r=0.227, p=0.046) and upper jaw height (r=0.353, p=0.002) was found.

However, since the sample numbers distributed among lip types were insufficient, on which lip type the difference was significant couldn't be statistically found. No correlations between philtrum depth and other measurements could be found.

Philtrum length, mouth width, philtrum width, lip point distances, and upper and lower jaw heights were correlated positively (Tables 4,5).

DISCUSSION

There are present scientific studies where certain anthropometric measurements were made on a face photograph and mean values were assigned.[7-9] However, no studies in literature where the sizes of the anatomic

structures on the face were compared to personality characteristics could be found.

Qin et al experimentally explore whether self-reported personality traits and intelligence can be predicted reliably from a facial image. The human behavior of evaluating other individuals with respect to their personality traits and intelligence by evaluating their faces plays a crucial role in human relations. These trait judgments might influence important social outcomes in our lives. About 21 salient points for each face were warped to their corresponding mean values to remove the shape variations. The classification and regression results show that it is difficult, if not impossible, to predict intelligence from either the facial features or the fingerprint feature, a finding that is in agreement with previous studies. The classification results show that the personality traits 'Rule-consciousness' and 'Vigilance' can be predicted reliably, and that the traits of females can be predicted more accurately than those of male.[10]

The relationship between lip thickness, lip shape, philtrum depth, jaw sizes and personality characteristics was researched for the first time in this study.

In female students, upper and lower lip thicknesses were found to be correlated positively only with the "openness to experience" trait from among personality characteristics. A correlation between lip type and "conscientiousness" was also found, however, since the sample numbers distributed among lip types were insufficient, on which lip type the difference was significant couldn't be statistically found. Philtrum depths, as well as upper and lower jaw height were found to be unrelated to personality characteristics.

In male students, there was a negative correlation between philtrum length and negative valence. The male students with longer philtrum values had lower negative valence.

We know that our facial expression reflects our emotional state.[1,2] The findings of our study have shown that we can guess the personality characteristics of a person by looking at lip and philtrum anatomy (lip thickness and philtrum length).

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