Research Article

Investigation of the Relation between Face Anatomy and Leadership Personality Trait: Sample of Faculty of Medicine Students

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Abstract

Objective: The aim of this study has to investigate the relationship some facial dimensions with between leadership personality traits. **Methods:** 139 university students have participated in our study. Two face photos from the front and the profile have been taken with the digital camera and transferred to the computer. 21 measurements including face and ear distances have been performed. A 32-question questionnaire has been applied to the participants about leadership personality traits. **Results:** According to the results we obtained from statistical analysis, it has been determined that the upper face length in women has shown a very weak positive correlation with the human leadership trait. A very weak positive correlation has been determined between philtrum length and human leadership trait in women. A very weak positive correlation between philtrum length and charismatic leadership trait in women. A weak negative correlation between philtrum depth and human leadership trait has been found in women. When the correlation coefficients and significance levels between leadership traits and facial anatomic measurements in the men have been examined, no statistically significant results have been found. **Conclusion:** Upper face length, philtum length and depth in women may give information about leadership personality trait. We hope this result contribute to the different disciplines.

Keywords: Face anatomy; Leadership; Personality traits

Introduction

The variation in human face is an important and complex phenomenon that cannot be exactly explained from the scientific aspect. [1] The shape of our face is also an important factor influencing the interpersonal communication and the behaviors as well. It was reported that, in the first period of life, the shape of face provides preliminary information about our personality development in the future. [2] The appearance of our face is one of the main components indicating our mood. Our personality traits reflect on the appearance of our face. [3] The reflection of emotions on the facial expressions plays an important role in our social life. [4] Since the facial expressions originating from the reflection of emotions on the face lay the foundation of the communication between individuals, it is thought to have an important effect on the estimations about personality traits. [5] In the literature, there are scientific studies investigating the facial anatomy, performing anatomic measurements, and reporting the average values. [6-10] The relationship of eye, nose, ear, forehead, and lip sizes and facial heights with the leadership trait has not been investigated. In the present study, it was aimed to shed light on this subject and to investigate the statistically significant relationships between leadership trait subgroups (structural leadership, human source leadership, political leadership, and symbolic leadership) and facial anatomy.

Methods

Ethics committee approval, field, and sample

In the present study, 139 voluntary university students (79 girls and 69 boys) in total. Prior to the study, the approval was obtained from the Bolu Abant Izzet Baysal University (BAIBU) Clinical Researches Ethics Committee (date: 01.25.2018, no: 60, decision no: 2018/08) and then the study was initiated. The participants were selected among the students studying at the Medical Faculty of BAIBU based on the principle of voluntariness. Among the participants, those having no congenital or acquired nose, ear, lip, eye and/or chin anomaly, having no history of surgery at these sites, and aged between 17 and 21 years were involved. The mean age of participants was calculated to be 19.87 ± 1.33 years for girls and 19.64 ± 0.97 years for boys.

Data collection method

Using a Canon D5 35 mm camera fixed on a tripod under the daylight; the face photos of individuals were taken from two sides (1 from the front and 1 from the profile). The shootings were performed at 2 m distance from the object standing, with open eyes, normal and closed lips, and completely visible forehead and face. The facial measurements were performed at mm sensitivity by a single person using Image J 1.52 a (National Institutes of Health, USA) program. At the same time, the

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participants were asked to fill a 32-item Leadership Orientation Scale. For this purpose, the survey, which was developed by Mahçe Dereli and reliability and validity of which were tested for the Turkish population. [11] She was informed about the use of her scale in the present study, and her approval was obtained. The titles of structural leadership, human source leadership, symbolic leadership, and political leadership were analyzed.

23 measurements performed on the photos of female and male university students aged between 17 and 21 years by using Image J 1.52 a (National Institutes of Health, USA) program are as follows [Table 1] [Figures 1 and 2]. In measuring the distances, the study carried out by Ashgari et al. was taken as basis. [9]

It was recorded if the earlobe is attached and if there is Darwin tubercle in the earlap [Figure 3]. The method developed by Susan J. Astley was used in measuring the philtrum depth. Philtrum depth was rated between 1: deepest and 5: most shallow. [12]

The measurements were recorded in Excel software and the statistical significance was analyzed. Statistical analyses were performed using SPSS (IBM SPSS for Windows, Ver.24) program. The mean values and standard deviations of the measurements were calculated. In comparing the groups' mean values for continuous variables, independent t-test or One-Way Variance Analysis (ANOVA) was used. For the comparisons, in which statistically significant differences were observed, the Duncan test was used for determining the categories. Pearson's correlation coefficients were calculated for determining the relationship between leadership trait and facial measurements. For the categorical variables, Chi-Square test was used for determining the leadership categories. The statistical significance level was set to $p<0.05$.

Results

The mean values and standard deviations of anatomic facial measurements are expressed in mm and presented in Table 2. The distance between eyebrows, the distance between the beginnings of eyebrow and eye, and the earlobe width were found to be statistically significantly higher among girls when compared to the boys. Among the boys, the nose length, width, and height, lower face length, forehead width, mouth width, and upper lip thickness values were found to be higher than among the girls.

In Tables 3 and 4, the results regarding the relationship of the percentage of Darwin's tubercle and attached earlobe's presence with the sex and the relationships between sex and presence of attached earlobe and between sex and presence of Darwin's tubercle are presented. Among boys and girls, the presence of Darwin's tubercle was found to have no relationship with leadership. Besides that, the presence of attached or free earlobe was also found to have no relationship with leadership among boys and girls.

Given the correlation coefficients and significance levels between the leadership trait and facial anatomic results of the boys, it was determined that there was no statistically significant

Table 1: Measured anatomical distances.

Eye Width (EW)	Distance Between Eyes (DE)
Distance Between Eyebrow (DEB)	Distance Between The Beginning of Eye and Eyebrow (DEEB)
Nose Length (NL)	Nose Width (NW)
Nose Height (NH)	Upper Face Length (UFL)
Lower Face Height (LFH)	Middle Face Length (MFL)
Forehead Width (FW)	Midle Face Width (MFW)
Philtrum Length (PL)	Philtrum Depth (PD)
Upper Lip Thickness (UT)	Lower Lip Thickness (LT)
Mouth Width (MW)	Ear Length (EL)
Ear Width (EW)	Ear Lobe Width (ELW)
Ear Lobe Length (ELL)	Ear Lobe: Free or Attached
Darwin Tubercle: Have or not	

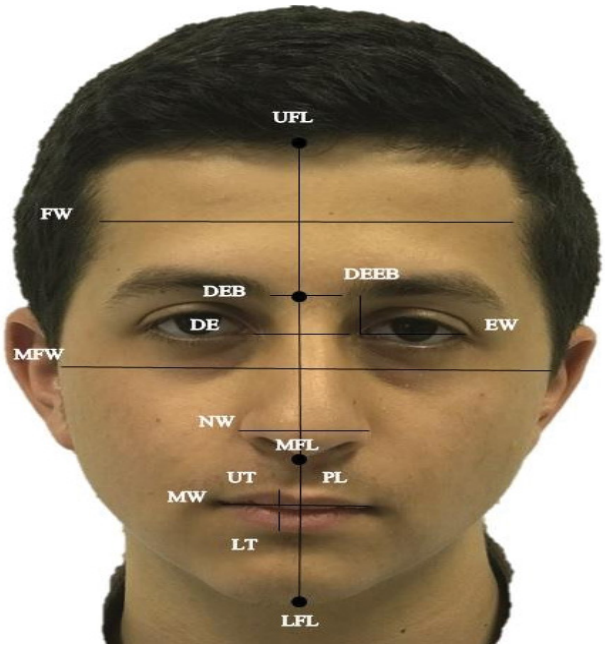

Figure 1: Eye Width (EW), Distance Between Eyes (DE), Distance Between Eyebrow (DEB), Distance Between the Beginning of Eye and Eyebrow (DEEB), Nose Width (NW), Upper Face Length (UFL), Lower Face Lenght (LFL), Middle Face Length (MFL), Forehead Width (FW), Middle Face Width (MFW), Philtrum Length (PL), Upper Lip Thickness (UT), Lower Lip Thickness (LT), Mouth Width (MW).

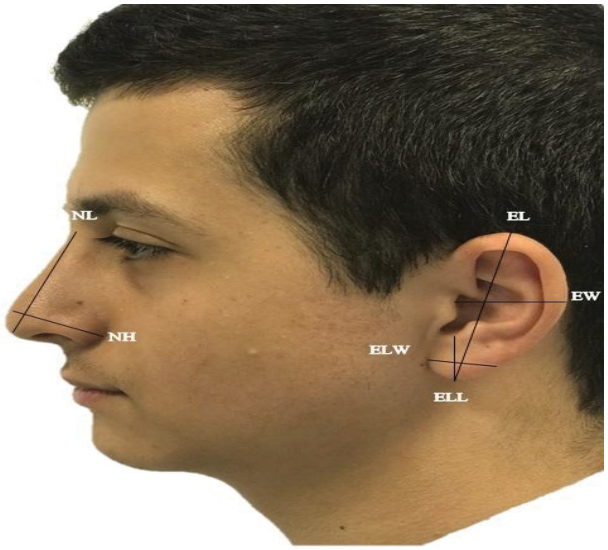

Figure 2: Nose Length (NL), Nose Height (NH), Ear Length (EL), Ear Width (EW), Ear Lobe Width (ELW), Ear Lobe Length (ELL).

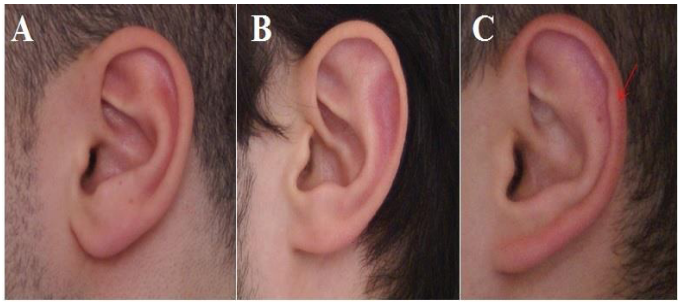

Figure 3: A) Free ear lobe B) Attached ear lobe C) Darwin tubercle presence.

Table 2: Comparison of mean values of measurements related to gender.

Variables	Gender				p-value
	Male		Female		
	Mean	Sd	Mean	Sd	
Eye Width	33,17	4,11	32,73	3,15	0,482
Distance Between Eyes	38,32	5,78	38,13	4,73	0,836
Distance Between Eyebrow	22,10	5,28	25,64	4,62	<0,001
Distance Between The Beginning Of Eye And Eyebrow	17,54	4,02	19,10	3,37	0,014
Nose Length	55,15	5,95	51,28	7,97	0,001
Nose Width	44,28	6,27	40,49	4,31	<0,001
Nose Height	34,87	3,80	31,72	4,33	<0,001
Upper Face Length	61,90	7,73	64,14	8,16	0,099
Middle Face Length	67,92	8,21	68,79	7,64	0,520
Lower Face Height	80,74	13,86	74,15	10,05	0,002
Forehead Width	134,55	18,04	125,13	14,55	0,001
Middle Face Width	156,12	22,02	155,50	17,12	0,852
Mouth Width	56,78	8,50	53,17	5,66	0,004
Upper Lip Thickness	9,78	2,19	8,50	1,93	<0,001
Lower Lip Thickness	11,79	2,25	11,22	2,06	0,125
Philtrum Length	18,22	4,16	16,94	3,84	0,062
Philtrum Depth	2,28	0,92	2,33	,99	0,743
Ear Length	78,95	9,99	75,66	7,86	0,032
Ear Width	37,32	4,37	35,59	5,80	0,048
Ear Lobe Length	21,95	3,38	21,76	3,83	0,748
Ear Lobe Width	21,92	4,11	24,43	4,89	0,001

Table 3: Darwin tubercle distributions and correlations.

Variables		Gender						p-value
		Male			Female			
Darwin tubercle	Absent	51	73,9%	53,7%	44	62,9%	46,3%	0,161
	Presence	18	26,1%	40,9%	26	37,1%	59,1%	

Table 4: Ear lobe morphology distributions and correlations.

		Gender						p-value
		Male			Female			
Ear lobe	Free	45	65,2%	45,9%	53	75,7%	54,1%	0,175
	Attached	24	34,8%	58,5%	17	24,3%	41,5%	

result. However, the correlation (r) and significance (p) values for the relationship between leadership trait and anatomic measurements among the girls are presented in Table 5.

Given the correlation coefficients and significance levels for the relationship between leadership trait and facial anatomy measurements among the girls, it can be seen that upper face length showed a very weak and positive correlation with human source leadership (r=0.242; p=0.031). As the upper face length of the girls increases, the human source leadership trait also increases. A very weak and positive correlation was determined between philtrum length and human source leadership among the girls (r=0.252; p=0.036). As the philtrum length increases, the human source leadership trait of the girls also increases. A very weak and positive correlation was found between philtrum length and symbolic leadership trait among the girls (r=0.256; p=0.032). As the philtrum length increases, the symbolic leadership trait of girls also increases. A weak and negative correlation was determined between the philtrum depth and

Table 5: Correlation coefficients and significance levels in female.

Variables		Structural leadership	Human source leadership	Political leadership	Symbolic leadership
Eye Width	r	0,049	0,098	0,194	0,099
	p	0,687	0,421	0,108	0,413
Distance Between Eyes	r	-0,211	0,024	0,068	-0,006
	p	0,080	0,844	0,574	0,963
Distance Between Eyebrow	r	-0,117	0,170	0,123	0,011
	p	0,333	0,159	0,310	0,931
Distance Between The Beginning of Eye And Eyebrow	r	-0,005	0,139	-0,031	0,086
	p	0,969	0,250	0,799	0,478
Nose Length	r	-0,037	-0,113	0,040	-0,034
	p	0,761	0,351	0,744	0,780
Nose Width	r	-0,073	0,088	0,104	0,012
	p	0,549	0,466	0,393	0,920
Nose Heigth	r	0,038	0,032	0,025	0,021
	p	0,756	0,794	0,836	0,861
Upper Face Length	r	-0,204	0,242	0,069	-0,009
	p	0,091	0,031	0,568	0,941
Middle Face Length	r	-0,017	0,106	0,062	0,076
	p	0,890	0,383	0,612	0,533
Lower Face Length	r	0,006	0,103	0,111	0,137
	p	0,960	0,396	0,359	0,256
Forehead Width	r	-0,034	0,143	0,113	0,079
	p	0,782	0,236	0,350	0,515
Middle Face Width	r	-0,006	0,124	0,152	0,100
	p	0,961	0,307	0,210	0,411
Mouth Width	r	-0,165	0,033	0,067	0,028
	p	0,172	0,785	0,579	0,815
Upper Lip Thickness	r	0,150	-0,004	0,185	0,217
	p	0,214	0,973	0,124	0,072
Lower Lip Thickness	r	0,046	0,205	0,223	0,189
	p	0,706	0,089	0,063	0,117
Philtrum Length	r	0,091	0,252	0,191	0,256
	p	0,452	0,036	0,113	0,032
Philtrum Depth	r	-0,116	-0,359	-0,216	-0,179
	p	0,340	0,002	0,073	0,138
Ear Length	r	-0,066	-0,034	-0,089	-0,033
	p	0,586	0,782	0,463	0,788
Ear Width	r	0,043	-0,010	0,031	-0,060
	p	0,723	0,937	0,797	0,619
Ear Lobe Length	r	-0,061	-0,231	-0,106	-0,113
	p	0,614	0,055	0,382	0,353
Ear Lobe Width	r	-0,034	0,047	-0,051	0,003
	p	0,783	0,698	0,678	0,977

human source leadership trait of girls (r=-0.359; p=0.002). As the philtrum depth increases, the human source leadership trait of girls also increases.

Discussion

In a study on the facial appearance and personality traits, Kosif et al., reported that, for the girls, there were weak-negative correlation between nose height and extraversion, very weak-positive correlation between nose height and sense of responsibility, weak-positive correlation between upper face length and negative worthiness, very weak-positive correlation between lower face length and openness to innovation, a weak-positive correlation between negative worthiness and distance between the eyes, and a weak-negative correlation between compatibility/adaptability ad distance between the eyes. For the boys, the authors reported that there were strong-negative correlation between negative worthiness and facial width and weak-negative correlation between emotional inconsistency and upper face length. However, the leadership trait was not analyzed. [13] In the present study, however, no significant relationship was found between the leadership traits of male participants and their anatomic facial measurements, whereas the philtrum length and depth were found to be correlated with leadership trait among the female participants. In their study, Dimberg et al. showed the angry, happy, and neutral face photos to the participants, and the EMG activities of the faces were measured. Finally, the authors determined that both of the negative and positive emotional reactions might be evoked

unconsciously.[14] In that study, the anatomic facial measurements and leadership traits were not analyzed. In their study, Alrajih et al. investigated the facial characteristics of the businessmen and the relationship with perceived authority, reliability, aggressiveness, attractiveness, and success. They determined that the faces of businessmen provided useful information for successfully estimating the perceived authority and success characteristics and these characteristics were closely related with the face width-height ratio. The anatomic measurements performed in the study of Alrajih et al. and in the present study were different.[15] They involved only the male participants in their study and the leadership trait among the personality traits was not analyzed. In the present study, however, the leadership traits and anatomic facial measurements of participants were analyzed, but no significant result was achieved for the male participants. In their study, Turan et al. analyzed the distance and angle measurements of Turkish young adults by taking face photos from the frontal point of view, and they compared the mean results of women and men. In conclusion, they reported that, when compared to the girls, the boys were found to have a wider and higher face. The lower and upper lip thickness values of the women were found to be higher than those of men.[16] In the present study, the upper lip thickness, lower face length, and forehead width values were found to be statistically significantly higher among male participants. In this study, in which we investigated the relationship between leadership trait and facial anatomy, we also determined that there were a negative correlation between philtrum depth and human source leadership trait and positive correlations between philtrum length and human source leadership trait and between philtrum length and symbolic leadership trait.

In their study, Lewis et al. investigated the relationship of width-height ratio of all the previous USA presidents and the current president with the motivation of success, authority, decisiveness, peaceful policy, and violence, and they reported that the face width-height ratio might be related to authority and violence, as well as the motivation of success.[17] In their study, Qin et al. concluded that the personality traits of girls might be more accurately estimated when compared to the boys.[18] Borkenau et al. showed 3 different face photos to the participants and asked them to rate their personality traits. In conclusion, it was determined that the extrovert persons generally have more vivacious facial expressions.[19] In these studies, the personality traits were analyzed, but the leadership trait was not examined. Zebrowitz et al. found that, for the men, the ones defined as attractive and honest based on the shape of their faces in the early periods of their lives have personality traits that are in corroboration with those estimations made years before. For the girls, the ones defined as attractive because of the shape of their faces in the early periods of their lives have personality traits that are in harmony with the attractiveness in the course of time.[20] In the present study, no anatomic measurement was performed on the face.

In this study, we examined the relationship between facial anatomy and leadership trait. The participants were asked to take part in a 32-item questionnaire about the leadership trait. As a result of the statistical analyses, it was determined that there was no significant relationship between leadership traits and facial anatomy among the male participants. Among the female participants, however, there was a positive correlation between upper face length and human source leadership trait. Moreover, it was also determined that, among the girls, there were negative correlation between philtrum depth and human source leadership trait and positive correlations between philtrum length and human source leadership trait and between philtrum length and symbolic leadership trait. Among the girls, the leadership traits were found to be correlated with the anatomic structure of face, even if the correlation was weak.

Conclusion

In the present study, we revealed that the philtrum length and upper face length of girls might provide an insight into the leadership traits. We hope to contribute to the disciplines examining the anatomic characteristics of the face such as anatomy, psychiatry, human resources departments, information technology, forensic medicine, and anthropology.

Competing Interest

The authors declare that they have no competing interests.

References

1. Claes P, Liberton DK, Daniels K, Rosana KM, Quillen EE, Pearson LN, et al. Modeling 3D facial shape from DNA. Plos Genetics. 2014;10:e1004224.
2. Petrican R, Todorov A, Grady C. Personality at face value: Facial appearance predicts self and other personality judgments among strangers and spouses. Journal of Nonverbal Behavior. 2014;38:259-277.
3. Niedenthal PM, Brauer M, Robin L, Innes-Ker A. Adult attachment and the perception of facial expression of emotion. J Pers Soc Psychol. 2002;82:419-433.
4. Yan X, Andrews TJ, Young AW. Cultural similarities and differences in perceiving and recognizing facial expressions of basic emotions. Journal of Experimental Psychology: Human Perception and Performance. 2016;42:423.
5. Knutson B. Facial expressions of emotion influence interpersonal trait inferences. Journal of Nonverbal Behavior. 1996;20:165-182.
6. Borman H, Ozgür F, Gürsu G. Evaluation of soft-tissue morphology of the face in 1,050 young adults. Annals of Plastic Surgery. 1999;42:280-288
7. Ozkoçak V, Ozdemir F. Anadolu erkeklerine ait yüz ölçümleri arasındaki ilişkinin incelenmesi. ASEAD. 2017;4:176-186.
8. Onal T. Üniversite öğrencilerinin yüz antropometrik ölçümlerinin artistik anatomi açısından fotografik analiz yöntemleriyle değerlendirilmesi. Doktora Tezi, Trakya Üniversitesi Sağlık Bilimleri Enstitüsü. 2014:89s.
9. Asghari A, Rajaeih S, Hassannia F, Tavakolifard N, Neisyani HF, Kamrava SK, et al. Photographic facial soft tissue analysis of healthy Iranian young adults: Anthropometric and angular measurements. Med J Islam Repub Iran. 2014;28:1-8.
10. Akhter Z, Banu MLA, Alam MM, Hossain S, Nazneen M. Photo-anthropometric study on face among Garo adult females of Bangladesh. Bangladesh Med Res Counc Bull. 2013;39:61-64.
11. Dereli M. İlköğretim okulu müdürlerinin liderlik davranışları. Yüksek Lisans Tezi, Orta Doğu Teknik Üniversitesi Eğitim Bilimleri Enstitüsü. Ankara, 2003:87s.
12. Astley SJ, Stachowiak J, Clarren SK, Clausen C. Application of the

fetal alcohol syndrome facial photographic screening tool in a foster care population. The Journal of Pediatrics. 2002;141:712-717.

13. Kosif R. Kişilik özellikleri ile yüz anatomisi arasındaki ilişkinin araştırılması. Kocatepe Tıp Dergisi. 2019;20:137-141.
14. Dimberg U, Thunberg M, El-Mehed K. Unconscious facial reactions to emotional facial expressions. Psychological Science. 2000;11:86-89.
15. Alrajih S, Ward J. Increased facial width-to-height ratio and perceived dominance in the faces of the UK's leading business leaders. British Journal of Psychology. 2014;105:153-161.
16. Turan Özdemir S, Sığirli D, Ercan I, Cankur NS. Photografic facial soft tissue analysis of healthy Turkish young adults: Anthropometric measurements. Aesthetic Plastic Surger. 2009;33:175-184.
17. Lewis GJ, Lefevre CE, Bates TC. Facial width-to-height ratio predicts achievement drive in US presidents. Personality and Individual Differences. 2012;52:855-857.
18. Qin R, Gao W, Xu H, Hu Z. Modern physiognomy: An investigation on predicting personality traits and intelligence from the human face. Science China Information Sciences. 2018;61:058105.
19. Borkenau P, Brecke S, Möttig C, Paelecke M. Extraversion is accurately perceived after a 50-ms exposure to a face. Journal of Research in Personality. 2009;43:703-706.
20. Zebrowitz LA, Collins MA, Dutta R. The relationship between appearance and personality across the life span. Personality and Social Psychology Bulletin. 1998;24:736-749.