

Relationship between Perception of Maxillary Midline Diastema and Personality Profiles

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ABSTRACT

Aims: The aim of this study was to investigate the relationship between personality profiles and perception of maxillary midline diastema (MMD) among laypeople.

Materials and methods: Hundred total of 200 laypeople (100 females and 100 males, mean age=28.8±5.5 years) were recruited in this cross-sectional study. They were asked to rate the attractiveness of two digital photographs of ideal smile with 1 and 2 mm MMD on a visual analog scale (VAS) from 0 to 10. Participants' personality and psychological profiles were assessed via neuroticism–extraversion–openness five-factor inventory. The statistically significant levels were set at $p \leq 0.05$.

Results: The mean VAS scores were 5.7 (± 2.1) and 4.3 (± 2.0) for 1 and 2 mm MMD respectively. The participants rated the attractiveness of 1 mm diastema better than the attractiveness of 2 mm diastema ($p < 0.001$). Females showed no difference in rating diastema attractiveness in comparison with males ($p > 0.05$). Participants (from both genders) with higher neuroticism scores rated 1 and 2 mm diastemas as less attractive than those with lower neuroticism scores ($p \leq 0.001$).

Conclusion: Psychological profiles (high neuroticism) might be associated with negative perceptions of attractiveness of MMD.

Keywords: Attractiveness, Diastema, Esthetics, NEO-FFI, Perception, Personality, VAS scale.

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INTRODUCTION

Maxillary midline diastema (MMD) is the space between maxillary two central incisors. It is a frequent orthodontic problem that may negatively affect smile attractiveness and drive patients to seek treatment.¹⁻⁴

Previous literature reported controversial findings regarding the perception of midline diastemas. Some researchers found that midline diastemas of any width were perceived as unattractive by laypeople.⁵⁻⁷ However,

other researchers found that the perception of diastemas depends on their width.⁸⁻¹⁰ Diastemas that were equal to or more than 2 mm wide were found to be negatively perceived by laypeople.⁸⁻¹⁰ Previous literature did not answer why some laypeople negatively perceive any width of a diastema whereas others only negatively perceive it when its width is 2 mm or more.

Currently, photographs of female models with midline diastema appear more frequently in famous fashion magazines.¹¹ This might highlight a shift in perception of midline diastema, which might have some implications on planning orthodontic and esthetic dental treatments. Moreover, MMD is artificially created in some parts of Africa in order to improve attractiveness as it is perceived as an icon of beauty.¹² Cracel-Nogueira and Pinho⁷ found that the laypeople perception of midline diastema was not affected by having previous orthodontic treatment or not.

Perception of esthetics varies between individuals, and this might be affected by individuals' psychosocial factors, professional training, experiences, and culture.^{5-7,10,13-20}

In order to satisfy esthetic demands of patients, it should be acknowledged that each patient is a unique individual with distinctive traits and characteristics. Therefore, a simple superimposition of an identical smile to every individual is not practical esthetic dentistry.²¹ Hence, esthetic treatment planning should consider scientific esthetic clinical principles as well as understanding of what each individual perceives as esthetic or attractive.

Personality profiles, body image, and self-esteem were previously associated with dental perceptions and satisfaction.^{13-16,18-20,22} Also, Onyeano and Sanu¹³ concluded that spacing of teeth might negatively affect body image. In addition, Nagalakshmi et al¹⁷ found that the correction of midline diastema was associated with 50% improvement in quality of life of young patients.

In order to provide adequate orthodontic services, Tsakos²³ suggested that orthodontic treatment needs should consider behavioral and psychosocial factors side by side to normative needs and clinical measures. In addition, Bernabé et al²⁴ concluded that malocclusion has psychosocial and physical impacts on quality of life. Therefore, evaluation of normative orthodontic treatment needs using clinical indices is not enough.

Few reports are available on the perception of midline diastema by laypersons. However, no reports are available regarding the relationships between personality profiles

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and perception of midline diastema. This prompted the conduction of this study in order to shed more light on the reasons behind different perceptions of midline diastema among laypeople.

The aim of this study was to investigate the relationship between personality profiles and perception of MMD among laypeople.

The null hypothesis was that there is no relationship between personality profiles and perception of MMD among laypeople.

MATERIALS AND METHODS

A total of 200 laypeople (100 females and 100 males) were recruited into this cross-sectional study from participants who attended dental clinics at the University of Jordan, Amman, Jordan; and Jordan University of Science and Technology, Irbid, Jordan, during the year 2015.

This study was carried out in full harmony with ethical principles as well as the World Medical Association Declaration of Helsinki. The procedures in this study were ethically approved by the Deanship of Research, Jordan University of Science and Technology. Each participant was invited to take part in the study and was provided with a full explanation of the study. Written informed consent was signed by each participant before participation in the study.

To be included, the participant had to be 17 years or above so as to be able to understand and score the questionnaires. Also, the participant should have no diagnosed medical disease (including psychological or mental disorders). In addition, the participants should have no orthodontic problems, no midline diastema, no missing anterior teeth, no spacing between teeth, and no prosthetic rehabilitations or restorations in the maxillary anterior area. Also, participant should have no history of orthodontic treatment and no history of facial trauma or surgery in the anterior region. The participants should not have received professional medical or dental training before and should not have worked in any medical or dental facility before.

Each participant was assessed prior to inclusion in the study. The evaluation incorporated participants' dental and medical histories and personal information regarding name, age, gender, occupation, education, marital status, and address. The participants should have attended for routine dental care (dental check up, simple scaling and polishing, and/or fluoride application). Also, the participants were thoroughly examined to exclude problems with their teeth including orthodontic problems, midline diastema, spacing of teeth, malformation of teeth, missing anterior teeth, presence of orthodontic appliances or restorative rehabilitations, presence of restorations in anterior teeth, presence of

caries or periodontal disease, and presence of anterior teeth staining. Participants with any of these problems were excluded from the study to exclude any potential psychological effects of these problems on the obtained results from the participants.

Two digital photographs of an ideal smile with MMD width of 1 and 2 mm were created using Adobe Photoshop CS5 software program (Adobe Systems Inc., San Jose, CA, USA) following previous recommendations.^{5,6} The photographs included the smiles and excluded other parts of the face to focus participants' judgment on the midline diastema and avoid confounding effects of other parts of the face.^{5,6} The smile photographs were posed on a 25 × 18 cm tablet screen (Toshiba Tablet AT200, Toshiba Corp., Japan) in actual dimensions. The first photograph was posed; then, the participants were asked to rate their view of the attractiveness of the midline diastema on a Likert scale from 0 to 10, where 0 means it is very unattractive and ugly and 10 means it is very attractive and beautiful. Ten minutes later, the participants were asked to rate the attractiveness of the second photograph under the same conditions following the aforementioned procedure.

Participants' personality profiles were assessed via neuroticism–extraversion–openness five-factor inventory (NEO-FFI).²⁵ The test consisted of 60 questions analyzing the five major personality dimensions: neuroticism, extraversion, openness, agreeableness, and conscientiousness.

Each participant was provided with a complete explanation of the questionnaire dimensions as well as the methods of scoring the questionnaire. The investigator was available during the process of completing the questionnaires in order to clarify any point for the participant if requested.

A total of 25 participants completed the questionnaires on two occasions with 1-week gap. Reliability testing was conducted on all items via correlation coefficients which were high and ranged from 0.89 to 0.94.

Statistical Analysis

The data were assessed using the Statistical Package for the Social Sciences (SPSS) computer software SPSS, Version 21.0, SPSS Inc., Chicago, IL, USA). Pearson's correlation test was used to identify the relationship between personality profiles, ratings of midline diastema attractiveness, gender, and age. Paired samples t test was used to test for differences of rating the attractiveness of midline diastema among the study population. Analysis of variance (ANOVA) test was used to compare midline diastema attractiveness and psychological profiles between males and females. The significance levels were determined at $p \leq 0.05$ during statistical analysis.

RESULTS

Participants' age ranged between 18 and 40 years (mean age = 28.8 ± 5.5 years). The highest score for the 1 mm midline diastema attractiveness was 10, and the lowest score was 1 (mean score = 5.7 ± 2.1). Meanwhile, the highest score for the 2 mm midline diastema attractiveness was 10 and the lowest score was 1 (mean score = 4.3 ± 2.0). Table 1 presents the distribution of midline diastema attractiveness ratings among the study population according to gender. Females showed no difference in rating diastema attractiveness in comparison with males ($p > 0.05$; Table 1).

Table 2 presents the differences of rating the attractiveness of midline diastema among the study population. The participants, including both males and females, rated the attractiveness of 1 mm diastema better than the attractiveness of 2 mm diastema ($p < 0.001$).

Among the total study population, the mean personality dimensions scores (\pm SD) were 22.9 (± 6.2) for neuroticism, 29.3 (± 5.1) for extraversion, 21.5 (± 4.4) for openness, 27.2 (± 4.4) for agreeableness, and 34.4 (± 5.4) for conscientiousness. Table 3 summarizes the mean, standard deviation, maximum, and minimum values for NEO-FFI dimension scores among participants according to gender.

Correlations between age, gender, visual analog scale (VAS) scores for 1 mm diastema attractiveness, VAS scores for 2 mm diastema attractiveness, and NEO-FFI scores for personality profiles revealed the following correlations.

Age had no significant relationships with VAS scores of diastema attractiveness or NEO-FFI scores of personality profiles ($p > 0.05$). On the contrary, females scored higher on neuroticism than males ($r = 0.196$, $p = 0.006$). In addition, higher neuroticism scores were associated with lower VAS scores of 1 mm ($r = -0.319$, $p = 0.000$) and 2 mm ($r = -0.241$, $p = 0.001$) diastema attractiveness. Participants with higher neuroticism scores rated diastema as less attractive than those with lower neuroticism scores.

Among females, higher neuroticism scores were associated with lower VAS scores of 1 mm ($r = -0.361$, $p = 0.000$) and 2 mm ($r = -0.345$, $p = 0.000$) diastema attractiveness. In addition, higher neuroticism scores were associated with lower VAS scores of 1 mm ($r = -0.280$, $p = 0.000$) and 2 mm ($r = -0.293$, $p = 0.000$) diastema attractiveness among males. Both males and females who scored higher neuroticism scores rated diastema as less attractive than those with lower neuroticism scores. Table 4 summarizes the correlations between VAS scores of 1 and 2 mm diastema attractiveness and NEO-FFI personality dimension scores among study population.

DISCUSSION

This study showed that neuroticism personality scores were significantly related to the ratings of midline diastema attractiveness; therefore, the null hypothesis was rejected.

The NEO-FFI test was utilized in this study to evaluate personality profiles for the reasons that it is reliable,

Table 1: Distribution of midline diastema attractiveness ratings among the study population according to gender (n=200)

	1 mm diastema			2 mm diastema		
	Females	Males	p*	Females	Males	p*
Mean score	5.8	5.6	0.632	4.4	4.2	0.506
Standard deviation	2.2	1.95		2.1	1.94	
Maximum score	10	10		10	10	
Minimum score	1	1		1	1	

*p value of the mean difference of visual analog scale scores of diastema attractiveness between genders using analysis of variance test

Table 3: The mean, standard deviation, and range values for NEO-FFI dimension scores among participants according to gender (n=200)

Personality domain	Females		Males	
	Mean score (SD)	Range	Mean score (SD)	Range
Neuroticism	24.1 (6.3)	9–36	21.7 (5.9)	6–35
Extraversion	29.8 (5.1)	3–43	28.7 (5.1)	3–38
Openness	20.8 (4.3)	12–30	22.2 (4.4)	15–37
Agreeableness	27.9 (4.5)	19–38	26.5 (4.3)	16–37
Conscientiousness	34.7 (5.4)	24–46	34.1 (5.6)	12–46

NEO-FFI: Neuroticism–extraversion–openness five-factor inventory; SD: Standard deviation

Table 2: Paired samples t test for comparison of ratings of midline diastema attractiveness among participants

Correlated pair: 1–2 mm MD	Paired differences						t	df	Sig. (2-tailed)
	Mean	SD	Standard error mean	95% confidence interval of difference					
				Lower	Upper				
All participants	1.355	0.722	0.051	1.254	1.456	26.533	199	0.000	
Males	1.380	0.722	0.072	1.237	1.523	19.122	99	0.000	
Females	1.330	0.726	0.073	1.186	1.474	18.332	99	0.000	

MD: Midline diastema; SD: Standard deviation; df: degrees of freedom

Table 4: Correlations between visual analog scale scores of 1 and 2 mm diastema attractiveness and NEO-FFI personality dimension scores among study population

VAS scores	NEO-FFI personality dimensions			
	Neuroticism		Other NEO-FFI dimensions	
	Female	Male	Female	Male
1 mm diastema	-0.361*	-0.280*	NS	NS
R= p=	0.000	0.000		
2 mm diastema	-0.345*	-0.293*	NS	NS
R= p=	0.000	0.000		

*Significant relation; VAS: Visual analog scale; NS: Not significant; NEO-FFI: Neuroticism–extraversion–openness five-factor inventory

sensitive, simple, valid, and uncomplicated for statistical use; it can also be scored quickly and offers comprehensive assessment of the five personality dimensions.^{14,15,18-20,25-29} Earlier investigations on different orthodontic problems have utilized other tools to evaluate psychological profiles of assessed participants, although these tools have some pitfalls associated with tests' suitability of use, comprehensiveness, validity, and reliability.^{14,15,27,28}

Diastemas of 1 and 2 mm sizes were selected for this study because previous literature reported that diastemas of 1.5 mm width or less were perceived as attractive while wider diastemas (≥ 2 mm) were perceived as unattractive.^{5,8-10}

Females demonstrated higher neuroticism scores than male participants in this study. This might owe to racial, social, or cultural features that drive females to experience more stressful lives and be more self-conscious than males. This concurs with the results of previous studies that reported females show higher neuroticism scores than males.^{18-20,29}

In this study, the participants rated the 2 mm midline diastema as less attractive than 1 mm midline diastema. This finding is in agreement with the findings of previous studies.^{5,6,9,30} This agrees with previous views that large diastema may negatively impact attractiveness of smile.³⁰

Also, females showed no difference in rating diastema attractiveness in comparison with males. This concurs with the results of previous studies.^{5,6} This agrees with previous views that beauty is perceived regardless the gender of an individual.⁶

Previous literature did not provide conclusive answer as to why some laypeople negatively perceive any width of a diastema, whereas others only negatively perceive it when its width is 2 mm or more. In this study, it was noticed that participants rated midline diastema differently. Some participants rated midline diastema as highly attractive regardless of its width; meanwhile, others rated midline diastema as very unattractive regardless of its width. This refers to the presence of other underlying

factors that might affect participants' views regarding the attractiveness of midline diastema.

For this reason, personality profiles were tested in this study for potential relationships with the perception of attractiveness of midline diastema. The results showed that participants (both males and females) with higher neuroticism scores rated diastema (both 1 and 2 mm diastemas) as less attractive than those with lower neuroticism scores. This could be explained based on that more neurotic participants could be more concerned regarding esthetics and thus be highly alerted to report more situations that they think might potentially impact negative appearance.^{14-16,18-20}

Therefore, personality profiles might explain varying perception of attractiveness of midline diastema. This finding agrees with the results of previous studies that reported relationships between perception of esthetics and personality profiles in other orthodontic and restorative situations.^{13-16,18-20}

Therefore, it might be good clinical practice for dental professionals to consider the psychology of patients who attend for management of midline diastema as these might impact esthetic views and requirements of patients and thus modify proposed treatment plans.

Study limitations include that this study did not test the effects of social conditions, economy, religion, and cultural values that might have possible effects on the perception of midline diastema and personality profiles. Further investigations are needed to study potential effects of these factors in this regard. In addition, this study only tested images for 1 and 2 mm widths of midline diastema. Future studies are still required on other dimensions of midline diastema as well as other types of diastema (lower midline diastema and diastema between other anterior teeth).

CONCLUSION

Psychological profiles (high neuroticism) might be associated with negative perceptions of attractiveness of MMD.

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