# Evaluation of 8-10 age group children's attitudes and perceptions about smile aesthetics

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## ABSTRACT

**Aims**: The aim of this study is to determine the attitudes and perceptions of 8-10-year-old children regarding smile aesthetics.

**Methods**: The cross-sectional study included 159 children aged 8-10 and their parents who were undergoing treatment in the Department of Pedodontics at İstanbul University. Participants were asked to fill out a questionnaire consisting of 26 questions. The first 8 questions aimed to assess the socio-demographic characteristics of the families, while the remaining 18 questions measured the attitudes and perceptions of children regarding smile aesthetics in 7 categories. The categories included satisfaction/dissatisfaction, honesty, sacrifice/deceit, selfishness, extroversion/introversion, personal happiness, intelligence, health status, and leadership. Photographs of children with different dental conditions (normally aligned teeth, crowded incisors, and diastema) were shown to the participants. Statistical analyses were performed using SPSS 25.0 software.

**Results**: Data regarding the seven areas of interest showed that children aged 8-10 years viewed their peers with normally-aligned teeth more favourably as far as extroversion and health status were concerned (p=0.042 and p=0.022 respectively). However, there was no statistically significant difference with regard to satisfaction/dissatisfaction, honesty, sacrifice/deceit, selfishness, personal happiness, intelligence and leadership in children with harmonious, as opposed to crowded or diastema.

**Conclusion**: Our study suggests that smile aesthetics have a significant impact on social perception during childhood. Orthodontic treatments not only affect smile aesthetics but also influence individuals' social aspects.

**Keywords**: Child, smile aesthetics, social perception

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## INTRODUCTION

Physical beauty is a significant social issue today, and facial aesthetics are one of its key components.[1-3] Many individuals often find the oro-facial region a matter of considerable concern as it tends to attract the most attention during interpersonal interactions and serves as the primary channel for vocal, physical, and emotional communication.[4] Smile aesthetics, a crucial component of dentofacial aesthetics, has gained great importance.[3,5] Psychosocial significance may be attributed to characteristics such as the color, shape, size, position, and exposure of teeth, irrespective of the presence of any relevant functional or aesthetic impairment.[6] Dental aesthetics is a dynamic concept with parameters that change over time.[7] Recently, increased interest in aesthetic dentistry has resulted from the growing demand for orthodontic and dental treatments among individuals of different age groups. In addition to buccal corridors, gingival display, arch width, tooth shapes and asymmetries, age is another factor that influence the perception of smile aesthetics.[8] Studies in the literature have found a correlation between different age groups and the perception of a smile.[9] Previous investigations have explored aesthetic perceptions related to smiles that exhibit features such as diastema and midline deviation, smile arc, absent teeth, buccal corridor, and gummy smile across a variety of age groups.[10] The results from many of these studies suggest varied perceptions within specific age brackets, which can be attributed to changing attitudes, lifestyles, and opinions. These factors may undergo modifications as individuals age, potentially influencing perceptions of smile aesthetics.[10] Researches also underscores the importance of considering the aesthetic expectations of patients from a young age.[11-14]

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Studies have shown that dental and smile aesthetics play a crucial role not only in interpersonal relationships but also in self-confidence, psychological well-being, and social behaviors. Individuals with an attractive smile are known to be more successful in school and job interviews and even in partner selection.[15-18] Studies have reported that children with normally aligned teeth are perceived by their peers as more intelligent, friendly, and sociable.[11] Similarly, children with crowded, diastema, decayed, and misshapen teeth are reported to be socially disadvantaged compared to those with normally aligned teeth.[11,19] While there are numerous studies evaluating aesthetic perceptions of different smile types in adults, there are limited studies assessing the attitudes and behaviors of children and adolescents regarding smile aesthetics.[20-22] In the studies conducted by Zhaoc et al.[20] and Musskopf et al.[21] the perception of smile aesthetics was evaluated in different age groups with different scales. In the study conducted by Lombardo et al.[22] children in the 8-10 age group with normally aligned teeth were found to be more honest and happy by their peers. Therefore our aim was to evaluate the attitudes and perceptions of Turkish children aged 8-10 regarding smile aesthetics.

## METHODS

The study was carried out with the permission of Kocaeli University Non-invasive Clinical Researches Ethics Committee (Date: 08.12.2022, Decision No: GOKAEK-2022/20.17). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

The study, conducted between March 2022 and March 2023, employed a descriptive cross-sectional design to determine the attitudes and perceptions of 8-10-year-old children towards smile aesthetics. Sample size calculation was performed using the G-Power program (ver. 3.1.9.7; Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany) for ANOVA: Fixed effects, omnibus, one-way test, considering an effect size of 0.25 (medium), alpha (α) error of 0.05, power of 80%, and assuming three groups. The minimum sample size was calculated as 159.

Patients with systemic diseases, previous orthodontic treatment and difficulty in understanding were excluded from the study. Before the study, written informed consent was obtained from parents of all patients.

### Data Collection and Analysis

The research was conducted by the Department of Pedodontics at İstanbul University Faculty of Dentistry. To determine the attitudes and perceptions of 8-10-year-old children towards smile aesthetics, participants in the sample groups were instructed to examine one of several

photographs and subsequently fill out a questionnaire. The questionnaire was created by two pedodontic specialists (EBTİ and EA) based on 'Smile perception questionnaire for children between the ages of 8 and 10' (SPQ 8-10) developed previously,[23] professional knowledge, and literature review. For reliability, the test-retest technique was used, where 40 children who participated in the study were systematically and randomly selected for retesting, and the survey form was reapplied to these children. The survey was conducted face-to-face. Furthermore, to achieve valid and reliable results, the prepared survey form was presented to two pedodontic experts and a language expert assisted the experts in the evaluation of questions for comprehensibility before implementation and revised based on their feedback.

The first eight questions of the questionnaire aimed to assess the socio-demographic characteristics of the families. The remaining 18 questions measured the attitudes and perceptions of children regarding smile aesthetics in seven categories: satisfaction/dissatisfaction, honesty, sacrifice/deceit, selfishness, extroversion/introversion, personal happiness, intelligence, health status, and leadership.

After the parents answered the first eight questions on behalf of the child, the remaining questions were answered by the child after showing them selected photos. The selection of which photo to show to each child was randomized using the envelope method. A total of six envelopes were prepared. The first child drew one of the six envelopes, the second child drew one of the five remaining envelopes, and this cycle repeated until all envelopes were used.

Children were asked to answer the questions using a five-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree". The options were scored from 0 to 4: 0 points for "Strongly Disagree," 1 point for "Disagree," 2 points for "Neither Agree nor Disagree," 3 points for "Agree," and 4 points for "Strongly Agree."

The survey questions were carefully formulated considering the age of the participants, and attention was paid to the internal coherence questions to determine whether the responses were given automatically or thoughtfully. These internal coherence questions used in the questionnaire were presented in both negative and positive formats. Consequently, questions 10, 13, 15, 18, 21 and 26 featured inverted response values; for instance, "Strongly Agree" corresponded to a value of 0, while "Strongly Disagree" equated to a value of 4.

Regarding the photos used in the survey, 10 colored photos of ten Turkish children (5 girls, 5 boys) aged 9 were used. Two female and two male residents in the

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department of Pedodontics scored each child from 1 to 5 based on their suitability for the general physical structure of Turkish children, without distinct physical features such as red hair or blue eyes. The highest-rated children were chosen for the survey. Photos were manipulated using Adobe Photoshop CS6 (Adobe Systems Inc., San Jose,CA) to obtain versions with normally aligned teeth (ok type), crowded incisors (c type), and diastema (d type). This resulted in six photos (**Figure**).
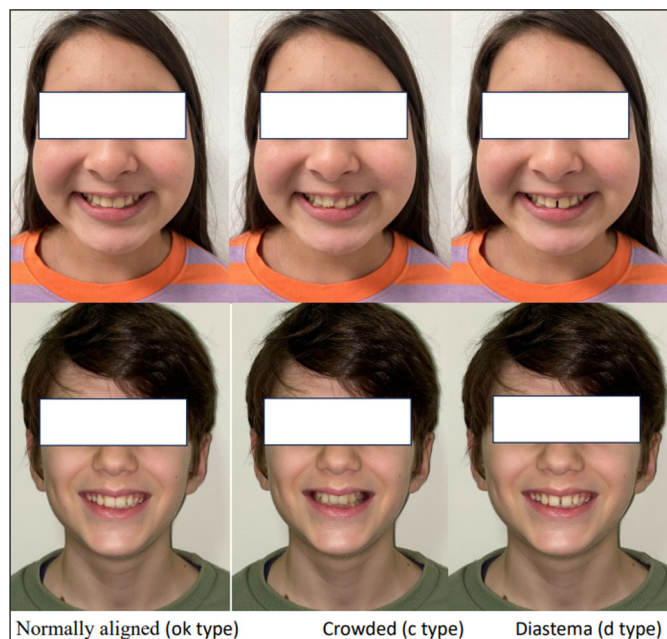


**Figure.** Photographs of children with normally aligned, crowded, and diastema

Fifty three children analysed either a male or female child's photograph, with normally aligned teeth, 53 children analysed either a male or female child's photograph, with crowded teeth, and 53 children analysed either a male or female child's photograph, with diastema.

**Statistical Analysis**

Data analyses were performed using the Statistical Package for Social Sciences (SPSS) for Windows version 25.0 (IBM Corp., NY, USA). The normal distribution of variables was examined using visual (histograms and probability plots) and analytical methods (Kolmogorov-Smirnov Test). Descriptive analyses were presented as percentages and mean±standard deviation (SD) for continuous variables and median (minimum-maximum) values where applicable. Categorical variable comparisons in independent groups were made using the Pearson chi-square test. For non-normally distributed data, Kruskal-Wallis test was used for comparisons among three or more groups, and ANOVA was used for normally distributed data that met the assumptions. For variables that showed statistical significance, pairwise

comparisons were conducted using Mann-Whitney U test for non-normally distributed data, Tukey test for homogeneous variances, and Tamhane's T2 test for non-homogeneous variances. Significance level was set at $p<0.05$.

**Test-retest Reliability**

40 randomly selected children from the original sample were retested in the same way 15 days later after the verification of the validity of the test. Each child received the same photograph as in the initial test. Correlations of rank between the 18 responses obtained in the first test and the 18 responses obtained in the second test were calculated (**Table 1**).

**Table 1.** Test-retest reliability: the number in the first column corresponds to question in the questionnaire. Correlation between test and retest indicate the validity of the results, as a positive correlation was found in all cases

| Question number | Test – Retest | P value |
|---|---|---|
| 9 | 0.840 | 0.000 |
| 10 | 0.942 | 0.000 |
| 11 | 0.560 | 0.000 |
| 12 | 0.343 | 0.030 |
| 13 | 0.340 | 0.032 |
| 14 | 0.716 | 0.000 |
| 15 | 0.363 | 0.022 |
| 16 | 0.709 | 0.000 |
| 17 | 0.405 | 0.009 |
| 18 | 0.557 | 0.000 |
| 19 | 0.489 | 0.001 |
| 20 | 0.623 | 0.000 |
| 21 | 0.334 | 0.035 |
| 22 | 0.952 | 0.000 |
| 23 | 0.719 | 0.000 |
| 24 | 0.932 | 0.000 |
| 25 | 0.618 | 0.000 |
| 26 | 0.458 | 0.003 |

**RESULTS**

A total of 168 children and their families agreed to participate in the study. Nine patients were excluded due to five families refusing to sign the informed consent form and four being incompletely filled out. According to the research findings, the average age of the 159 participating children was 8.9±0.84 years, with 47.2% being boys and 52.8% girls. 69.8% of the children had come to hospital with their mothers and whereas 30.2 % of the participants were the fathers in the study. The mean age of the parents were 38.67±5.76 years (minimum 25, maximum 53). The majority of the children's families had an educational level of high school or below (84.9%). Again, the majority of family members had marked the question about "your profession" as 'homemaker/not employed' (64.2%). Our results suggested that, 57% of

the participants' monthly income was below the poverty line. (The socio-economic status of the families was determined according to Turkish Statistical Institute (TURKSTAT) data.[24]) The majority of families had 2 or more children (35.2% had 2, 38.4% had 3 and 20.8% had ≥4 children), and the child they brought for treatment was mostly their second child (74%).

When analyzing the survey results, a significant difference was found between the "ok type" and other two groups in terms of "health status" (p=0.022) (**Table 2**). Children aged 8-10 statistically found their peers with "ok type" teeth more extroverted compared to those with crowded teeth and diastema since, a statistically significant difference was found in terms of friendship relationships between the "ok type" and other two groups (p=0.042) (**Table 3**). In contrast, no significant results were found for personal happiness, intelligence, leadership, satisfaction, and honesty indicating that these criteria were not perceived to be affected by smile type.

**Table 2.** Comparison of the smile type shown as a photograph and the answers given by children regarding "health status" category in the questionnaire using the Pearson chi-square test

| Groups | Strongly disagree | Disagree | Neither disagree nor agree | Agree | Strongly agree | Total |
|---|---|---|---|---|---|---|
| C type | 7 | 19 | 5 | 17 | 5 | 53 |
| D type | 5 | 23 | 4 | 16 | 5 | 53 |
| Ok type* | 5 | 6 | 5 | 32 | 5 | 53 |
| Total | 17 | 48 | 14 | 65 | 15 | 159 |

*p=0.022, Ok type: normally aligned teeth, C type: crowded incisors, and D type: diastema

**Table 3.** Comparison of the smile type shown as a photograph and the answers given by children regarding "extroversion/introversion" category in the questionnaire using the Pearson chi-square test

| Groups | Strongly disagree | Disagree | Neither disagree nor agree | Agree | Strongly agree | Total |
|---|---|---|---|---|---|---|
| C type | 3 | 11 | 7 | 28 | 4 | 53 |
| D type | 3 | 4 | 5 | 34 | 7 | 53 |
| Ok type* | 2 | 1 | 4 | 34 | 12 | 53 |
| Total | 8 | 16 | 16 | 96 | 23 | 159 |

*p=0.042, Ok type: normally aligned teeth, C type: crowded incisors, and D type: diastema

## DISCUSSION

In daily life, the focus of interpersonal communication is predominantly on the orofacial region.[25] Consequently, facial aesthetics, due to the psychological impact it creates, holds great importance in individuals' overall quality of life. Smile aesthetics also plays a key role in general aesthetics.[26] The aesthetic norms of today's society encourage individuals to seek orthodontic and dental treatment to achieve a beautiful and harmonious smile.[9]

The perception of smile aesthetics is subjective and shaped by an individual's experiences and social surroundings.[27] There are studies in the literature that deal with aesthetic perceptions of smile types in different age groups in a range between 13 and 60 years old.[28-30] Since orthodontists mostly manages and treats malocclusions in younger patients, there occurred a need to consider the aesthetic expectations of patients at a young age.[23] Additionally, analyzing children's perceptions of dental aesthetics has become an important topic to understand societal values.[2]

The purpose of selecting children in the 8-10 age group for evaluating the perception of smile aesthetics in this study is due to the completion of eruption of the front four incisors in this age group, the possibility of preventive orthodontic treatment before fixed treatments during this period, and the comprehensive exploration of the inner motivation of children in this age group for orthodontic treatment not being extensively studied.

Children participating in our study statistically found their peers with normally aligned teeth to be more extroverted compared to those with crowded teeth and diastema teeth (p=0.042). This aligns with the results of Lombardo et al.'s[22] study on the same age group, where children with normally aligned teeth were perceived as more talkative by their peers (p<0.05).

Shaw,[11] conducted a study in 1981 on 840 children aged 11-13, evaluating their aesthetic perceptions of smiles using the Visual Analog Scale (VAS). The study found that children with normally aligned teeth were considered more attractive by their peers (43.1 mm, p<0.01). However, our study did not find a statistically significant difference in this aspect among the three groups (p>0.05).

In Verdecchia et al.'s[23] study, children with normally aligned teeth were perceived as statistically more advantageous in terms of honesty, personal happiness, and intelligence compared to their peers with proclined and crowded teeth (p<0.05). In our study, no significant difference was observed among the three groups regarding honesty, personal happiness, and intelligence (p>0.05). We suggest that these different results of our study may be attributed to ethnic and cultural disparities, individual characteristics, socio-economic status, elements of social media, parental influence and the surrounding environment.

Our study has a few limitations. Firstly, only the first impression was analyzed in our survey study. Secondly, the study population were small children between 8 to 10 years-old and these small children often needed assistance during the study. Additionally, we believe that the overall facial appearance in the

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presented photographs could introduce bias. In future studies, investigating the same smile in different facial combinations could mitigate this bias.

## CONCLUSION

Our study suggests that smile aesthetics have a significant impact on social perception in this sample of 8-10 years-old children. Our results showed a correlation between normally aligned smile and the level of desirability perceived by peers, with highly significant findings in relation to qualities such as extroversion and health status. Conversely, regarding the attributes of personal happiness, intelligence, leadership, satisfaction, and honesty, the results did not reach statistical significance to suggest a preference for aesthetic smiles over those with crowded teeth or diestema teeth. Orthodontic treatments not only affect smile aesthetics but also influence individuals' social aspects. When making clinical decisions during orthodontic treatment, psychological and aesthetic factors should be evaluated together.

## ETHICAL DECLARATIONS

**Ethics Committee Approval:** The study was carried out with the permission of Kocaeli University Non-invasive Clinical Researches Ethics Committee (Date: 08.12.2022, Decision No: GOKAEK-2022/20.17).

**Informed Consent:** All patients' parents signed and free and informed consent form.

**Referee Evaluation Process:** Externally peer-reviewed.

**Conflict of Interest Statement:** The authors have no conflicts of interest to declare.

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**Author Contributions:** All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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