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The effects of a maternal personality, children’s behavioral characteristics, and parenting styles on the dental anxiety of 3- to 6-year-old children

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Abstract

Background: Many individual and environmental factors cause dental anxiety in children. The aim of this study was to examine the effects of a maternal personality, children’s behavioral characteristics, and parenting styles on the dental anxiety of three- to six-year-old children. **Methods:** The parents of 230 children who applied to the Department of Pediatric Dentistry, Faculty of Ondokuz, Mayıs University were involved in this study. The “Temperament and Character Inventory”, “Child Behavior List”, and “Parenting Attitude Scale” were applied to the volunteer parents. All data were statistically analyzed ($p < 0.05$). **Results:** From the results of determining the maternal personality, it was found that the score of “novelty seeking” and those of all the character dimensions were statistically significantly higher in the dental anxiety group than in the control group, while the scores of “reward dependence” and persistence were statistically significantly lower in the dental anxiety group ($p < 0.001$). From the aspect of children’s behavior characteristics, the scores of “inhibitory control” ($p = 0.029$) and permissive attitude among the parenting styles were statistically significantly higher in the dental anxiety group ($p = 0.027$). **Conclusion:** In this study, it was determined that maternal characteristics, children’s behavioral characteristics, and parenting attitudes affect the dental anxiety of three- to six-year-old children.

Keywords: child behavior, dental anxiety, maternal behavior, parenting, education

Introduction

Dental anxiety is defined as a sense of anxiousness and loss of control regarding the events that occur during dental treatment.¹ For dentists, children are the most difficult group to communicate with, and the patient-dentist relationship of adulthood becomes the child-dentist-parents relationship in pediatric dentistry.² It is important to effectively establish this relationship not only for the quality of treatment but also for the discontinuance of the dental anxiety of the childhood period into adulthood. In various studies carried out on different populations, the incidence of dental anxiety among children has been reported to be between 5% and 28%.^{3–6}

It is important for dentists to assess dental anxiety in children as early as possible to identify those who need relief from dental anxiety. However, dental anxiety is difficult to measure due to the varying degrees of

anxiety of each individual.⁷ To determine dental anxiety among children, various methods such as physiological, protective, and psychometric tests and behavior scoring are utilized. Nowadays, the methods most commonly used in clinics are the Corah Dental Anxiety Scale, Dental Subscale of the Children’s Fear Survey Schedule, Facial Image Scale, Venham Picture Test and Frankl Behavior Rating Scale.⁸

In addition, to determine whether children have dental anxiety, dentists should also possess knowledge about the etiology of dental anxiety. The etiological factors of dental anxiety among children are divided into three main classes, namely individual, environmental, and dental factors. Individual factors include the children’s age, gender, neuropsychiatric disorders, and personality and behavior characteristics, while environmental factors include socioeconomic status, dental anxiety of family members, and attitude types of parents. Various

studies have been carried out on many of these factors,^{3,4,6,9,10} but the effects of the mother's personality, children's behavior characteristics, and parenting styles on the dental anxiety of children have yet to be sufficiently studied. Therefore, this cross-sectional study aimed to reveal the relationship between the variables mentioned above and the dental anxiety of children aged 3–6 years who go to the dentist for the first time.

Methods

Study population. The sample group of the present study consisted of the parents of 230 children (137 boys and 93 girls) aged between three and six years who visited the dentist for the first time and applied to the Department of Pediatric Dentistry, Faculty of Dentistry, Ondokuz Mayıs University. Other inclusion criteria included: a) Mental and physical health; b) No history of behavioral disorder diagnosis; c) Normal cognitive development; d) No requirement of emergency treatment.

The study design was explained to the parents and approved by the Ethics Committee of the University of Ondokuz Mayıs (no. 2015/40).

The Frankl Behavior Rating Scale (Table 1) was used to determine the dental anxiety level of the children by the dentist. A total of 150 children in the Rating 1 and Rating 2 groups according to the Frankl Behavior Rating Scale were assigned to the dental anxiety group, while the rest of the children in Ratings 3 and 4 were assigned to the control group. In the Frankl Behavior Rating Scale, the children's behavior was determined to vary between "Definitely Negative" and "Definitely Positive" according to their responses to intraoral and radiological examinations, their cooperation during prophylactic procedures, and when leaving their family; these actions were scored between one and four points.¹²

Table 1. Frankl's behavioral rating scale

Grade	Behavior	Description
1	Definitely Negative	Refusal of treatment, forceful crying, fearfulness or any other overt evidence of extreme negativism.
2	Negative	Reluctance to accept treatment, uncooperativeness, some evidence of negative attitude but not pronounced (sullen, withdrawn).
3	Positive	Acceptance of treatment; cautious behavior at times; willingness to comply with the dentist, at times with reservation, but patient follows the dentist's directions cooperatively.
4	Definitely Positive	Good rapport with the dentist, interest in the dental procedures, laughter and enjoyment.

Assessment Instruments. The children's mothers were informed about the process. The "Temperament and Character Inventory" was used to evaluate the characteristics of the mothers, while the "Child Behavior List" was used to evaluate the personality traits of the children. The "Parenting Attitude Scale" assessed the parenting styles of the parents. Since mothers are typically the primary caregivers and spend more time with children than fathers, the researchers preferred to complete the "Temperament and Character Inventory" and "Child Behavior List" with the mothers.

Temperament and Character Inventory. The "Temperament and Character Inventory" (TCI) form used in the present study consists of 240 items. It is a self-reported scale filled in as "true/false" and can be applied to individuals aged 17 or higher. The TCI assesses four temperament dimensions (Novelty Seeking, Harm Avoidance, Reward Dependence, and Persistence) and three character dimensions (Self-Transcendence, Self-Directedness, and Cooperativeness) of personality. The total score of a dimension is calculated as the sum of all the scores of the sub-dimensions. In the assessment of this questionnaire, some of the items are scored in the reverse direction. The Turkish version of the TCI was approved by Cloninger.^{12,13}

Child Behavior List. The "Child Behavior List" is a Likert-type scale consisting of 94 questions that examine 15 temperament characteristics of children.¹⁴ The reliability and validity of a short form of the list was approved. The temperament characteristics measured are activity level, anger/frustration, approach/positive anticipation, attentional focusing, discomfort, falling reactivity/soothability, fear, high intensity pleasure, impulsivity, inhibitory control, low intensity pleasure, perceptual sensitivity, sadness, shyness, and smiling and laughter. The score of each characteristic is calculated individually; then, the score of each dimension is calculated. Some of the questions are scored inversely.

Parenting Attitude Scale. The "Parenting Attitude Scale", which can be applied to parents with two- to six-year-old children, consists of 4 parenting sub-dimensions (authoritative parenting style, authoritarian parenting style, overprotective parenting style, and permissive parenting style) and 46 items. It is a Likert-type scale. The items are in the form of behavior styles, and there are five frequency options for each item. The score of each characteristic is calculated individually; then, the score of each dimension is calculated. A higher score in any dimension indicates a stronger adaptation of the behavior style that the dimension represents.

Statistical analysis. The SPSS 21.00 software program was used for the statistical analysis. The data were expressed in mean (SD) and median (min-max). The Student's t-test was used to compare the mean values of

two independent groups with a normal distribution, while the Mann-Whitney U test was used to compare the values of non-normally distributed data. A Spearman correlation analysis was employed to analyze the relationships between the data. $p < 0.05$ was considered to indicate statistical significance.

Results

The statistical results of the mothers' temperament and character sub-dimensions are presented in Table 2. The dental anxiety group's scores were higher in the category of reward dependence characterized by socialization of people and persistence behavior, which is characterized as persistence against difficulties ($p < 0.001$). The novelty seeking score was found to be statistically significantly higher in the dental anxiety group compared to that of the control group ($p < 0.001$). In the harm avoidance dimension, there was no statistically significant difference between the groups ($p = 0.167$). In all character sub-dimensions, there were statistically significant

differences, and the scores of the dental anxiety group were discovered to be statistically significantly lower than those of the control group ($p < 0.001$).

The mean (SD) values and median (min-max) of the sub-dimensions of the children's behavioral characteristics are presented in Table 3. Among these sub-dimensions, the score of the dental anxiety group was statistically higher than that of the control group in "inhibitory control" alone, which represents children's attitudes toward new situations ($p = 0.029$).

According to the values presented in Table 4, there was no statistically significant difference between the scores of the dental anxiety group and control group in the "authoritative parenting style", "authoritarian parenting style", and "overprotective parenting style" sub-dimensions. In the "permissive parenting style" sub-dimension, the dental anxiety group's score was found to be statistically higher than that of the control group ($p = 0.027$).

Table 2. Statistical results of maternal temperament and character sub-dimensions

Variables	Dental Anxiety Group		Control Group		<i>p</i>
	Mean ± SD	Median (Min–Max)	Mean ± SD	Median (Min–Max)	
Temperament Sub-dimensions					
Novelty seeking	23.21 ± 4.47	23 (5–35)	15.79 ± 4.48	15 (8–29)	<0.001*
Harm avoidance	17.66 ± 5.16	18 (3–30)	18.78 ± 5.72	18 (7–33)	0.167
Reward dependence	9.71 ± 2.69	10 (2–17)	15.02 ± 2.85	16 (7–20)	<0.001*
Persistence	2.75 ± 1.58	3 (0–8)	5.11 ± 1.52	5 (2–8)	<0.001*
Character Sub-dimensions					
Self directedness	17.73 ± 5.86	18 (4–33)	27.85 ± 5.95	27 (16–39)	<0.001*
Cooperativeness	12.81 ± 4.68	13 (4–24)	30.41 ± 5.79	32 (15–39)	<0.001*
Self transcendence	12.55 ± 4.62	12 (3–25)	19.86 ± 4.37	21 (9–30)	<0.001*

* $p < 0.05$

Table 3. Statistical results of child's behavioral characteristic's sub-dimensions

Variables	Dental Anxiety Group		Control Group		<i>p</i>
	Mean±SD	Median (Min–Max)	Mean ± SD	Median (Min–Max)	
Activity level	4.98 ± 1.06	5 (1.71–7)	4.92 ± 1.05	4.86 (1.43–7)	0.670
Anger/frustration	4.60 ± 1.06	4.66 (1.33–7)	4.65 ± 1.08	4.67 (1.83–7)	0.714
Approach/positive anticipation	5.45 ± 0.92	5.50 (0.83–7)	5.62 ± 0.73	5.67 (3.67–7)	0.201
Attentional focusing	4.49 ± 1.12	4.50 (0.33–6.83)	4.52 ± 1.20	4.67 (1–7)	0.685
Discomfort	4.55 ± 1.11	4.66 (1.50–6.83)	4.62 ± 1.03	4.58 (0–6.50)	0.682
Falling reactivity/soothability	4.36 ± 0.90	4.33 (1.33–6.83)	4.53 ± 1.18	4.67 (0–7.00)	0.101
Fear	4.56 ± 1.20	4.66 (1.50–7.00)	4.53 ± 1.25	4.67 (0.67–7.00)	0.853
High intensity pleasure	4.61 ± 1.08	4.66 (1.67–7.00)	4.51 ± 1.22	4.41 (2.17–6.67)	0.519
Impulsivity	4.40 ± 0.96	4.41 (2.00–7.00)	4.44 ± 1.76	4.33 (1.17–17.67)	0.470
Inhibitory control	4.78 ± 0.97	4.83 (0.83–6.67)	5.05 ± 1.01	5.08 (2.33–7.00)	0.029*
Low intensity pleasure	5.58 ± 0.78	5.62 (2.50–7.00)	5.66 ± 0.74	5.75 (3.75–7.00)	0.335
Perceptual sensitivity	5.85 ± 0.99	6.00 (2.17–7.00)	5.98 ± 0.81	6.17 (3.33–7.00)	0.743
Sadness	4.46 ± 0.97	4.57 (0.14–7.00)	4.61 ± 0.84	4.57 (2.71–6.43)	0.482
Shyness	4.08 ± 1.28	4.33 (1.00–7.00)	4.09 ± 1.90	4.00 (1.00–17.67)	0.209
Smiling and Laughter	5.05 ± 0.90	5.16 (2.83–7.00)	5.19 ± 1.09	5.33 (2.67–11.00)	0.312

$p < 0.05$

Table 4. Statistical results of parenting style's sub-dimensions

Variables	Dental Anxiety Group		Control Group		p
	Mean±SD	Median (Min–Max)	Mean±SD	Median (Min–Max)	
Authoritive parenting style	71.97±9.04	74 (39–85)	74.12±6.81	74 (49–85)	0.157
Authoritarian parenting style	24.86±7.69	23 (11–53)	22.64±5.46	22 (11–39)	0.090
Overprotective parenting style	35.44±5.70	36 (22–45)	35.54±5.97	36 (20–45)	0.835
Permissive parenting stlye	22.46±5.93	23 (11–45)	20.51±4.74	20 (13–35)	0.027*

p < 0.05

Discussion

Dental anxiety is a universal problem affecting the vast majority of the population, and its origin is based in childhood. As such, pediatric dentists should aim to determine children's dental anxiety in the early period in addition to protecting their oral and dental health.¹⁵ Determining children's dental anxiety level and its causes early on is important for dentist to be ready for potential problems during treatment and take measures to decrease the children's anxiety.

One of the most important demographic factors affecting children's dental anxiety is the children's age. In studies carried out on various age groups, it was determined that dental anxiety is more frequently seen in children at earlier ages.^{5,14} However, in Nakai *et al.*'s study,¹⁵ no statistically significant difference was found between the level of dental anxiety and the age of children. It has been reported that the majority of behavior management techniques used in practice and discussed in the literature are for three- to six-year-old preschool children.¹⁶ Starting from this point, the study groups of this research were constructed from the parents of three- to six-year-old children.

Another factor playing a role in the development of dental anxiety is previous dental experiences. In a previous study, it was determined that children with a high level of dental anxiety have one or more post-traumatic stress disorder symptoms due to negative dental treatment experiences.³ Negative experiences from dental treatments are one of the determinant causes of dental anxiety in children.¹⁷ However, there are also studies suggesting that a childhood dental experience will contribute to a more positive attitude in subsequent dental treatments.^{18,19} In our study, since it is believed that a positive or negative dental experience in the past will affect children's future dental anxiety level, children visiting the dentist for the first time were involved in the study group.

In studies wherein the etiological factors of dental anxiety among children are examined, including the effects of socio-demographic characteristics, educational status of family members, socioeconomic status, dental anxiety of family members, personality

traits, and parenting attitude styles on children's behavior in dental treatment, the dental anxiety levels are most often scored using the Frankl Behavior Rating Scale.^{20,21} From this perspective, the age range of the children was also taken into consideration, and the dental anxiety and control groups were determined using the Frankl Behavior Rating Scale.

In studies wherein scales are used as a measurement tool, the TCI, the reliability and validity of which have been proven, is used to assess the mothers' personality traits, and the "Child Behavior List", which has been used in many studies on this topic,^{20–22} is utilized to determine the behavioral characteristics of the children. The "Parenting Attitude Style" scale, which is a rare scale used to assess parents' attitudes toward their two- to six-year-old children, has been proven to have a sufficient level of psychometric properties. As such, the parents in this study were asked to complete the Parenting Attitude Style scale together.

Based on children's abilities to imitate and observe, it could be hypothesized that mothers' personality traits might play a determinant role in children's ability to adapt to strangers and new environments such as dental clinics. In a previous study, it was reported that among the personality traits of mothers, decisiveness, relationships with others, flexibility, problem solving, optimism, and capacity for empathy were found to have a positive correlation with positive behaviors of children during dental treatments.²³ In the present study, statistically significant differences were found between the dental anxiety and control groups in terms of the sub-dimensions of temperament and character. One of the most important results of the present study is that the total score of the mothers of children in the dental anxiety group from the "novelty seeking" sub-dimension of temperament was higher than that of the mothers of children in the control group. A negative aspect of having a high level of novelty seeking is that such people experience intense anger when confronted with obstructions and surrender quickly. Higher scores in "harm avoidance", which represents the limits set on behaviors, indicate that such individuals tend to be more mistrustful, over-defensive, and nervous.²² On the contrary, despite expectations, no statistically significant difference was found between the groups in terms of

this sub-dimension in the present study. The score of “reward dependence”, which indicates the socialization of individuals, was found to be lower in the dental anxiety group compared to the control group; a lower score indicates introversion. The “persistence” sub-dimension represents the ability to sustain a behavior despite environmental obstructions, fatigue, or compulsions. In the present study, the score of this sub-dimension was found to be lower among the individuals in the dental anxiety group.

A person that successfully manages themselves believes in themselves and does not provide exaggerated responses when confronted with difficulties. Therefore, it was predictable that the score of “self-directedness” would be lower in the dental anxiety group. Individuals with a high score in the “self-transcendence” sub-dimension, such as those in the control group of the present study, are more adaptive to different situations and tend to exceed beyond their limits to adapt themselves to changing conditions. Individuals with a low level of cooperativeness avoid events and other people.¹¹⁻¹² In this parallel, it was found in the present study that the cooperativeness scores of the mothers of children in the dental anxiety group were lower.

According to this study’s results regarding the personality traits of mothers, it was determined that both the temperament and character of mothers played an effective role in the children’s behaviors. This is believed to be due to the fact that children spend more time with their mothers in this period, when their social and emotional adaptation is developing.

It has been reported that the behaviors children exhibit in dental treatments vary in parallel for various reasons but are directly related to the children’s general depression and personality characteristics, regardless of their other socio-demographic characteristics such as age and gender.²⁴ In some studies performed in consideration of this idea, it was reported that shy, fearful, aggressive, and obstinate children exhibit more difficulty with cooperation.^{24,25}

In the present study, the score of the “inhibitory control” sub-dimension, which represents children’s capacity to suppress and plan inappropriate responses to implicit or new situations or directions, was found to be lower among the children in the dental anxiety group. This was attributed to the children’s confrontation with an implicit situation and difficulty to successfully adapt their fears to the environment.

In the literature, there are studies reporting that parents’ attitudes might change children’s ability to adapt to dental environments. A study found that advanced behavior orientation techniques were used for children of only permissive type families.² It of stated that no

boundary could be set for children in such families.^{26,27} In the present study, in parallel with the results of those studies, the “permissive parenting style” scores were found to be statistically significantly higher in the dental anxiety group. This was attributed to the fact that families adopting this type of attitude tolerantly respond to the negative behaviors and exaggerated responses of children in any environment and do not attempt to change these behaviors. In the present study and a similar one carried out previously, no statistically significant difference was found between parenting attitude styles and children’s dental anxiety.²³ This study has some limitations, such as the evaluation of the factors examined by the parents themselves and the absence of psychiatric interviews.

Conclusion

To eliminate children’s dental problems at all age groups, dentists should be qualified to successfully manage children with dental anxiety in addition to having fundamental clinical knowledge and skills. Children who are not aware of how they should behave at dental clinics and how to cure treatment despite their concerns should not be forced beyond their ability to cope with such a situation. Considering the fact that parental attitudes, children’s behavior characteristics, and mothers’ personalities affect dental anxiety in preschool children, the parent-child relationship should be taken into consideration when choosing appropriate behavior management techniques.

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Conflict of Interest Statement

The authors declare that they have no competing interests.

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