

# Relationship of Maternal Anxiety to the Behavior of Young Children Undergoing Dental Extraction

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*A significant relationship was observed between the behavior of 60 children (3 to 7 years old) undergoing a dental extraction and the anxiety level of their mothers as measured by scores on the Taylor manifest anxiety scale. The results of this investigation indicated that, in this sample, maternal anxiety appears to be a major factor affecting the behavior of young children experiencing dental extraction.*

There seems to be little doubt that fear and anxiety associated with dental procedures are major causes of neglect of oral health and of negative or uncooperative behavior in the dental situation. Although prior dental or medical trauma and negative family attitudes toward the dentist have been implicated in studies dealing with adults,<sup>1-3</sup> relatively little is known about factors affecting dental behavior in children.

For the young child, the dental experience is a novel situation. It appears highly likely that the emotional attitudes of family members, especially the mother, toward the dental situation will be communicated to him. Perhaps of greater importance in determining his response to early dental contacts is the manner in which these figures respond to unfamiliar or conflicting situations and to experiences of anxiety in general.<sup>4</sup> It was the aim of this study to focus more closely on the role of one aspect of affective state in the mother, that of generalized or chronic anxiety, in the behavioral response of young children to a dental situation involving exodontia.

The major hypothesis was that the behavior

of young children in the dental situation would be directly related to the level of manifest anxiety in their mothers. More specifically, it was predicted that children whose mothers had high anxiety levels as measured by scores on the manifest anxiety scale (MAS) would show more negative or uncooperative behavior in the dental situation than children whose mothers had low anxiety levels.

Despite widespread interest in the investigation of various aspects of anxiety and rather extensive literature on the subject, relatively few objective tests have found acceptance in the field. The present problem called for an instrument that could be used to measure the more generalized or enduring aspects of anxiety that might be characterized as a basic state or condition of life. One of the most widely known tests of this kind of anxiety is the Taylor manifest anxiety scale (hereafter referred to as the MAS).<sup>5-7</sup> This instrument was adapted from the Minnesota Multiphasic Personality Inventory by Spence and consists of 50 revised items. It originally was constructed to serve as a measure of drive level in experiments that tested some implications of Hullian learning theory.<sup>7,8</sup> In general, it is designed to tap the more stable or enduring aspects of anxiety and is not considered to be responsive to acute or transitory experiences. The MAS was chosen over other similar pencil-and-paper measures of anxiety because of its wide use, as well as because of its internal consistency and test-retest reliability.<sup>5-9</sup>

## Materials and Methods

The subjects for the study were 60 children, 3 to 7 years old, whose treatment at the dental clinics of the Children's Hospital Medical Center and the Forsyth Dental Center in Boston involved dental extraction. For most

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of these children, the treatment was their initial dental contact, although no effort was made to select them on this basis. All patients and their mothers were informed of the proposed procedure one week prior to the scheduled surgery.

The experimental procedure consisted of giving a brief history form, a short questionnaire, and the MAS to the mothers of the patients immediately prior to the scheduled surgery. The history form was an attempt to learn something about the child's past dental experience and his family environment. The questionnaire was designed to secure the mother's ratings of her child's behavior and reactions, past and present, in the dental or medical setting (Table 1). The MAS was used to assess the level of manifest anxiety in the mother.

The mother was prepared for this procedure, and especially for the MAS, by being told that there were no "right" or "wrong" answers to the questions. Furthermore, it was emphasized that a true expression of her feelings in answering the questions would help us in understanding and working with her child. It was further explained that this could be of benefit to other children attending the clinic.

TABLE 1  
PREOPERATIVE QUESTIONNAIRE COMPLETED BY  
THE PARENT

DIRECTIONS: Check appropriate answer to the following questions:

1. How do you think your child has reacted in the past to dental and medical procedures?
  1. Very poor \_\_\_\_\_
  2. Moderately poor \_\_\_\_\_
  3. Moderately good \_\_\_\_\_
  4. Very good \_\_\_\_\_
2. How do you think your child will react to this procedure?
  1. Very poor \_\_\_\_\_
  2. Moderately poor \_\_\_\_\_
  3. Moderately good \_\_\_\_\_
  4. Very good \_\_\_\_\_
3. How would you rate your child's anxiety (fear, nervousness) at this moment?
  1. High \_\_\_\_\_
  2. Moderately high \_\_\_\_\_
  3. Moderately low \_\_\_\_\_
  4. Low \_\_\_\_\_
4. How would rate your own anxiety (fear, nervousness) at this moment?
  1. High \_\_\_\_\_
  2. Moderately high \_\_\_\_\_
  3. Moderately low \_\_\_\_\_
  4. Low \_\_\_\_\_

Using a behavioral rating scale adapted from the work of Frankl et al,<sup>10</sup> the child's behavior was observed and rated at six intervals before, during and after the surgical procedure. All of the behavioral ratings were made by two independent observers, especially trained, who were aided by observation checklists to assess child behavior. Prior to participating in the project, all observers practiced for at least one week rating children's behavior during other dental procedures, and the results were reviewed and discussed at frequent intervals. An attempt was made to standardize observer ratings and to develop good interjudge agreement by means of this training schedule. All extractions were performed by one dentist, who used the same operatory and a similar approach for each child. The four rating categories, together with the behavioral patterns, were: (1) Definitely negative: Refusal of treatment, overt resistance and hostility, extreme fear, forceful crying, and massive withdrawal or isolation, or both. (2) Slightly negative: Minor negativism or resistance (accessible to treatment technics) and minimal to moderate reserve, fear, nervousness, or crying. (3) Slightly positive: Cautious acceptance of treatment, but with some reluctance, questions, or delaying tactics; moderate willingness to comply with dentist, at times with reservation, and to follow directions. (4) Definitely positive: Good rapport with operator, no sign of fear, interest in procedures, and appropriate verbal contact.

Using the preceding scale, these aspects of the child's response to the extraction experience were rated: (1) Reaction to separation from mother. (2) Reaction to initial exposure to dental environment. (3) Reaction to administration of medication and anesthesia. (4) Reaction to dentist and assistant. (5) Reaction during operation. (6) Postoperative reaction.

Socioeconomic status was determined for all subjects in the experiment by using the Hollingshead two-factor index of social position.<sup>11</sup> This index uses the occupation and education of the head of the household to group families into five classes. Class 1 consists largely of college-educated executives and professionals, and class 5 consists mainly of unskilled manual laborers with grade-school educations. This variable was selected because of the obvious socioeconomic bias

built into most clinic populations.

An index of reliability for observer ratings was calculated from the percentage of agreements between the observers. The index demonstrated a range of 88% to 97%, with a mean figure of 93.2%.

The results of the data presented as four-fold contingency tables were analyzed by chi-square tests corrected for continuity.

### Results

Results of the investigation showed that there was a highly significant relationship between the level of manifest anxiety in the mothers, as measured by their scores on the MAS, and the behavior of their children in the dental situation, as recorded on the behavior rating scale (Table 2). Confirming the major hypothesis of the study, children of mothers with high anxiety scores demonstrated significantly more negative dental behavior than did children of mothers with low anxiety scores ( $\chi^2=24.20$ ,  $p<0.001$ ).

A significant relationship was also found between the mothers' answers to the first three questions on the preoperative questionnaire and their children's behavioral ratings (Table 2), although this was not true of the mothers' ratings of their own anxiety (question 4, Table 1). The mothers' answers to each of the first three individual questions on the preoperative questionnaire also were related to their children's behavior, although not as significantly. The answers to the questions dealing with a mother's predictions of her child's reactions to the procedure and her rating of his level of anxiety were most highly

related to the observed behavior of the child in the dental situation. A lower level of significance was obtained for those answers dealing with the child's previous response to medical and dental procedures. None of the answers to individual questions was as significantly related to the children's ratings as was the total prediction, based on the answers to all three questions. The relationship between the mothers' answers on the preoperative questionnaire and their own anxiety scores also proved to be significant (Table 3). The distribution of this study group into quartiles demonstrates an even greater level of probability for the hypothesized relationship (Table 4).

TABLE 3  
RELATION OF MANIFEST ANXIETY SCALE (MAS) SCORE (MATERNAL) AND PREOPERATIVE QUESTIONNAIRE

Preoperative Questionnaire	MAS Score		Chi Square	P
	High	Low		
Negative	20	11	5.45	<0.02
Positive	9	20		

See footnotes to Table 2.

TABLE 4  
BEHAVIORAL RATING OF THE CHILD AND MATERNAL MANIFEST ANXIETY SCALE (MAS) SCORE IN QUARTILES

Behavior Rating	MAS Score (Quartiles)				Chi Square	P
	0-7	8-13	14-22	23-43		
Negative	3	2	13	13	30.12	<0.001
Positive	12	13	3	1		

TABLE 2  
FACTORS ASSOCIATED WITH BEHAVIORAL RATING OF THE CHILD

Preoperative Measures		Behavior Rating		Chi Square	P
		Negative	Positive		
1. MAS score* (maternal)	High	25	4	24.20	<0.001
	Low	6	25		
2. Preoperative questionnaire†	Negative	24	7	14.97	<0.001
	Positive	7	22		
3. Child's past behavior	Negative	10	2	4.54	<0.05
	Positive	21	27		
4. Child's predicted behavior	Negative	12	1	9.00	<0.01
	Positive	19	28		
5. Child's anxiety	Negative	18	6	7.23	<0.01
	Positive	13	23		

\* High manifest anxiety scale (MAS) score was 15 and over and low MAS score was 14 and under as determined from the normative data of Taylor's original study.<sup>7</sup>

† Based on answers to the first three questions of preoperative questionnaire completed by the mother. Any negative response by the mother (1 or 2) categorized the total response as being negative.

Factors 3, 4 and 5 were the mother's answers to the individual questions on the preoperative questionnaire.

Surprisingly, such factors as sex, age, purpose of visit, and history of previous unpleasant dental and medical experiences were found not to be significantly related to the dental behavior of the children. Neither was any significant difference found between the behavior of those few patients in the current sample who had had previous dental experience and the majority of the group, who were experiencing dental procedures for the first time. Variables such as number of children in the family, order of the child in the family, and socioeconomic class produced individual cells of such small size that statistical analysis was not thought to be useful, and the calculations are not shown. Tabulation of the index of social position of these subjects confirmed the assumption that most of them were from lower socioeconomic backgrounds, but no conclusions could be reached regarding the effect of this variable on the findings.

The ratings of the children's behavior during the six recording periods are shown (Table 5). Negative behavior was recorded when physical discomfort tended to occur most frequently (ie, areas 3 and 5, reaction to medication and anesthesia and reaction during the operation).

**Discussion**

Much of the previous research with the Taylor scale has focused on the difference between those groups scoring in the upper and lower quartiles. Indeed, the present hypothesis originally defined the population in this fashion. That basic maternal attitudes toward life profoundly affect the behavior of the young child has been suggested by a

number of workers in child development.<sup>3,12</sup>

Cramer and Szmyd,<sup>1</sup> working with military patients, suggested that those patients with a history of dental or medical trauma, or at least a recollection of such, tended to react more negatively during oral surgery than did patients without such a history. Although the present results with young children suggested that the level of anxiety in the mother is of greater influence on the child's behavior than are his part dental or medical experiences, it appears reasonable to conclude that these conflicting results in large part are because of the differences in ages of the subjects used in each study. It seems probable that maturation and experience play a greater role in the dental attitudes and behavior of the adult and that the child's behavior and personality are influenced and molded largely by the attitudes and experiences of the individuals in his environment. Thus, the attitudes of children may not be related to their attitudes as adults.

The question of the validity of the mothers' written responses on the MAS and the questionnaire must be acknowledged, and a number of writers have referred to the inherent difficulty of using questionnaires as determinates of anxiety.<sup>9,13</sup> Although there was no way to evaluate the extent to which specific individuals consciously or unconsciously were defensive to such admissions, every attempt was made to encourage free expression of the mothers' feelings.

Perhaps one of the most important contributions of this study may be the development and description of a working experimental model for the study of behavior in

TABLE 5  
RATINGS OF CHILD BEHAVIOR DURING DENTAL EXTRACTION

Behavior Rating*	Observation Period					
	(1) Reaction to Separation	(2) Reaction to Dental Environment	(3) Reaction to Medication and Anesthesia	(4) Behavior Toward Dentist and Assistant	(5) Reaction During Operation	(6) Post-operative Reaction
Definitely Negative (1)	2	2	25	6	16	10
Slightly Negative (2)	17	16	23	23	26	14
Totals	19	18	48	29	42	24
Slightly Positive (3)	35	34	31	41	45	37
Definitely Positive (4)	66	68	41	50	33	59
Totals	101	102	72	91	78	96

\* Two ratings for each period.

the dental setting. Such a model can be utilized in investigations of many pertinent variables, such as premedication, hypnotic suggestion, psychological preparation, and various procedural measures.

### Conclusions

A significant relationship was observed between the behavior of the children in the dental situation and the anxiety level of their mothers (as measured by scores on the MAS). There also was a significant relationship between the children's behavior and their mothers' answers to three questions concerning the child's behavior asked in a brief preoperative questionnaire. Factors of sex, age, purpose of visit, and history of previous unpleasant dental and medical experiences had no demonstrable effect on the children's behavior.

It must be pointed out that the demonstration of a relationship is not evidence of a cause-and-effect situation. Thus, although the data are suggestive, other possibilities must be entertained; eg, the mother's anxiety over the expected misbehavior and discomfort of her child, rather than some generalized chronic condition.

The results of this investigation indicate that, in this sample, maternal anxiety appears to be a major factor affecting the behavior of young children in the dental situation. They likewise suggest the importance of studying the role of other basic maternal attitudes that may affect the response of children to dental procedures. A brief interview or preoperative questionnaire to identify those children most likely to react negatively in a dental situation may be of value. There is some indication that such a preoperative questionnaire could be substituted for a psychological anxiety test in a variety of clinical settings, thus aiding the clinician in predicting and managing the child's behavior.

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