Maternal behaviour and anxiety as related to children’s response to their first dental experience

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MATERNAL BEHAVIOUR AND ANXIETY AS RELATED TO CHILDREN'S RESPONSE TO THEIR FIRST DENTAL EXPERIENCE

BY
Huda Yousif Naoum BDS

A Master's Thesis submitted in partial fulfillment of the requirements for the award of Master of Philosophy of the Loughborough University of Technology.

March 1990

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DEDICATION

To My Husband George
and Our Children
Amar and Dalal
DECLARATION

No portion of the research referred to in this thesis has been submitted in support of an application for another degree or qualification at this or any other university or other institution of learning.
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ABSTRACT

This study was conducted to examine the relationship between the mother's behaviour in the treatment room and her child's behaviour during the initial dental visit. It is hypothesised that mothers who behave in a positive way by providing reassurance and information will have more cooperative children. A scheme for categorising the mothers' behaviour was developed. It consists of six categories that describes the mother as being informative, sympathetic, rewarding, blaming, threatening, or passive. Moreover, two questions were developed and examined for their predictive value of the mother's behaviour. These two questions ask the mother to describe her most likely behaviour in two different everyday life situations where her child might become anxious.

The study further sought to examine the effectiveness of a preappointment procedure on reducing children's behavioural problems. It was hypothesised that a letter of advice sent to the mother a week prior to her child's visit would encourage the mother to behave positively by being informative and reassuring to her child. This, in turn, might lead to better cooperation on the child's part. Several aspects of the mother's anxiety and her perception of her child's first dental visit were also examined in relation to the child's response to such a visit.

Fifty-two children, 30-133 months of age, were included in the study. All children received an examination and prophylaxis. Subjects were divided equally and randomly into a control and experimental group. The same procedure was used for both groups of children, except that mothers of the children in the experimental group received a preappointment letter.

Children's behaviour was assessed using a clinical rating scale and their anxiety was measured by a self-report anxiety test. Mothers were asked to complete a questionnaire which elicited information about the mother's dental and state anxiety and her perception of her child's visit.
The results and the conclusions of the study are as follows:

1- Overall, the mothers' behaviour in the treatment room was not related to the children's behaviour. However, this relationship was significant within subgroups of older children (60-133 months), and working class subjects.

2- The mother's behaviour towards her child on the first dental visit was found to be significantly related to her response to two questions which were examined for their predictive value of the mother's behaviour.

3- The preappointment letter was not effective in reducing children's behavioural problems at their first dental visit.

4- Mothers who believed that their children would be unhappy during the visit had uncooperative children.

5- A six-point scale was devised for categorising the mother's behaviour toward her child in the dental setting. This scale proved to be valid and reliable for use in future research.
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CHAPTER 1: INTRODUCTION

1.1 Introduction to the Study
1.2 Statement of the Problem
1.3 Objectives of the Study
1.1 Introduction to the Study

The child's emotional and behavioural response in the dental chair is a matter of serious concern to both pediatric dentists and researchers. Almost all children are exposed to dental procedures. These experiences are often highly stressful. The pain and discomfort that occur when the child is exposed to noxious stimuli in an unfamiliar environment prompt avoidance and heightened arousal. Furthermore, these reactions are enhanced if separation or inadequate support from parents occur.

Unlike adults, who do not normally show uncooperative behaviour because of social constraints, young children when confronted with the dental situation, are more likely to translate their emotions into negative behaviour. Thus previous literature have considered children's negative behaviour at the dental surgery as the overt manifestation of their anxiety (See Section 2.3.8).

An uncooperative behaviour at the dental surgery may impede efficient delivery of dental care and compromise the quality of treatment provided. Moreover it may presage emerging precipitations of and attitudes toward dental care which affect the subject's later propensity to follow preventive routine and to accept restorative care.

In recent years investigations have attempted to identify the factors that influence child behaviour in the dental situation. Among these factors are the child's age, sex, birth order, social class, past medical and dental experiences, dental attitudes of family members and siblings, and the child's personality and rearing variables.

Many subjective observations have been made about the influence of family members, especially mothers, on the child's response to dental contact. Some have investigated the relationship between maternal anxiety and the child's response to the dental setting. Others have investigated the influence of maternal presence or absence on the child's response. The present study will take a new approach to the
same problem by investigating the influence of the mother's behaviour in the treatment room on the child's response to the first dental contact.
1.2 Statement of the Problem

A controversy exists in the literature and among clinicians regarding the presence of the parent in the dental room during treatment of the child. Some dentists discourage the parent's presence in the treatment area by expressing the belief that parents disrupt the office routine, elicit undesirable behaviour from the child and often project their own anxieties. Others argue against routine exclusion of the parents expressing the belief that some parents have a positive influence on the young child.

The results of controlled investigations have been equally contradictory. One study found a positive effect on younger children due to their mother's presence, while other studies have reported no significant effect due to the mother's presence or absence (See Section 2.6.2.1). Although different studies have employed different methodologies and experimental designs, the discrepancy between research findings could be attributed to one important, yet uncontrolled factor namely, the mother's behaviour towards her child and her effectiveness in moderating the child's stress response to the dental situation. In some studies (Venham 1972, 1979, Venham, Bengston, and Cipes 1978) it was observed that although mothers, when present, were asked to sit passively and quietly, they tended to express several kinds of behaviour that could have affected the child's anxiety and uncooperativeness. Therefore, it seems that the mother's behaviour towards her child could be far more important in determining the child's response than her mere presence or absence. In other words, if the mother is reassuring, helpful, and informative then this sort of behaviour might lessen the child's anxieties and increase cooperativeness. On the other hand, if the mother is to behave in an unfavourable way, for example, to blame or threaten the child then this could lead to more negative response on the child's part.
The present study set out to investigate the influence of the mother's behaviour in the treatment room on the child's response during the first dental appointment. A scheme for categorising the mother's behaviour was developed for this purpose. It contains six categories which describes the mother as being informative, sympathetic, rewarding, blaming, threatening, or passive. According to the author's professional experience and to findings and suggestions of previous literature, the former categories cover the most common behaviours that mothers display during their child's dental visit. It should be mentioned that the study will deal with mothers because it is mostly she who brings the child to the dentist, but it could be the father, grandparent, or any person who is responsible for the child.

Inconsistent findings were also drawn from previous research investigating the relationship between maternal anxiety and the child's behaviour. This could suggest that other more direct variables such as the mother's behaviour during the dental visit, might have a greater effect in determining the child's response to the dental situation. In other words, the mother's behaviour and her communicative strategies during the child's dental visit could be more easily perceived by a young child than her hidden anxieties. Therefore, the present work has attempted to answer the question of whether maternal behaviour or anxiety has a greater influence on the child's behaviour in dental settings. Whereas most previous research in this area has emphasised maternal trait anxiety, this work will consider state and dental anxiety, as a mother could not be chronically anxious in all situations but could have a predisposition to become anxious in certain situations such as the dental setting.

The study further intended to find a way by which the mother's behaviour in the treatment room could be predicted. According to a national survey conducted in 1972 (Association of Pedodontic Diplomates 1972), a large proportion of dentists routinely exclude parents from the treatment room. A more recent one (Cipes and
Miraglia 1985), suggests that this trend in the philosophy of pedodontic practice has been changed. Yet this later survey shows that only 71 percent of the pedodontists generally allow parental presence during the examination visit of three-to-five-year-old patients, and only 55 percent of dentists generally allow parental presence during the same children's treatment visit.

Reviewing the previous literature, it is reasonable to suggest that it is not appropriate for a clinician to adopt a general rule as to either include or exclude all mothers from their child's visit. Some mothers might provide their children with information and different kinds of verbal and physical assurance, while others might express unfavourable attitudes and behaviours that would encourage more negative response on the child's part. It seems that it is more appropriate to decide individual cases separately, and to think of each mother, whether she will be helpful or not to the child if she is to be admitted to the treatment area. Therefore, the present study will examine two questions as to their validity in predicting the mother's behaviour in the treatment room. These two questions ask the mother how she would be most likely to behave in two different everyday life situations in which her child might be anxious. It is assumed that the mother's behaviour toward her child will be the same during different stressful situations whether dental or not (See section 3.6.6).

Previous dental literature have explored several methods of preparing the child and the parent for the dental visit. One of these methods is the use of a letter that is mailed directly to the child or the parent prior to the child's dental visit. This preappointment procedure is a cheap and easy one, yet very little research has been done to investigate its effectiveness. Most of this research found the letter ineffective in improving the child's adjustment to the dental situation, but on the other hand, this method proved to have had a positive effects on mothers by reducing their anxieties and reducing the number of broken appointments (See Section 2.5.4). This could suggest that a
letter of advice could also have a positive effect on modifying the mother's behaviour toward her child during the dental visit and thus improving the child's adjustment to such visit. Unfortunately, this was not examined by previous studies that have employed this method of preparation, and mothers were asked to remain in the reception room during their child's visit.

Therefore, the present study is intended to examine the effectiveness of a letter of advice that is sent to the mother a week prior to the child's visit. It is hoped that such a letter will provide the mother with an elementary understanding of the importance of the child's first dental visit and an explanation on how to prepare the child for such a visit. This approach might lead to more favourable behaviour on the mother's part by encouraging more mothers to behave in a helpful, informative, and reassuring way, thus decreasing the possibility of a negative response on the child's part.

Finally, the present study will examine the relationship between several aspects of the mother's perception of her child's dental visit and the child's response to such visit. The aim is to provide predictors for the child's response to the first dental experience. It has been suggested that maternal perceptions could influence the child's dental response (Venham 1979), but this issue has not been empirically evaluated.
1.3 Objectives of the Study

1- To find the relationship between maternal behaviour in the treatment room and children's response to dental treatment. It was expected that mothers who behave positively by providing information and reassurance will have more cooperative children. In addition, to re-evaluate the relationship between maternal anxiety and the child's behaviour in dental settings, and to find out if the child's behaviour is more highly related to the mother's behaviour than to her anxiety.

2- To develop a way by which the mother's behaviour in the treatment room could be predicted beforehand, thus providing aid to clinicians to decide whether or not to include her in the child's dental visit. Two questions are to be examined as to their predictive value of the mother's behaviour. These two questions ask the mother how she would be most likely to behave in two everyday life situations when her child might become anxious.

3- To evaluate the effectiveness of a preappointment letter on modifying maternal behaviour and improving the children's response during their first dental contact. It is believed that the letter will encourage more mothers to behave in a positive way by providing the child with assurance and information. This sort of behaviour might lead to better adjustment and more cooperation on the child's part.

4- To look for relationships between the children's behaviour and several aspects of the mother's perception of her child's dental visit. The aim is to provide predictors for the child's response to the dental visit. The following aspects of the mother's perception of her child's dental visit are to be examined: if the mother thinks that her child will suffer emotionally or physically during the visit, if she thinks that there is something wrong with the child's teeth, how important is her
presence with the child in the treatment room, and if she had explained to the child what to expect during the visit.

5- To develop a conceptual scheme for rating the mother's behaviour.
CHAPTER 2: REVIEW OF RELATED LITERATURE AND RESEARCH

2.1 Introduction
2.2 The Problem: Dental Anxiety and Uncooperative Behaviour
2.3 Origin and Development of Dental Anxiety
2.4 Assessment of Dental Anxiety in Children
2.5 Methods of Reducing Dental Anxiety in Children
2.6 The Influence of the Mother on Her Child's Anxiety
2.7 Research Hypotheses
2.1 Introduction

It is a common knowledge that most people experience some apprehension on connection with dental care. Thus, in the course of routine clinical practice, dentists frequently treat patients who experience mild to extreme anxiety about dental procedures. In recent years, important new information has emerged on the nature and origin of this anxiety. This information has important implications for the prevention, assessment, and treatment of dental anxiety.

The present chapter will provide a literature survey that would increase our understanding of the problem of dental anxiety and uncooperative behaviour. Dental anxiety varies in intensity from patient to patient. At one end of the continuum are patients who experience no anxiety; at the other end of the continuum are the very anxious patients; there is also a group of phobic patients who have such intense anxiety that they avoid treatment completely. There is little systematically collected information on the proportion of the population that falls into each category (Scott and Hirschman 1982). However, recent research does provide some rough estimates. Thus the prevalence of dental anxiety and uncooperative behaviour as reported by different research on adults and children will be reviewed in this chapter which will also clarify the origin and etiology of dental anxiety and measures of its assessment. In addition, this chapter will provide background information on the methods and techniques applied by practitioners in the management of dental anxiety.

Since the present work is dealing with both mother and child, a special section is provided to review different studies that have investigated the influence of the mother on her child's response to both medical and dental situation. The mother could be seen as both an etiological and a treatment factor that could influence the child's response to the dental experience. This issue will be discussed later in the chapter.

Finally, based on previous dental literature the hypotheses of the present investigation are formulated and discussed.
2.2 The Problem: Dental Anxiety and Uncooperative Behaviour

Fear associated with dental treatment and the rise in anxiety which is occasioned by an impending visit to the dentist are feelings which most people have either experienced personally or observed in others (Tullman, Tullman, Rogers, and Rosen 1979). Dental anxiety is defined as the unpleasant subjective emotions characterised by worry, apprehension, or fear on the one hand, and the observable behaviour, for example, of whining, fighting, crying, or withdrawal on the other hand, which individuals (especially young children) experiences when confronted by the prospect of dental treatment (Wright, Lucas, and McMurray 1980).

Individuals who experience anxiety when visiting the dentist are often unwilling to cooperate during treatment (Shoben and Borland 1954). A study by Robbins (1962) suggests that people even worry more about dental treatment than they do about the condition of their teeth. Fear of dental treatment is a problem not only for the fearful patient but for the dentist as well. Anxious patients often require more time per visit, even for simple procedures. In addition, working with tense, anxious patients can be a source of considerable stress for all members of the dental team.

In recent years much attention has been focused on this issue and behavioural researchers have been making a number of contributions to an understanding of fear and anxiety during routine dental treatment. Several studies demonstrated the prevalence of dental anxiety in society today. Curson and Coplans (1970) found that at least 38 per cent of patients who were attending the emergency clinic in an inner London hospital were too afraid to visit a dentist except in an emergency. Woolgrove, Atkins, and Cumberbatch (1980) reported that 28 per cent of similar sample gave fear of dentistry as their reasons for seeking dental treatment less frequently than they felt they should. Lutch (1971) reported that a large and representative sample of individuals avoided dental treatment because of anxiety.

In regard to distribution by sex, more women reported severe discomfort than male, (19 per cent compared with 10 per cent respectively). A similar ratio occurred regarding severe pain (13 per
cent compared with 8 per cent respectively). (Molin and Seeman 1970).

Fear as a principal reason for dental avoidance was also reported by dentists. A national survey of over 500 practising dentists who responded to a list of problems by checking those encountered in their practices showed that, although dentists consider most of their patients to be pleasant, considerate people who pay their bills, they report encountering problems with about 20 per cent of them. Most of the problems were clearly behavioural in nature and fear was the most frequent reporting problem (87.4%) (Ingersoll, Ingersoll, McCutcheon, and Seime 1979).

Fear is also an important factor in broken or cancelled appointments, a problem reported by over three-quarter of the dentists surveyed. Patients who fail to appear for an appointment disrupt the dentist's time and complicate the scheduling process. (Ingersoll et al 1979).

Therefore, despite research and various treatment techniques dental anxiety still exists in our society and it seems to be the principal deterrent to regular dental treatment. Although the relationship between fear and avoidance of dentistry awaits more satisfactory epidemiological data, it is highly probable that many people avoid dentistry because they are too afraid. People have many dental related fears, these include: fear of the Unknown, fear of the "needle", fear of having a "nerve" removed, fear of losing consciousness, fear of having teeth extracted, fear of having someone working in the mouth (psychosexual significance of the oral cavity), fear from stories read or heard, fear from previous experience, fear of mask (For anesthesia or rubber dam for isolation), fear of dental procedures being painful, and fear of having post-treatment pain (Morse 1977).

Children report dental fear more often than adults (Ingersoll 1982). These fears are in no doubt the major cause of difficulty in treating children in the dental surgery. This was described by Hepworth (1972) who in his structured group discussions with 14 to 18-years-olds found that the fear of visiting the dentist appeared out of all proportion to any of their recollection of actual dental experience. In fact, very few said that they would visit their dentist immediately on
having toothache and 10% said that they would not go at all.

Unlike adults whose fear of dentistry is characterised principally by a level of apprehensiveness which they report and by avoiding dental appointments (Kleinknecht and Bernstein 1979), children attend the dental surgery because their parents make them, if they do not like the experience, they are still often forced to return. Therefore, in children the problem lies with their behaviour at the dentist. Activities such as pushing away the dentist, closing the mouth at an inappropriate time, for example during injection, could considerably affect the quality of the treatment provided and subject a great pressure on the dentist.

Therefore pedodontists and researchers have always been concerned with the child's emotional and behavioural response to dental treatment. The dental literature describes the incidence and etiology of dental fears and different techniques to reduce fear and facilitate coping in the dental settings. Winer (1982) provided a review and analysis for children's fearful behaviour in dental settings. In a clear table, he presented the incidence of children's dental fears that was found in different studies. It showed that the percent of children who received a negative rating varied across different studies. For example, two studies (Hawley, McCorkle, Wittemann, and Ostenberg 1974, Johnson and Baldwin 1968) found that almost half of the children examined exhibited negative behaviour (52%-47%). Few other studies (Johnson and Baldwin 1969, Koenigsberg and Johnson 1972, 1975, Robins, Robins, and Rawson 1973) found that less than half of the sample behaved negatively (42%-32%). And the rest of the studies reviewed (Frankl, Shiere, and Fogels 1962, Ghose, Giddon, Shiere, and Fogels 1969, Johnson and Machen 1973, Oppenheim and Frankle 1971, Howitt and Stricker 1965) found that only a minority of children behaved negatively (24%-15%). Winer also presented the data categorised separately by age. He concluded that, a small number of children were showing negative behaviour, only a minority of children were behaving negatively by 4 or 5 years of age, and there were indications of decrease of negative behaviour between age 3 and 6.

Children's dental anxiety have also shown to decline with age. However this was not found to be consistent in older children. Therefore, Winer stated that the strong age changes occurring in the
early years suggest the possibility of substantial changes in processes underlying the experiencing and the control of fearful behaviour. The decline in children's fear during these early years might be due to a number of factors, including a decline in separation anxiety, increase in general competencies, and development of thought processes. On the other hand, Winer addressed the issue of whether the decline across age represents a decline in experienced fear as much as a decline in the expression of fear. It might be hypothesized that older children are no less basically fearful than younger ones, but merely that they have learned to control the way they exhibit their fear. Sonnenberg and Venham (1977) reported a correlation between age and ratings of behaviour and anxiety, figure drawing, and self-ratings, but no relation between age and physiological measures. They suggest that external manifestations of anxiety may diminish with age, while internal manifestations remain.
2.3 Origin and Development of Dental Anxiety

Despite the improved dental techniques, fear of dentistry still remains a major hurdle to be overcome for the successful management of many dental patients. Previous literature has suggested that the origins of dental fears could be explained by either of three approaches. These are, the trait or disposition approach, the psychoanalytical approach, and the behaviouristic approach.

The trait or disposition approach claims that dental fears are associated with certain trait or specific "type" of personality and that it is not a form of state anxiety that could arise due to situational factors. To better understand this approach it was felt that a short review for the concepts of state and trait anxiety should be provided as this might be helpful for some readers (especially dentists with no psychological background).

The concepts of state and trait anxiety were first introduced by Cattell and Scheier (1961), and have been elaborated by Charles D. Spielberger who in his book *Anxiety, Current Trends in Theory and Research*, stated, "an adequate theory of anxiety must distinguish conceptually and operationally between anxiety as a transitory state and as a relatively stable personality trait" (Spielberger 1972). He conceptualized the state anxiety (A-State) to be a transitory emotional state or condition of the human organism that varies in intensity and fluctuates over time. This condition is characterized by subjective, consciously perceived feelings of tension and apprehension, and activation of the autonomic nervous system. The Level of A-State should be high in circumstances that are perceived by an individual to be threatening, irrespective of the objective danger. A-State intensity should be low in circumstances in which an existing danger is not perceived as threatening.

Trait anxiety (A-Trait) refers to relatively stable individual differences in anxiety proneness, that is to differences in the disposition to perceive a wide range of stimulus situations as dangerous or threatening, and in the tendency to respond to such threats with A-State reactions. A-Trait may also be regarded as reflecting individual differences in the frequency and the intensity with which A-States have
been manifested in the past, and in the probability that such a state will be experienced in the future. Persons who are high in A-Trait tend to perceive a larger number of situations as dangerous or threatening than persons who are low in A-Trait, and to respond to threatening situations with A-State elevation of greater intensity (Spielberger 1972).

Reviewing the dental literature, attempts to uncover the origins of dental fear within the patient's unconscious and to identify personality characteristics associated with fear of dentistry were not successful. Researchers so far have failed to find relationships between dental fear and such personality traits as orality, dependency, trouble with authority figures, neuroticism, or introversion-extroversion (Lautch 1971, Shoben and Borland 1954).

However, these studies did reveal significant differences between fearful and nonfearful patients in reported dental history and in family attitudes toward dentistry. Specifically, fearful patients more frequently reported a history of traumatic dental experiences and unfavorable family attitudes toward dentistry.

It should be mentioned though, that one study on children found a significant relationship between personality factors and the children's ability to tolerate their initial dental stress (Venham, Murray, and Gaulin-Kremer 1979-b). This finding suggests that internal or personality factors could either facilitate or impede the child's adaptation to the dental stress.

It has also been found that anxious patients typically expect more pain than they experience (Lindsay 1984). This could explain the cognitive process involved in anxiety, where some patients remain uncomfortably anxious or unable to visit the dentist despite behavioral interventions for relieving dental anxiety. For such patients, disconfirming experiences do not always modify expectations of future discomfort (Lindsay and Woolgrove 1982). Anxiety may be maintained through the heuristic rules which people use to base their expectations and judgements of events (Tversky and Kahneman 1974). For example, anxious patients may discount a pain-free appointment as atypical and seek ways to generate explanations for the discrepancy between expectations and experience so as to keep their beliefs intact (Clary and Tesser 1983). These views were also shared by Wardle (1982).
Kent (1985-a) confirmed the role of the cognitive process in dental anxiety. He found that both attendance pattern (regular and irregular) and anxiety levels were related to the patient's perceptions of the likelihood of negative events. His results indicate that the cognitive process in dental anxiety is maintained despite repeated free-pain experiences.

The second approach that has been adopted in explaining the origins of dental fears is the psychoanalytical. Psychoanalytical theory has emphasised the importance of the mouth in emotional development as described by Freud (1905). He referred to the mouth in childhood as "an erotogenic zone".

Hoffer, in his early work (published posthumously in 1981) has suggested that infants by putting every thing in mouth, have managed to build up an oral tactile concept of their own body and by this means can regulate to a certain extent, their erotic and aggressive drives.

These views were supported by Schwartz (1971). He explained that the intake of oxygen and nourishment, the quenching of thirst and the discharge of tensions through crying, are obvious psychological concomitants of the psychological needs mediated through the oral cavity. Here are first experienced taste, smell and the special sensitivities involved in swallowing. It has been postulated that cognitive processes begin with the awareness of these inner sensations. It can be seen then that interference with oral activities is, in effect, interference with the infants' contact with the world as they know it. Thus, for a dentist a recognition of orally based anxieties of the patient is fundamental to their management.

The third and more recent approach in explaining dental anxiety is the behaviouristic one which states that dental fears are acquired or conditioned as a result of both environmental and experience factors (Morgan 1940). Some of these factors were explained earlier by Finn, Cheraskin, Volker, Hitchcock, Lazansky, Parfitt, Thomas and Sharry (1957). They described children's dental fear as being either of objective or subjective origin.

**Objective fears**: are those produced by direct stimulation of the sense organs in physical contact with the experience and are generally not of parental origin. They are responses to stimuli that are felt, seen, heard,
smelled, tasted, and are of a disagreeable or unpleasant nature. An example of these fears could be present in a child whose previous contact with the dentist has been very poorly managed so that undue and unnecessary pain has been inflicted.

Objective fears may be associative in nature. For example a child who has been improperly handled or subjected to intense pain in a hospital by persons in white uniforms may develop an intense fear of the sight of similar uniforms on dentists or oral hygienists. The same will apply to the characteristic smell of certain drugs or chemicals previously associated with unpleasantness.

**Subjective fears**: are those based on feelings and attitudes that have been suggested to the child by others about the dental visit without the child’s having experienced the incident personally. For example a child hearing from parents or playmates of the supposed terror of the dental surgery soon accepts it as real and to be avoided if at all possible. Children have fear of the unknown. Any experience that is new and unknown to the child will produce fear until there is a proof that such experience is not harmful.

Dental fears, as suggested by Marks (1978), are not persistently psychologically injurious and early stress experiences may increase the child’s ability to adapt to later stress. The child’s success in learning to manage the anxiety in the dental situation will determine the child’s future pattern for seeking dental care.

In general, the following specific factors have been studied in relation to dental anxiety.

2.3.1 *Age and the Psychological Development of the Child*

The role of age as a contributer to dental anxiety in children has been extensively investigated. Massler (1968) made an effort to characterise the general pattern of child behaviour at different age periods in the dental surgery, stating that children grow in three dimensions: physically, mentally, and emotionally. Behaviour at any one age level is dependent upon the interaction among these three growth areas. If any one growth area is accelerated or retarded the behaviour
pattern is markedly affected. This is especially true when emotional
development is disturbed.

Finn et al (1957) described the child’s behaviour at different age
level as follows:

Infancy (birth to 2 years). Infants are dependent upon their
mother for care and protection, and strongly attached to her. They are
not often brought to the dental surgery. When they come it is usually
for emergency treatment such as injury to the teeth or rampant decay.
But even for simple inspection, the dental environment is strange and
threatening. Thus infants may show an infantile behaviour by burying
themselves within their mother's arms.

Early childhood (2-4 years). The child will appear to be more
confident and independent, but it is not a true independency. In
moments of stress the child quickly reverts to infancy and seeks the
security of the mother. A child at this age seems to be loosely attached
to the mother physically, but in fact is still strongly attached to her
emotionally.

The eruption of the deciduous teeth into the oral cavity begins at
about the sixth month and continues until about two to two and a half
years. Thus the early childhood age is the best for introducing the child
to the dentist, and beginning a programme of preventive dental care.
At this age the child’s first fears associated with dentistry, as described
by Finn et al (1957), are those of the unknown and unexpected. Any
intense or sudden stimulation of the sense organs is fear promoting to
the child for it is unexpected. The noise and vibration of the dental
drill, the pressure exerted in the use of hand instruments in the oral
cavity, suddenly being lowered or being tilted back in the dental chair
without warning, all these may arouse fear. Even the bright lights of the
operating unit, if allowed to shine in the child’s eyes, may be fear
producing. The mother of a child of this age is the source of protection
and security. Therefore, Finn et al suggested that any attempts to
separate the mother from the child at this age should be approached
with caution. These views were also shared by Firestein (1976).

The preschool child (4-5-6 years). At this age, the child’s
behaviour at the dental surgery depends to a great extent upon the
child’s basic personality structure, the family constellation and the
environment in which s/he lives. Thus this age period is characterised by a wide variety of behaviour patterns. It has been reported that at four years of age, the peak of definite fears is reached and from four to six there is a gradual decline in the earliest fears, such as fear of falling, of noise, and of strangers.

In the dental surgery, many factors might initiate fear in the preschool child, for example, the separation from the mother. Roskin and Rabiner (1979) stated that any attempt at separation might provoke a repetition of feeling of helplessness and abandonment the child might have experienced during early childhood. Other factors like strange persons and situations and the sight of unfamiliar dental equipments might also provoke fear (Finn et al 1957).

The five year old may want to be free and separated from the mother, but not too far. Simple procedures are usually accepted at this age. However, when threatened by painful procedures the child reacts violently. Although the tolerance of painful procedures is better than at three years of age, violent reactions will still be exhibited rather than controlled behaviour (Schuster 1951).

School age child (5-9 years). At this age children change as they go to school and learn how to get along with people and to know the roles and regulations of society. In dental settings, the child usually prefers to be alone with the dentist, although this might not be as true for the age of five or six as for age nine. The child at this age has the ability to accept the dentist as an authority and to cooperate, even unwillingly, without force (Massler 1968).

The pre-pubertal child (9-12 years). Children at this age are seldom a problem to the dentist. They have developed considerable emotional control and learned how to control unpleasant situations.

The teenage child (12-18). They are concerned about their appearance, especially girls who would like to be as attractive as possible. This factor can be used by the dentist as motivation for dental attention (Finn et al 1957).

Results of some investigations suggest that positive behaviour increases with age (Frankl et al 1962, Ghose et al 1969, Hawley et al 1974, Neiburger 1978, Oppenheim and Frankl 1971, Venham 1979). There are some other studies that report no difference due to age
(Defee and Himelstein 1969, Johnson and Baldwin 1968, Koenigsberg and Johnson 1972).

Other studies on young children observed a decline in anxiety with age. This decline in anxiety was not consistent with older samples, where although some studies have found a decrease in anxiety with age (Baily, Talbot, and Taylor 1973, Howitt and Stricker 1970), others have reported either an increase in anxiety (Herbertt and Innes 1979, Kleinknecht, Klepac, and Alexander 1973), or found no difference due to age (Howitt 1967, Srp and Kominek 1963).

Although the mechanisms that account for the decline in dental fears are unknown, Winer (1982) in his review of children's dental fears speculated that the anxiety shown in dental situations reflects more general and more basic types of anxiety or fears, such as separation anxiety or perhaps fantasies of bodily harm and invasion. Factors that mediate the decline in more general fears might affect those shown in dental settings.

### 2.3.2 Sex of the Patient

Gender is another factor that has been investigated in relation to dental anxiety. It has been found in most studies of adults that female patients are more dentally anxious and find the dental situation more stressful than their male counterparts (Corah, Gale and Illig 1978, Weisenberg, Kreindler and Schechat 1974). Studies of children have revealed no overall main effect due to the sex (Allan and Hodgson 1968, Frankl et al 1962, Howitt and Stricker 1965, Herbertt and Innes 1979, Johnson and Baldwin 1968; 1969, Oppenheim and Frankl 1971). Only in one interesting study by Kleinknecht et al (1979), in which they employed subjects considerably older than those examined in most other research, they noted that female regarded themselves as more fearful than males. When the sexes are compared with regard to which item of treatment they found most fearful, a significant difference was found with the female subjects being more frightened of the needle and drill than their male counterparts. Winer (1982) suggested that this difference in dental anxiety between male and female subjects of that
particular age group appear to be consistent with the developmental hypothesis that sex differences increase with age because of socialization.

2.3.3 Social Class

Reviewing the dental literature, different studies have discrepant findings in relation to the influence of social class on the fearful behaviour of the young child. Two studies used children from the middle socioeconomic stratum seem to report high level of positive behaviour (Johnson and Machen 1973, Koenigsberg and Johnson 1975). Results from studies employing lower-class subjects are often not that discrepant from those with middle-class children. Moreover, the few studies that have compared social class differences have presented different results. Thus, Frankl et al (1962) report no difference, while social class differences occur in studies by Neiburger (1978) and Wright and Alpern (1971). Winer (1982) in his review of children's fearful behaviour in dental settings concluded that social class has not been consistently related to fearful or anxious behaviour.

2.3.4 Family Attitudes and Peer Groups Influence in Dental Anxiety

Shoben and Borland (1954) in their investigation of dentally anxious adults have shown the importance of unfavorable family attitudes and experiences in determining how an individual will react to dental procedures. Schwartz (1971) supported these views. He stated that, traumatic dental experiences are so potent that they linger on into adulthood and parenthood and can be transmitted, unknowingly, into the next generation. Massler (1968) insisted that the actual emotional environment in which the child grows up is influential in dental anxiety. These same views were expressed earlier by McDermott (1963).

In a descriptive paper, Brand (1976) showed that adults dislikes, antipathy, and fear of the dental situation may serve as a model on
which observing or listening children may base their behaviour. Therefore, through communication and modeling, parents could influence children's dental fear manifestations. Family members in general proved to contribute to the child's response in dental settings, but the mother is considered to be the most important influence (Hagman 1932, Johnson and Baldwin 1968, 1969, Johnson and Machen 1973, Koenigsberg and Johnson 1972, Shoben and Borland 1954, Wright and Alpern 1971, Wright, Alpern, and Leake 1973).

There are other more general ways by which a family may influence a child's behaviour, namely through providing controls and structure through disciplinary techniques and types of quality of home stimulation. Venham et al (1979a) tested the hypothesis that parental characteristics and child-rearing practices are related to the young child's response to dental stress. He examined 26 children, aged 3 to 5 years with no prior dental experience. Data collected during each child's initial examination visit included heart rate and clinical anxiety ratings. Following the dental examination, a trained researcher visited the child's home for a 90 minutes period. Child-rearing measures were collected, which included the inventory of home stimulation (STIM) and the child rearing practices questionnaire (CRPQ). Results confirmed the author's hypothesis. He found that stress tolerance and coping skills seem to be facilitated when 1) the home environment was structured; 2) mothers were responsive and self-assured; and 3) parents set limits and provide ample rewards and punishments.

The influence of peer groups on the child's reaction to dental settings has been the interest of several investigators. It is thought that the child's playmate who has already experienced dentistry could share their impressions with the uninitiated youngster. This was shown by Baly et al (1973), who found more negative experiences among children who had siblings with dental experience. However, Hawley et al (1974) found that the number of siblings accompanying the child to the visit was positively related to cooperative behaviour. Their findings were consistent with those of an earlier study by Ghose, Giddon, Shiire, and Fogels (1969) in which they found that if the child follows or observes older siblings and see that there is nothing to fear from a dental examination, s/he will be more likely to cooperate as well.
Reviewing those different studies, Winer (1982) concluded that the effect of the siblings might vary depending on the type of communication and interaction found among the children.

2.3.5 Traumatic Oral Experiences

Traumatic dental experiences are another important cause of fear of dentistry. In their study of adults, Molin and Seeman (1970) found that 15 out of 19 participants reported specific experiences they felt had either produced or significantly contributed to their fear of dentistry. Also Leutch (1971) in his study on dental phobia found that all the patients in the study group had had a traumatic experience when they first attended the dental surgery. He suggested that this experience remained with them so that whenever reference was made to anything associated with dentistry, whether in thought or reality, it produced vivid images of the traumatic experience accompanied by anxiety.

Schwartz (1971) pointed out that the unpleasant emotional charge created by traumatic dental experiences lingers on in many parents and not infrequently, transmitted to their children, even when a parent has no intention of doing so. These explanations supported Massler’s (1968) earlier views that dental trauma leaves a deep-seated fear within the child which might lead to full-mouth extractions in the young adult.

McDermott (1963) considered that the child’s reaction to the dentist could be partly predetermined by the way in which earlier stressful experiences have been handled. He stated “we cannot expect that a child who has suffered repeated frightening trauma without assistance from those who are older and stronger will be able to view a new situation objectively and comfortably”. His views were later supported by Brand (1978) who suggested that if the child must submit to a hostile and aggressive dentist, then the dental situation will carry a negative affective charge.

However, these views were contradicted by Kent (1985-b) who tested the possibility that patient’s memory for acute pain is
reconstructed over time. He concluded that the accuracy of patient's reports of pain experienced in the past may be suspect and that dental anxiety may be slow to extinguish because the discrepancy between expected and experienced pain felt at one appointment may not be recalled by anxious patients at their next appointment.

On the other hand, some other investigators have described the negative emotional overlay as being associated with a previous traumatic medical or hospital encounter. Exposure to the dental situation (the white coat, the gleaming instruments) may provide sufficient stimulus as to evoke a fear response. Such negative emotional attitude is described by Hobson (1965), as resulting in fear of pain, injury, and the unknown. Jacobs and Nicastro (1978) have cited fear of the unknown as primarily being caused by the strange office and forbidding equipment. Similar views have been expressed by Cecil and Coleman (1966) who stated that "when the child visits the physician or the dentist, two great childhood fears are evoked, one is the fear of the unknown, the other is the fear of injury or pain."

However, children's anxiety and disruptive behaviour is not always a sign of their fear only. As found by Rowland, Lindsey, Winchester, and Zarkowska (1989), some children react with disruption to discomfort. Disruptive behaviour was associated with facial evidence of pain during both "drilling" and oral injection and with the children's reports of discomfort during "drilling". There was no significant association between disruption and the children's ratings of fear. They concluded that disruptive behaviour in children can be evidence of sudden discomfort and need not be evidence of fear alone.

Brown and Smith (1979) took up Brand's view by considering dental anxiety as acquired as a consequence of conditioning. Coriat (1946) has pointed out that fear of the unknown and fear of a past traumatic dental experience are factors that contribute to the resulting anticipatory anxiety in the dental patient. His views were supported later by Swallow (1970) and Gale (1972).

Gochman (1977), from his study of school children found that perceived vulnerability to dental problems was related to a traumatic dental experience. He further suggested that the source of this vulnerability to dental problems arises in the young person's first
encounters with the dentist.

The effect of experience on children's anxiety and behaviour in dental settings have also been studied by Venham, Bengston, and Cipes (1977). They examined the responses of 29 pre-school children, 2 to 5 years old, to their initial and subsequent dental visits, using behavioural, physiological and projective measures. Children's responses were examined over six visits: an examination visit, four visits involving restorative treatment, and a final visit to polish the restorations, clean the teeth, and apply topical fluoride. Results of this study indicated that the response of children became increasingly negative over the first four visits and then became increasingly positive over the fifth and sixth visit. These results indicated that the effect of experience is complex. Experience initially sensitizes the child to the stressful procedure. However with continuing experience the child's response improves indicating desensitization to dental stress. Experience may also reduce the general amount of negative response by allowing the child to accurately distinguish between stressful and non-stressful procedures. In support of these views Bernstein, Kleinknecht, and Alexander (1979) have found that the fear resulting from early dental traumatic experiences could be mitigated by assurance from the dentist. Also Wardle (1982) in her study of adults, provided evidence that anxiety and pain can be mitigated by psychological manoeuvres.

Woolgrove, Atkins and Cumberbatch (1980) found that the most common cause of dental anxiety was due to painful experiences and a fear of the unexpected. They explained that dental anxiety resulted from all previous painful dental experiences. These views have been further supported by Scott and Hirschman (1982) who after their consultation to a phobic child found that the child's phobia appeared to be due to several historical antecedents such as trauma caused by dental treatment and a perceived dental trauma. A patient may not have had real trauma but may have perceived having been traumatized.

Freeman (1983) in her thesis investigating the aetiology of dental anxiety and the dentist-patient relationship, concluded that the consequences of dental traumatic experience are complicated in that they have an initial effect as well as a secondary one. The initial effect was a fear of the dentist. The secondary resulted from that initial fear.
The anticipatory anxiety will be a combination of fear of the unknown, and fear of pain and injury. The traumatic dental experience will influence the patient's attitudes to dental treatment— the treatment evoking the memories and emotions of the previous dental situation.

2.3.6 Medical Experiences

It has been implied by many studies that the quality of medical experience is related to the child’s dental anxiety and behaviour. For example, Bailey et al (1973), have shown that traumatic medical experiences or contacts have a significant relationship with negative dental behaviour and high anxiety scores. These findings were later supported by Sermet's study (1974) in which he examined 100 dentally anxious children, some of whom were categorized as being generally fearful. The largest sub-group of neurotic conditions was anxiety and a third of this group had a specific fear or phobia. Results from comparing the experimental group children to the control, showed that 20% of the anxious children had had traumatic medical experiences compared with 11% of the control group. In addition, mothers were also invited to comment about their children in terms of other disturbances. These disturbances were reported in 65% of the experimental group children compared with 5% from the control group. Sermet has also found that anxious children were shown to have dislike for doctors and hospitals compared with the non-anxious children. Such children, therefore, may well be seeing the dental situation as an extension of their medical experience and their dental anxiety may reflect the anxiety they feel about medical situations generally.

Wright and Alpern (1971) in their study investigating variables influencing children's cooperative behaviour at their first dental visit, have argued that the children's attitude toward physicians and the quality of their relationship with his physician, rather than the frequency of medical experiences, which greatly influence their cooperative behaviour at the first dental visit. These views have been further supported by Shaw (1975). However, in a few other studies
previous medical experience appeared to have no demonstrable effect on the child's dental behaviour.

Martin, Shaw, and Taylor (1977) investigated the influence of prior surgical experience on the child's behaviour at the initial dental visit. Results demonstrated that children with a history of surgical experience manifest more negative behaviour. Additionally, the authors concluded that the parent's assessment of the child's medical experiences and the parental prediction of the child's behaviour are useful in detecting those children who may present a behavioural problem at the initial appointment. However, this last conclusion could be questioned as the correlations obtained were relatively low ones.

2.3.7 Immediate Antecedent of Dental Anxiety

The immediate antecedents of dental anxiety have been classified by Scott and Hirschman (1982) as: patient factors, treatment factors and dentist factors. They stated that the only patient factor that appears related to dental anxiety is the gender of the patient. Some studies have shown that women reported more anxiety than men, but, this difference was not of great clinical significance (Corah, Gale et al 1978, Kleinknecht et al 1973). Studies of children showed no difference in dental anxiety as related to gender (see section 2.3.2).

With respect to treatment factors, the two most anxiety arousing ones are the intra-oral injection and the drill. In a study of children's reactions to dentistry, Howitt and Stricker (1970) compared the heart rate of normal children at various times during their routine dental treatment. They found that children had significantly higher heart rate during the intreoral injection than during drilling. The drilling, in turn, produced a heart rate significantly above the baseline resting period. Finally, the dentist and her or his staff may contribute to the patient's dental anxiety. For example, past interactions with the dentist may continue to influence patient's anxiety levels into the present. In addition the immediate interaction with the dentist can also raise the patient's anxiety. Gale in his study (1972) found that insults or fear of
insults by the dentist is a significant contributing factor to the patient's dental anxiety. In agreement with Gale, Scott and Hirschman (1982) found in their survey of 609 undergraduate students that 10% of the students reported that they would experience terror if the dentist told them that they had bad teeth.

On the other hand, the dentist's behaviour toward the patient could contribute to the patient's dental anxiety. For example, Weinstein, Getz, Ratener, and Domoto (1982) examined the relationship between the dentists' behaviours and the children's responses. They found that providing immediate direction, specific reinforcement and petting and stroking behaviours, all tended to lessen the fear-related behaviours. Surprisingly, reassurance and explanations were ineffectual. Coercion, coaxing, and putdowns tended to be followed by a substantial increase in the fear-related responses by the children.

The setting of dental trauma could contribute to dental anxiety (Schwartz 1971). Swallow Jones, and Morgan (1975) investigated the effect of the environment on a child's behaviour and reaction to dentistry. In their experiment they used three rooms: 1. An interview room which contained two easy chairs and a small nursery type chair, a wash basin and a mirror, and a fitted carpet. 2. The standard surgery which was typical of the isolated surgeries in the dental hospital. It contained a dental unit with a standard kit of hand instruments placed on its bracket table, an operating stool, an office chair provided for the parent, writing area and wash basin. 3. The third room was a modified surgery which was the same as the standard one except that a portable dental unit, a mobile aspirator and wash basin were concealed behind the dental chair by screens. One hundred children were randomly allocated to four groups. For the first group the history was obtained from the child and parent in the interview room, then examination and treatment were carried out in the standard dental surgery. For the second group, the history was taken in the same interview room, but then the child was examined and treated in the modified surgery. For group three, the history, examination, and treatment were undertaken in the standard surgery while for group four the same procedures were undertaken in the modified surgery.
Results showed that children of the second group responded optimally. Therefore Swallow et al concluded that children will behave best if initially they were interviewed away from the surgery and subsequently treated in a surgery in which all the apparatus and instruments are kept out of vision.

Cohen (1973) has also investigated the effect of setting on dental anxiety. In his study he looked at the attire of the dentist in relation to child's dental anxiety. Subjects were 300 children who were invited to look at three sets of photographs of the same male person wearing a shirt and tie, a shirt and tie plus white jacket, and finally a conventional clinical white gown. Children were asked which dentist they would like to choose. From the results Cohen claimed that the study dispelled the notion that children were affected by the dentist attire.

2.3.8 Dental Anxiety as Related to More General Type of Anxiety

Winer (1982) in his analytical review of children's dental fears tried to answer the question of the relationship between anxiety in dental and non-dental settings. This question is important as if a relationship is found between dental anxieties and other type of anxieties or fears, this will lead to the suspicion that dental anxieties represent a more general class of behaviour rather than isolated fear learned in response to specific situations. To test this hypothesis, Winer reviewed a number of studies and finally concluded that although there is much conflicting evidence, there are many findings relating many different manifestations of anxiety the child might have to dental behaviour or dental fear. This lends some support to the hypothesis that dental anxieties are not highly specific.

Therefore, children's dental fears were also suggested to reflect more general and more basic types of anxieties or fears such as separation anxiety, stranger anxiety, or perhaps fantasies of bodily harm and invasion (Winer 1982). These kinds of anxieties could be easily elicited in the dental situation. Children may realize that going to the dentist probably means that they will have to separate from their mothers, at least for a short time. In addition, they will be confronted
with strange persons and strange equipments which might heighten their stranger anxiety. Added to this are fears of the unknown and fears of pain and discomfort.

Therefore, an understanding of children's fears in general might be helpful in understanding children's specific dental fears. Lewis and Rosenblum (1974) in their book *The Origins of Fear* have classified children's fears into five kinds. One type is unlearned and occurs when the organism experiences an intense, sudden and unexpected change in the level of energy reaching the sensory system. Such stimuli probably account for a relatively small percentage of fear responses, particularly as they become increasingly associated with other events over time. Learned fears, in contrast, probably account for a much larger portion of children's fear behaviours. They are usually present when the child remembers or at least associates the previous anxious event with the current one, and when its reaction to the present situation is affected by the past event.

A third kind of fear, which has generated much research, is seen in an infant's negative response to strangers. In this situation the child becomes frightened of new people and shows positive behaviour toward its caregivers. This phenomenon has been considered to be a manifestation of the child's cognitive ability in comparing the various social events (people) to an internal representation of its caregivers.

Violation of expectancy is a fourth type of event that produces fear when infants are unable to assimilate, or make sense of, a change in a familiar stimulus. Fear is particularly likely to occur if the new event cannot be ignored but impinges on the child and causes a loss of control. A fifth kind of fear involves loss of the mother. It is clear that in primates the loss of the primary caregiver increases the probability of death. Thus it is extremely important for the infant to help regulate the physical distance between itself and the mother. This regulation which is performed by both members of the dyad, consists of a wide variety of behaviours. Initially due to the infant's helplessness, the mother is the most active regulator. However she is by no means the only one, through crying, eye contact, and smiling the infant also helps regulate this distance. As the infant matures and is able to both leave and follow, it becomes increasingly capable of assuming a major role in the
regulation. So the mother's departure usually evoke expressions of fear in infants. Not only that but her inaccessibility and/or unresponsiveness may also elicit distress behaviours.

These types of fear are quite different, yet all are characterised by an emotional response that is distinguishable by a negative hedonic quality and some form of avoidance behaviour.

Therefore, fear could lead to avoidance behaviour. This is explained by social learning theory which states that the extinction of a maladaptive response can not take place in the absence of the stimulus that evokes that response (Bandura 1977).

This relationship seems to be best explained in the dental situation when the child's anxiety or fear leads to defensive or uncooperative behaviour. However, reviewing the dental literature there seems to be no clear distinction between the two constructs. To measure the child's response to dental stress, different studies have used various tests that have often been given different labels and thus implicitly defined as reflecting different constructs. Thus on the one hand, there are tests of anxiety versus those that measure cooperativeness or disruptive behaviour. However, it has been suggested that anxiety and cooperative behaviour are frequently interrelated (Melamed and Siegel 1980, Venham 1972, Winer 1982). This statement was based on two facts. On a theoretical level, the behaviours employed in scales of cooperation and anxiety (for example in Venham's behavioural rating scales for anxiety and behaviour) are precisely those that were implied in defining anxiety. In fact Venham’s scale of cooperation and anxiety often measure similar types of behaviours (e.g. crying, verbal protest, bodily movement, reluctancy). On a more empirical level, behavioural ratings of anxiety and cooperation are often highly intercorrelated. For example, Venham and Gaulin-Kramer (1979) found a high correlation (r=0.80) between Venham’s behavioural ratings of clinical anxiety and uncooperative behaviour.

In addition, overt behaviour response have been the most heavily emphasized component of anxiety in the social learning literature (Borkovec, Weerts, and Bernstein 1977). It is explained to reflect either the direct or indirect effect of ongoing physiological activity on
observable behaviour. Assessment of *direct* anxiety focuses on the observable effects of physiological events on behavioural functioning and/or the interference of arousal with performance. *Indirect* assessment involves measures of observable escape and avoidance of anxiety provoking stimuli. However, the previous assumption should not be taken to mean that it is impossible to differentiate cooperation and anxiety either conceptually or empirically.

Melamed and Siegel (1980) stated that fear is a complex phenomenon. It may not be clearly reflected in any one system (self-report, behavioural, physiological). A person may say he is afraid but may fail to show avoidance behaviours or to exhibit visceral arousal in the fear situation. Thus, a three-system approach has been recommended in which somatic indices (heart rate, flushing, sweat, irregular breathing), self-report of anxiety or discomfort, and observations of behaviour or motor acts (fainting, fidgeting) are evaluated.
2.4 Assessment of Dental Anxiety in Children

Over the last few decades, scientific psychologists have come to view anxiety as a shorthand term that refers to a complex and variable pattern of behaviour "... characterized by subjective feelings of apprehension and tension accompanied by or associated with physiological activation", which occurs in response to internal (i.e., cognitive) or external (i.e., environmental) stimuli. Furthermore, it is clear that this complex construct is multidimensional, involving three separate but interacting response components, and that it is therefore measurable by three main channels. The first channel involves overt, *motoric behaviour*, which occurs either as an observable consequence of increased physiological arousal (e.g., trembling or stuttering) or as a means of escape from or avoidance of certain stimuli. The second is the subjective or *self-report* channel, in which an individual may indicate informally (by reporting on current or past cognitions or arousal levels) or formally (i.e., through psychological test scores) the degree of anxiety s/he experiences, either as a role (trait anxiety) or in response to specific situations (state anxiety). The third response channel is that of *physiological arousal*, primarily involving activity of the sympathetic branch of the autonomic nervous system. Persons showing anxiety in this channel display changes in one or more indices such as electrodermal responses, heart rate, blood pressure, blood volume, respiration, muscle tension, pupillary response, and the like (Borkovec et al. 1977).

Anxiety research has highlighted the fact that data from one of the three anxiety response channels often do not correlate well with one from another (This issue will be discussed in section 2.4.5).

The purpose of the present section is to briefly review the various measures of children's dental anxiety. As mentioned above, anxiety is difficult to assess accurately because of its intangible nature (Jacobs and Nicastro 1978, Kleinknecht 1977). This same point has always posed a problem for researchers. One essential component of any pedodontic research programme investigating the child's response to dental treatment is a reliable and well validated tool for assessing that response. In point of fact four types of measures relevant to the
study of children's fears in dental settings have been relatively extensively employed, namely:

2.4.1 Overt Behaviour Measures of Dental Anxiety (or Rating Scales)

The most consistently employed measure of behaviour in dental settings involves analysis of the child's overt behaviour through use of rating scales. The uncooperative child's behaviour is any behaviour that leads to the delay, disruption, or termination of the dental examination or restoration. Several rating scales have been used quite effectively to measure the child's overt behaviour.

2.4.1.1 Frankl scale

This scale was developed by Frankl et al (1962). As can be seen from Appendix H, this scale consists of four categories of behaviour, ranging from definitely negative to definitely positive. In general the child is rated repeatedly in each of several settings. The data produced through use of this scale are generally presented and/or analyzed in two different ways. A few studies (Frankl et al 1962, Koenigsberg and Johnson 1975) present a relatively complete picture of behaviour indicating for each occasion the frequencies of children receiving each rating.

Data could also be employed to assign individual subjects an overall score or designation. One technique employed involves assigning each child a positive or negative rating for the visit. Another way consists of summing the ratings an individual receives on the different measurement occasions (Machen and Johnson 1974). The Frankl scale has also been employed by asking dentists to make an overall judgment of the child's behaviour during the visit (Klorman, Michael, Hilpert and Sveen 1979).

The reliabilities of the Frankl scale are often very high. For example, Frankl et al (1962) in comparing 1,120 different observations by a dentist and two raters, found only 29 disagreements, while others
have reported interobserver reliabilities over 90% (Koenigsberg and Johnson 1975, Machen and Johnson 1974). However there are also potential problems associated with its use, like the problem of the halo or bias effect where, for example, the behaviour of a child in one situation might influence ratings made in other instances. This criticism applies to other behaviour rating scales as well. Moreover, where there have been slight modification of the Frankl scale these might lead to suspicion that categories of the scale are not used consistently by different investigators. The Frankl scale has been considered to be valid and sensitive to conditions designed to change levels of disruptive behaviour.

However, there is evidence that ratings made on the basis of Frankl's categories do not correlate highly with other measures of dental anxiety, such as self-ratings (Klorman et al 1978, 1979). Low correlation between different measures of dental anxiety are frequently reported (see section 2.5.5).

2.4.1.2 Venham scale

Venham (Venham 1972, Venham, Gaulin-Kremer, Munster, Bengston-Audia, and Cohen 1980) have constructed two scales to evaluate the child response to dental treatment, an anxiety scale and an uncooperative behaviour rating scale. Each is a six point scale. In their study (Venham, Bengston, and Cipes 1978) ratings were made during three periods within a visit (mirror and explorer examination, prophylaxis, cavity preparation or flouride application), and responses are averaged for the entire visit. There was a high degree of interobserver agreement on the scale (Venham et al 1980). In another study (Venham, and Gaulin-Kremer 1979) found a high correlation between the measures of clinical anxiety and uncooperative behaviour suggesting that, both scales might be tapping the same underlying variable. This same point receives support from the fact that the measures of anxiety and cooperative behaviour vary similarly across conditions such as age and visit (Venham, Goldstein, Gaulin-Kremer, Peteros, Cohen, and Fairbanks 1981). Both measures of anxiety and
behaviour do not correlate highly with other measures of fear (Venham and Gaulin-Kremer 1979), and this fact is consistent with results from other studies that have examined intercorrelations between measures of stress or anxiety.

2.4.1.3 Behaviour checklist scale

Lindsey (1977) has developed a behavioural checklist for recording the children's behaviour during dental treatment. It consists of eleven disruptive behaviours which are recorded minute by minute. Thus this scale is considered to be much more sensitive to changes in disruption than other scales that would give only a single rating for each assessment period. In addition, it is not so sensitive to expectations of the raters as it counts the activities observed more precisely.

Lindsey (1977) also presented another checklist scale for assessing the clinician's supportive behaviour towards the patient. Both checklist scales are of proven reliability and validity (Lindsey 1977, Lindsey and Roberts 1980, Lindsey and Yates 1985).

2.4.1.4 Melamed behaviour profile rating scale

This instrument has been constructed by Melamed and her colleagues (Melamed, Hawes, Heiby, and Glick 1975, Melamed, Weinstein, Hawes, and Katin-borland 1975). To apply this scale, one records across successive 3-minutes intervals any of twenty seven different types of behaviour that has been weighted for disruptiveness. A total score is obtained indicating the disruptiveness per 3-minutes interval. Using this scale, high inter-rater reliabilities were demonstrated (Melamed, Weinstein et al 1975). Moreover in Melamed's work the tests have proved useful in documenting behaviour changes across conditions designed to alleviate anxiety or noncooperation. Again correlation between the behaviour profile test and other fear measures are often low and/or nonsignificant.
2.4.1.5 Other rating scales

There are several other ways of rating or recording behaviour. Melamed, for instance, had judges merely rate anxiety or cooperation on a 10-point scale. Correlation between different observers' ratings prove to be reasonably high (Melamed, Weinstein et al 1975).

Another way of rating the child's continuous behaviour was developed by Allard and Stokes (1980), who presented a coding system for different behaviours which are recorded in successive 15 seconds intervals throughout the visit. Percent of intervals in which any disruptive behaviour occurred, plotted graphically by 10-minute intervals revealed a continuous picture of disruptive behaviour during treatment. This technique is useful in assessing the effectiveness of behavioural techniques.

Another technique that yields continuous data is the North Carolina Behaviour Rating Scale (NCBRS). In this scale the observable disruptive behaviour was chosen as the focus of observation. Negative behaviour was recorded on a keyboard with labelled keys. By pressing appropriate keys, raters record the duration of negative behaviour and mark rating intervals on time-scaled chart paper. Using this scale the interrater reliability was 83-91% (Chambers, Fields, and Machen 1981, Fields, Machen, Chambers, and Pfefferle 1981).

Finally it should be pointed out that when using any of the previously mentioned behavioural scales one should bear in mind that absence of signs of noncooperation or anxiety does not necessarily signify that the child is not experiencing anxiety. That is, children might feel anxious and show no external sign of distress.

2.4.2 Self-Report Measures Of Dental Anxiety

Self-report instruments designed for the young child are rare due to the necessity of non-verbal measurement and the necessity that the child be able to observe and label the effect presented. One self-report measure was developed by Venham (1972), [see Appendix I] in which the child is presented with pairs of pictures displaying various
emotions, and then asked to pick the picture that best feels like him or her. The total score represent the number of times the child select the most anxious member of each pair. This picture test has been found to be reliable and valid for measuring situational anxiety in children as young as three years old (Venham and Caulin-Kremer 1979). In addition, using the picture test results confirmed earlier suggestions that children's dental anxiety declines with age (Frankl et al 1962, Hawley et al 1974). However, the sex difference was not examined, this might question the validity of the picture test especially on considering the fact that the test portrayed pictures of boys only. Researchers who have used the picture test have recorded a low to modest correlation between performance on the picture test and behavioural ratings of cooperation (Klorman et al 1978, Sonnenberg and Venham 1977, Venham and Caulin-Kremer 1979).

Melamed and her colleagues have employed two self-report scales, one a modification of the Children's Fear Survey Scale to include items of pertinence to the dental setting, and the other a fear thermometer on which children indicate their fear (Melamed, Yurcheson, Fleece, Hutcherson, and Hawes 1978).

2.4.3 Physiological Measures of Dental Anxiety

Changes in activity within the autonomic nervous system often accompany the stressful dental procedure. Several studies have investigated changes in heart rate, muscle tension, basal skin response, skin temperature, and respiration.

The most frequently employed method is that measuring heart or pulse rate. Many investigators reported increases in heart rate at times when increased anxiety was expected (Howitt and Stricker 1965, Myers, Kramer, and Sullivan 1972). Therefore it was suggested that heart rate is useful as a measure of fear or anxiety.

Heart rate has also been correlated with several other measures of behaviour. Myers et al (1972) showed heart rate correlated with mothers' assessment of their children's anxiety. Venham and Caulin-Kremer (1979) found that heart rate scores were correlated with
scores from the projective measure of anxiety, and with a variety of personality and child-rearing variables (Venham, Murray, and Gaulin-Kremer 1979-a, Venham, Murry, and Gaulin-Kremer 1979-b).

Lewis and Law (1958) found that the basal level of heart rate was correlated with the presence or absence of the mother. Melamed et al (1978) found that heart rate could be used successfully as a dependent variable in situations designed to alter the level of anxiety or disruptive behaviour.

Other physiological variables appear to be useful for example the palmar sweat index (PSI) which is a measure of the palmar sweat gland activity, and is obtained by applying a graphite solution to the finger. When this substance dries, it is peeled off and mounted on a slide for microscopic examination. Open sweat spores, which appear as holes in the film, are counted and the total employed as a measure of sweat gland activity. Using this measure, Kleinknecht and Bernstein (1979) found that low-fear subjects adapted to the dental situation over the course of the dental appointment as indicated by a decrease in PSI scores across the appointment. Such a pattern of steady decline was not found among high-fear subjects, suggesting that these subjects do not adapt during the appointment. Melamed et al (1978) found that the palmar sweat index serves as a useful dependent variable to measure decline of fear due to intervention.

Changes in electrical activity of the skin is another physiological measure for dental stress. It can be obtained by attaching electrodes to the fingers with paste. The researcher can measure changes in galvanic skin resistance (GSR) or its converse, galvanic skin conductance (GSC). The degree with which such changes occur is used as an indicator of arousal or fear (Ingersoll 1982). For example, the anesthetic injection is associated with the greatest amount of change in GSR, followed by high-speed drilling then by low-speed drilling (Corah, Bissell, and Illig 1978). Corah (1973) found the galvanic skin response is sensitive to variations in conditions.
2.4.4 Projective Measures of Dental Anxiety

The most frequently employed type of projective tests involves having the child draw a picture, either of a person or of other objects. Several interesting results have occurred in studies using this type of measure. For example, Baldwin (1966) claimed that there was a consistent pattern of constriction in the size of human figure drawings observed in children faced with the threat of oral surgery and that this reflected the stressful nature of dental extraction in children.

Eichenbaum and Dunn (1971) have examined the pictures children drew during dental treatments which he regarded as stressful and anxiety-provoking. The anxious child he saw, omitted certain bodily parts and drew the frightening figures very small.

Sheskin, Klein, and Lowenthal (1982) developed a dental anxiety scale for children, by means of their drawings. They concluded that this dental anxiety scale proved to be a sensitive and simple method for the pedodontist.

Swallow and Sermet (1972) stated that projective measures have been criticised for being unscientific and overt behaviour ones for tending to rely too heavily on scales, therefore they devised the Visual Analogue Scale which they believed that it encompass the good qualities of projective and behavioural measures. The scale mainly consists of 100 mm line drawn horizontally on a page with its boundaries defined as anxiety and non-anxiety. However, this scale lacks the measure of reliability and has not been used in subsequent research.

Research involving dental fears has frequently indicated low correlation between different measures. This issue will be discussed in the following section.

2.4.5 Discrepancies Between Measures of Anxiety

Reviewing the dental literature, only few investigators have bothered to compute correlations between different measures of dental anxiety, despite the fact that the data are often readily available. However, those who studied this issue have found low or/and
non-significant correlations. Performances on different behavioural rating scales do not generally correlate highly with scores from other types of tests such as, those of projective or physiological nature (Kleinknecht and Bernstein 1979, Klorman et al 1978, 1979, Venham, Bengston, and Cipes 1977, Venham and Gaulin-Kremer 1979, Melamed, Weinstein, Hawes, and Katlin-Borland 1975, Melamed, Hawes, Heiby, and Glick 1975, Melamed et al 1978).

The lack of correlation between different measures of anxiety has not been clearly explained in the dental literature. However, low correlation in dental situations are consistent with those found in other studies who have examined both children (Johnson and Melamed, 1979) and adults (Borkovec et al 1977, Lazarus, Averill, and Opton 1970) in non-dental settings. Therefore, explanations to the same problem offered in non-dental situations (discussed shortly) could be applied in the same manner to dental settings. In addition to that, several methodological problems that were encountered in different dental studies could explain the problem. For example, some behavioural rating scales have been slightly modified (such as the Frankl scale), therefore, there is no assurance that categories of the scale are used consistently by different investigators. In addition, using the latter scale, different studies have used different criteria as to interpret the scores.

Also there is the problem of possible undetectable bias and distortion of data in using rating scales. For example the ego-involvement or expectations of the rater could lead to scoring bias.

Other methodological problems on using the self-report anxiety measures could be mentioned, as in some studies (Venham and Gaulin-Kremer 1979, Venham 1979, Klorman et al 1979), the self-report measure were obtained at the outset of the dental visit, therefore reflected the child’s initial response to the situation, whereas other anxiety measures (behavioural ratings or physiological) were obtained throughout the visit which represented an average response to procedures occurring throughout the dental visit. This methodology could itself reduce the correlations between the self-report indicies and the remaining measures.
A final problem is that some studies have used the self-report tests to measure the child's anxiety during treatment visit (that could include restoration or extraction), fear at such visit is often confounded with the pain and physical debilitation that accompany the illness, therefore the measure could have reflected more than just dental anxieties.

The problem of lack of agreement among response indices have been frequently reported in psychological studies. Specifically, measures of cognitive, behavioural, and physiological reactions in learned situations rarely correlate highly with one another (Johnson and melamed 1979, Lazarus et al 1970, Borkovec et al 1977). Two basic approaches to this problem were suggested by Lazarus et al (1970). The first is to view response discrepancies as due to methodological inadequacies such as, uncontrolled extraneous variables, unreliability in measurement, improper statistical analysis, etc. The second approach is to treat response discrepancies as potential source of information concerning the individual's attempt to cope with the environment. This latter approach assumes that each response dimension has its own particular adaptive function. For example, in addition to the communicating subjective experience, verbal report can also dissimulate and can be used to create any kind of social impression the person desires, consciously or unconsciously. The same can be said for motor-behavioural patterns, although not all emotional responses are equally susceptible to modification. Ekman and Friesen (1966) have reported evidence of micromovements in facial expression which pass so rapidly that they may seem to remain unnoticed when the observer reports, but which may inadvertently communicate, for example, contempt or disgust, which were not otherwise evident. Ekman referred to this as "leakage" of information.

Implied in the above argument is that the precise pattern of agreement and disagreement between emotional response indices contains within it information about the kind of transaction which the person is having within himself and with various aspects of the environment. Therefore Lazarus et al (1970) suggested that these kinds of psychological transactions must be carefully distinguished from the many artifacts of measurements which also reduce agreement.
among measures.

These same views were presented by Borkovec et al (1977) who have questioned anxiety data generated through self-report and behavioural measures. They stated that although such data represent a relatively convenient means of data collection and are the most obvious and direct approach to the cognitive component of the anxiety construct, self-report measures are far from perfect indicators. The most serious concern is that the individual's verbal response may not be a valid report of experience or of other behaviours. Because it is a response system under a direct voluntary control, a self-report may function instrumentally to achieve other anticipated consequences for the individual leading to responses that are simply untrue and that depend on the individual’s perception of the assessment situation. Lower degrees of anxiety than actually experienced may be reported if consequences for doing so are positive, whereas spuriously high levels of anxiety may be reported for similar reasons. For example, a male college student may show intense physiological activity and a great deal of overt avoidance behaviour in relation to large dogs but, because he does not wish to appear "foolish" or "unmasculine" he vigorously denies any discomfort. Other factors, such as, habitual response styles, arousal during testing, contrast effects, temporal isolation from or lack of familiarity with the relevant stimulus situations, and inexact or confusing test items may also contribute to the contamination of the self-report data. Factors such as these may play a role in the usually low predictive validity of self-report measures of personality in general and of anxiety scales in particular. One approach of reducing the response bias in self-report measures of anxiety is the use of format that makes it difficult for the subject to determine the meaning of various responses.

Borkovec et al (1977) have also referred to the potential problems that accompany the assessment of arousal through observing the overt motor behaviour. The most fundamental of the problems is establishing the reliability of one's observational system. They recommended that operational definitions must be used in such a way that independent observers can all agree whether various target behaviours did or did not occur. In addition to that, repeated reliability checks are important to assure that observers do not gradually alter
their scoring criteria. Any drift from the established criteria may reduce the overall reliability of the observation system but might not be reflected in the degree of interjudge agreement.

Another problem in observing the direct effects of physiological events is that, because of autonomic response stereotype not every subject's performance will be affected in the same way. Some people may display heavy breathing whereas others show perspiration, trembling, or facial flushing. Therefore, it is recommended that the instrument should include a wide range of scoreable behaviours designed to reflect as many behavioural consequences of autonomic activity as possible. The complexity of the task on which clients performance is being assessed may influence anxiety scores; performance by certain subjects may be poor and/or appear disrupted partly as a function of their lack of familiarity with it. A final problem is that, as was the case in self-report measures, subjects may exert some voluntary control over specific overt behaviours indicative of anxiety. For example, an individual who reports strong anxiety in relation to dentistry and displays clear autonomic arousal in the dentist's chair may show no overt avoidance behaviour because of the anticipated positive consequences of receiving treatment.

In questioning the anxiety data generated through physiological measures Borkovec et al (1977) stated that different threatening stimuli prompt different patterns of physiological responding. It is well established that even simple non-signal stimuli, such as weak tones, lights, and touches, evoke physiological component profiles unique to the stimuli. In addition, many relatively benign situations could provoke considerable physiological activity. Therefore, it must be kept in mind that the threat is not the only dimension that arouse increases or decreases in measures of physiological response. Hence, all assessments of physiological responding in the face of threat must be made relative to responding to stimuli equal to the threat stimuli on all dimensions except that of threat. An example of this approach is, when the physiology that attends snake approach assessed, it should be compared to approach to a neutral animal.

Another problem that encounter the physiological measures of anxiety is that, individuals clearly vary in their emotional responses to
situations, perhaps because they focus on different aspects of any particular situation or because past history of learning leads them to perceive situations differently. Whatever the origin of these individual differences, they are found in physiological assessment as well as in behavioural and cognitive assessments.

Borkovec et al (1977) concluded that different measures of the anxiety responses rarely correlate highly with one another, reflecting the role of individual differences in patterns of anxiety responses and the complexity of the anxiety construct. They suggested that any attempt to measure anxiety must include an awareness of the nature of the specific responses being measured, and valid interpretation of obtained measures assumes proper control of numerous factors not related to anxiety that can influence behaviours assumed to be indicative of anxiety.

In general, the problem of low correlations between measures of anxiety could be interpreted as an indication of the broad scope of human behaviour labelled anxiety. Since different types of measures assess different aspects of anxiety, the use of several measures simultaneously has been advocated.

There are two further limitations to the use of such scales in the measurement of dental anxiety. The first of these is that anxiety and actual pain are possibly confounded by the measures. Dental treatment can result in pain due to variations in the effectiveness of anaesthetics (Kuster and Rakes, 1987) and consequently may influence on some of the measures described independently of anxiety. Secondly, it has to be stressed that not all of the measures discussed in this section actually purport to measure anxiety. Some are measures of disruptive behaviour which need not always be a consequence of anxiety. These factors reduce the validity of the measures as indicators of dental anxiety and consequently may make it more difficult to obtain reliable findings.

In general, the problem of low correlations between measures of anxiety could be interpreted as an indication of the broad scope of human behaviour labelled anxiety. Since different types of measures assess different aspects of anxiety, the use of several measures simultaneously has been advocated.
2.5 Methods of Reducing Dental Anxiety in Children

It has been well documented that some people experience apprehension in connection with dental care. For this reason, behavioural research has recently been making a number of contributions to an understanding of fear and pain during routine dental treatment, and a vast array of interventions have been reported for the treatment of dental anxiety. Among these are:

2.5.1 Pharmacological Management (the Administration of Sedative and Anesthesia)

It is considered as one of the easiest and most successful way of calming patients and allaying their fears. Topical and general anesthesia has been used for many years in dental offices. One of the most popular sedative procedures is relative analgesia which consists of the administration, by the dentist, of nitrous oxide in variable concentration in oxygen to the patient who remains conscious. Relative analgesia may provide a quick, easy, and safe solution to the behaviour management and has been seen as an alternative to general anesthesia in children.

Another sedative measure is the administration of oral diazepam. Although this method have been recommended by many textbooks of pediatric dentistry, there still no clear evidence to support its efficiency in children as dental patients. In a recent study by Lindsay and Yates (1985), diazepam administered either in a single or repeated dose prior to treatment was found no more effective than an inert placebo in helping nervous children to cope with dentistry. They concluded that diazepam can not yet be considered useful for routine use with nervous children.

General anesthesia and intravenous valium are available for patients who are very intolerant of dentistry. Although the risk of serious medical emergency or even fatality is low with them, it is higher than it would be in a patient who remains conscious throughout treatment (British Dental Association 1975). Although it is clear that
these measures will enable a frightened patient to undergo dentistry, they are unlikely to lead to the patient's appreciation of the treatment. While on the other hand, relative analgesia may have rehabilitatory properties because the patient remains conscious throughout treatment (Lindsay and Roberts 1977).

2.5.2 Systematic Desensitization

This is a technique in which the feared stimulus is presented to the patient on graded hierarchies, while the individual is under a state of relaxation. Such a stimulus is the dental experience. Ideally, the individual never experiences anxiety in relation to any hierarchy item because each is a small and easily tolerated step over the one before it, and no new hierarchy item is visualised until the one below it no longer generates anxiety (Bernstein 1977).

2.5.3 Modeling

Modeling or observational learning is the process within which a person observes the behaviours of others, forms an idea of the performance and results of the observed behaviours, and uses those ideas as coded information to guide his future behaviours. It is considered as one of the most effective procedures for teaching a new behaviour to a child (Bandura 1977). During childhood, much of the learning that occurs is based on the individual's imitation of others. Thus observing a model by the child can reduce the amount of time a child needs to learn a particular behaviour (Adelson and Goldfried 1970). There are three forms of modeling: live, symbolic, and covert.

Live modeling involves the direct observation of a live model. It has been demonstrated as being effective in reducing uncooperative dental behaviour (Stokes and Kennedy 1980).

Symbolic modeling involves observing behaviour patterns through films, television, stories and verbal description. It too, has been effective in reducing dental anxiety (Melamed, Hawes et al 1975).
The third form, covert modeling, is a process in which the individual imagines a model engaging in the desired behaviour. It also has been shown to be effective in reducing children's dental fears (Chertock and Bronstein 1979).

All three forms of modeling result in behaviour change principally through its information function (Bandura 1977, Bernstein 1977). During observation modeled behaviours are coded into either images or words which function as guides for subsequent performances.

Although desensitization and/or modeling have proved successful in ameliorating fears, there are still some failures (Sawtell et al 1974, Carter 1995) as well as limitations to the effects (Klorman et al 1980, Melamed et al 1978).

From another view, these methods prove beneficial from a developmental aspect in certain regards. For example, Melamed et al (1978) in their study suggested that the closer in age the subject was to the model, the greater the effect of the modeling condition. Also of interest in this study were some complex interactions between age and film condition. It appeared that a film condition portraying a co-operative patient was more effective than a film in which the dentist merely demonstrated the procedure, but only for older children (8-11yrs). Younger children were apparently not as much affected by a film of a model as they were by a film conveying information.

The effect of desensitization and modeling technique on the previously described relationships between maternal anxiety and child behaviour, has been studied by Johnson and Machen (1978). They found that model learning therapy introduced to preschool children before their first dental visit resulted in more positive behaviour and a change in the relationship between maternal anxiety and the child behaviour. This was not shown with the desensitization technique.

2.5.4 Preparatory Information

Many workers believe that in order to reduce the stressful experience of a medical event such as hospitalization or dental surgery, patients should be prepared beforehand. The rationale is that
preparation will decrease the individual's anticipatory fears and less stress will develop.

Anticipatory fears are not always harmful. Emphasizing the potential positive value of anticipatory fear, Janis (1974) in his book, *Psychological Stress*, stated that the arousal of some degree of anticipatory fear may be one of the necessary conditions for developing inner defenses of the type that can function effectively when the external dangers materialize. He found in many individual case studies, that if a person is given appropriate preparatory communications before being exposed to potentially traumatizing stimuli, the chances of behaving in a disorganised way and of suffering from prolonged sensitization effects may be greatly decreased. Nevertheless, some authors have questioned this type of approach with children, arguing that some children may be more disturbed by attempts at preparation than by the medical procedures themselves (Becker 1972).

Anticipatory fear, in some circumstances, may have a negative effect. According to Bandura (1977) a great deal of human behaviour is activated by events which become threatening through association with painful experiences. A prime function of the most anticipatory behaviours is to provide protection against potential hazards. Some threats activate defensive behaviour because of their predictive rather than their aversive quality. They signal the likelihood of painful outcome unless protective measures are taken. Defensive behaviour, in turn, is maintained by its success in forestalling or reducing the occurrence of aversive events. Once established, defensive behaviour is difficult to eliminate even when the hazard no longer exists. This is because consistent avoidance prevents the organism from learning that the real circumstances have changed. So if apprehensive individuals do not fully trust what they are told, they continue to behave in accordance with their expectations rather than risk the painful consequences, however improbable they may be.

To investigate the effect of anticipation on dental anxiety, Shannon and Isbell (1963) studied the reaction of men to dental injection. They divided their subjects in three groups. In one, they injected sodium chloride; in group two they were informed that an injection will shortly occur and then the needle insertion in the tissue
occurred without an injection. The third group had the needle placed in their mouth but it never touched the tissue. To measure anxiety they estimated the amount of hydrocortisone in the blood. All three experimental conditions produced significant increases in hydrocortisone in the blood. The authors concluded that in dental situations, the anticipation of pain and discomfort accounts largely for the anxiety produced. Therefore, preparation prior to the child's dental visit is a method that has been advocated by many clinicians and researchers.

In pedodontics, preparatory information involve providing the child with information and familiarisation with the dental environment, equipment, procedures and expected sensations prior to examination or treatment. This technique has been proved to be effective in reducing children's dental anxiety (Christen 1972, Rosengarten 1961). However, there still are some failures in their use. For example, Herbert and Innes (1979) investigated the effect of both familiarization and information on the emotional state of the child and on his cooperation during dental procedures. The results showed no significant effect of either of the experimental conditions on the child's anxiety ratings or the ratings of child cooperation. Also Carter (1985) in her study found that young children who viewed a peer modeling videotape do not appear to exhibit significantly less dental anxiety than children who viewed a preparatory information videotape or a control videotape unrelated to dentistry during either a dental examination or a subsequent dental restorative treatment session.

Some investigators have applied other techniques along with preparatory information. For example, Keys, Field, and Korbott (1978) found that combining praise with preparatory information was effective in reducing uncooperative behaviour during dental treatment.

A variety of other studies have manipulated the information the child has prior to treatment. For example; Oppenheim and Frankl (1971) found that being greeted by the dentist or hygienist made little difference in the child's anxiety or behaviour. Yet in another study by Baldwin (1966), it was found that imposing a delay between informing children about an extraction and the operation itself reduced anxiety, at least as measured on a figure drawing task. Presumably the delay
allowed the children to marshal their defences or, perhaps to experience desensitization to the situation.

Providing parents with preparatory information prior to the child's medical or dental experience seem to be advocated by both clinicians and researchers. Most clinicians recognize that there are differences between parents in their abilities to help their child cope with medically related anxieties. Schuster (1951) formalized these ideas by identifying three groups of parents: those who instinctively know how to deal with their children's needs because of their own experiences, those who do not know but profit from written or verbal instructions, and those who, because of their emotional inadequacies, are not able to cope effectively. Therefore Schuster suggested that pediatricians need to recognize these differences in their dealings with parents.

In agreement with their views, Goffeman, Buckman, and Schade in their study (1957) suggested that most parents by themselves seem unable to prepare their children adequately for the experience. They asked 100 children what their parents had told them about why they were coming to hospital. 26% had been told nothing, 22% had been given vague reasons, and 27% obtained their information from overhearing others. Only 25% had been adequately prepared according to the author's criteria. Therefore it has been mostly the responsibility of the medical personnel to provide adequate preparatory information to the child prior to the experience.

However in a study by Heffernan and Azarnoff (1971), on children of one of the pediatric medical out-patient clinics, it was found that communication between parent and the child about a forthcoming clinic visit helped reduce the child's anxiety, if the child had initiated the communication. They also found a high correlation between the mother's and child's anxieties.

In several studies attempts to prepare mothers for their children's hospital stay appear to have led to improvement in the children's emotional and behavioural responses to hospitalization. Mahaffy (1965) studied 43 children aged between two and ten years and their mothers. Children were assigned to a control group, who received standard admission procedures, and an experimental group,
who were helped through admission by a nurse and trained to establish a warm relationship with the mother. There were no differences between the groups on admission. However, during their hospital stay, children in the experimental group showed significantly lower temperature, blood pressure and pulse rate. Seven days after discharge mothers were asked to complete a questionnaire covering items such as disturbed sleep, crying, need to call the doctor and so on. Children in the experimental group appeared to have made a far better and rapid recovery on all dimensions.

Similar conclusions were reached by Skipper and Leonard (1966). Half their sample of 80 patients was assigned to a control condition and experienced routine care. The other half was admitted to hospital by a specially trained nurse, who was attentive to the mother's emotional needs. Mothers in the experimental group reported less stress themselves and this was reflected in improved behaviour of their children over those in control group.

In the dental situation, educating the parents about how to prepare their child prior to the visit seems to be very helpful. It is important that they should not avoid the issue, on the one hand or exaggerate and over-emphasize it on the other. McDermott (1963) discussed some of the problems that could be caused by the parents themselves promoting positive behaviour in their children. For example, some parents show uneasiness about their own dental experiences, and it is always easy for a child to sense the contrast between the parent's comforting words and their uncomfortable manner, as if trying to reassure themselves rather than the youngster. Yet more serious problems can be created by parents who use this opportunity to express their own hostility toward the child, implying that going to the dentist is a form of punishment. In other instances, the parent's preparation for the child is either grossly lacking or misleading. In such cases, the child will arrive at the office surprised and angry, unwilling to trust the dentist, who is a stranger, if the parents have practised deception. The child may see the dentist as a part of a plot or may use the dentist as a target for the feeling of mistrust and anger toward the parents.
In agreement with McDermott's views, Baily, Talbot, and Taylor (1973) suggested that there is a relationship between the child's dental behaviour and the way in which the parents have discussed and explained the dental visit. They found that the child's behaviour was improved when the dental visit was properly discussed by the parent.

In the hope of minimising the problems that parents and their children have at the child's dental visit, clinicians and researchers have explored a variety of methods to prepare the child and parents prior to the visit. Some clinicians have advocated the use of a familiarization visit and exploration for the parents as well as the child to get acquainted with the office environment. Others have used a preappointment letter as a measure of preparation. This was first suggested by Tuma (1954). Since then little has been done to investigate the effectiveness of this method. Rosengarten (1961) in his study, which represents the first objective investigation that attempted to modify child's behaviour, found that mailing an instruction for preparation along with a booklet to be read to the child and a short introductory non-treatment visit prior to the day of the dental appointment is helpful in reducing behaviour problems in younger children group (Thirty-six to fifty-four months). This preparation format had little effect with older children group.

Other investigators (Wright, Alpern, and Leake 1973) reported that material sent home generally informing the parent of the nature of the dental visit appeared to mitigate the parental anxiety but not the children's behaviour. A similar conclusion was drawn from Hawley, McCorkle, Wittemann, and Ostenberg (1974) in which the letter did not significantly influence cooperative behaviour but it had a positive effect on the parents by reducing the number of broken appointments.

Thus it seems that although the letter did not significantly improve the children's behaviour, it had a positive effect on mothers by reducing their anxieties and encouraging a better compliance with the dental appointments. This could suggest that such a letter may also improve the mother's attitudes to the dental situation and therefore encouraging her to behave in a more positive way towards her child during the visit by providing assurance and information. Such positive behaviour on the mother's part could lead to a better adjustment on the
child's part.

However, in the experimental design of the previously mentioned studies mothers were asked to remain in the reception room during her child's visit. It is clear that further research is needed as to evaluate the effectiveness of this preappointment procedure on reducing maternal anxiety and modifying her behaviour, which could lead to a better adjusted child.

Therefore, parents' education and preparation seem to be more important if they are to be allowed to stay with their child during treatment. Venham (1979) in his study investigating the influence of the mother's presence on her child's behaviour in the dental situation, noticed different patterns of mothers' behaviour. Some mothers clearly exhibited behavior that would tend to increase their children's anxiety, while others were supportive to their child. He concluded that the mother's behaviour in the treatment room was an uncontrolled factor that might have influenced the child's response to the dental visit. Yet, this issue remains unresolved as it has not been empirically investigated.

Siegel and Peterson (1980) observed that providing children with sensory information about an impending restorative session was about as effective as a coping skills condition and more effective than a control condition in reducing anxiety, disruptive behaviour, and pulse rate. Treatment effects for both experimental groups were maintained during a second treatment session one week following preparation.

2.5.5 Other Behavioural Techniques

Other behavioural techniques which have been used with adults mostly are coping rehearsal, imaginal desensitization and training in pain tolerance (Klepec 1975, Mathews and Rezin 1977). Those techniques which are best developed with the patient in individual counseling sessions, have shown some striking successes with people who have been avoiding dentistry for years.

Relaxation and hypnosis have also been used as psychological
adjuncts to the use of sedatives and tranquilizers with dentally anxious children. Bernick (1972) suggested that hypnotic techniques can be most helpful with shy, hysterical, fearful and incorrigible children, so long as they can intelligently understand and respond to suggestions given. It is not applicable, in most instances, with children under the age of six and older ones with mental deficiencies. Bernick has also explained the many uses for hypnosis in children's dentistry as; raising the pain threshold; reducing resistance to local anesthesia; assisting in adaptation to orthodontic appliances; reducing the gag impulse while taking impressions and X-rays, and during general operative dentistry; relieving general apprehension; breaking habit patterns for thumb sucking; motivating the child and parents to accept treatment and improve oral hygiene; relaxing facial muscles; controlling saliva and capillary haemorrhage; maintaining the patient's comfort during long procedures; and premedicating for general anesthesia.

The effect of auditory and visual stimulation have been examined. Howitt (1967), studying 138 children aged 8-14 years, found that patient's pain tolerance thresholds were elevated under a white noise condition. However, the increased pain tolerance apparently reflected a placebo effect created by the suggestion that the auditory stimulation would reduce discomfort.

Results of several investigations suggested that physical aspects of the dental environment have an impact also, with certain stimuli enhancing fear or anxiety (Simpson, Ruzicka, and Thomas 1974, Swallow et al 1975). In discussing the importance of the dental environment on the child's anxiety, Jacobs and Nicastro in their article (1978) described the waiting room as the first contact the patient has with the dental environment. Thus the dental office dealing mainly with children should try to make the child feel comfortable. Cheerful surroundings provide a positive atmosphere for dentistry. Thus a brightly coloured reception area with child-size furniture, a brightly colored dental chairs and office walls, X-ray heads decorated with the face of an animal, could all reduce the child's dental anxiety. They further advised that dental personnel should be pleasant, reassuring and understanding, and should try to make the child feel that s/he is the centre of attention. They should wear colourful uniforms and jackets,
because white appearance is very similar to that of physicians and those who work in hospitals.

Also mentioned in the literature is that many patients experience anxiety when they see dental instruments and hear the sound of the drill. Two methods have been suggested to alleviate this problem. One is to place a mobile dental unit where all the instruments are placed behind the patient's chair and thus out of sight, the other is to use a blindfold. The dark cloth covers the eyes and is held with elastic straps. To reduce the stressful sounds in a dental office, earphones with piped-in music can be made available for patients. This helps the patient relax.

Lenchner (1966) investigated the effect of the time spent in the dental environment on the child's anxiety. Results showed that it does not seem to affect children. Other studies involved manipulating the type of communication with children. For example, Corah (1973) allowed the child to use a button to signal (a) that the child was being bothered, or (b) that the dentist should stop. He found that the signaling group experienced less anxiety as measured by the galvanic skin response (but not behavioural measures) than did the control group, but this difference appeared only on the more stressful procedures. With procedures which produced less arousal, the results suggested that the button condition might actually increase anxiety.

Other studies have been reporting impressive results with the use of a minor intervention. For example Neiburger (1978) suggested to children that the dental experience was of a ticklish nature as to make the children laugh. Another experiment by Shapiro (1967) in which he used the technique of a "magic penny" which capitalized on the fantasy of young children. Praising words are also very important for children, as they are susceptible to suggestion and their imagination can be employed for long periods (Jacobs and Nicastro 1978).

Distraction methods have been also used to reduce dental fears in children as well as in adults. For example, Venham, Goldstein, Gaulin-Kremer, Peteros, Cohen, and Fairbanks (1981) conducted research in which fifty-five children ranging in age from two to six years, were studied over a series of four dental visits. Patients in the distraction condition viewed familiar children's television programs.
throughout their dental visits while patients in a control condition had no exposure to this distraction stimulus. The children's response to dental care was assessed using a combination of physiological, behavioural, and self-report measures. There was no evidence that exposure to popular television programmes is effective in modifying young children's responses to dental treatment. The authors recommended further research to explore the effectiveness of distraction techniques which require more active participation of the pedodontic patient.

2.5.6 Some Behavioural Measures Recommended at the Child's First Dental Visit

Going to the dentist for the first time is a pure new experience and an anxiety producing one for the child whether it is unpleasant or not. It may give rise to two great childhood fears; fear of the unknown and fear of injury and pain. In addition, many other factors (explained earlier in section 2.3) could contribute to the child's fear at the first visit. For example, a child may realize that going to the dentist probably means separation from the mother which might be something difficult for a child to do, or it might be due to the fact that dental procedures deals with an important part of the body, namely, the mouth.

For a child who has not been to the dentist before, dental fears could also be acquired either from parents or peer associate. As described by Schwartz (1971), a child playmate who have already experienced dentistry often manifest an ardent desire to share the impressions of the treatment with the uninitiated younger. The vivid parlance in which a playmate describes a session in the dental chair can be very convincing. The same is true of the characteristic references to the 'ordeal' that the young child hears repeatedly in cartoons, movies and comic strips on TV (Sawtell, Simon, and Simeonsson 1974). Unpleasant previous medical experience such as with the pediatrician or the family doctor could also lead to fears of the dental situation. Therefore the first visit to the dentist should be approached with care and concern. Children's emotions at this first visit and how they
interpret and feel about what goes on might well set a pattern for behaviour in a future dental visit. Thus a little care and preparation of the child and parents at this crucial, initial time can have far reaching effects on the child's future dental behaviour.

Achieving a successful initial visit may encourage the child to follow a routine of good dental care throughout life. Offord (1963) also believed that, the better the children cope with a fear-producing situation, the more confident and mature they can feel when faced with other fear-producing situations, such as a subsequent visit to the physician or the first visit at school. He further stated that the initial visit may also provide the child with the first forced separation from mother which is a big developmental step of any human being.

Therefore, it has been always to the best advantage of the dentist and the child that the possibility of negative behaviour on the first visit be minimized and that the visit be as pleasant an experience as possible for the child. To achieve this, dentists have advocated different approaches and attitudes to follow during the child's first dental visit. These approaches has been explained in many articles and books on children's dentistry. For example one of these methods is to send a letter to the mother, before the appointment, stating that the dentist will be primarily concerned during the first visit with getting acquainted with her child and the carrying out of a simple examination. This might deter the parent from discussing with the child all about the pain and discomfort that might be experienced during the visit.

Another approach is to schedule the child's first visit early in the morning when the child, the parent, and probably the dentist will be at their best. Afternoon appointments is not ideal for a child who might be tired, after a day at school, when the attention span may be pretty short (Davies and King 1961, Offord 1963).

Some of the things the receptionist can do is greeting the child in a warm and friendly way, and taking time to talk to and get to know the child. Talking to the parents and ignoring the child, might increase fears and anxiety (Goose and Kurer 1973, Offord 1963). In addition, children should not be kept waiting very long. A long time of anxious anticipation by the child and parents will worsen their dispositions considerably (Davies and King 1961, Goose and Kurer
1973, Holloway, Swallow, and Slack 1969, Offord 1963). One of the useful things dentists can do is to greet the child wearing other than a white coat, especially if they know that the child had had an extremely painful experience with doctors previously. A white coat is usually associated in a child's mind with a doctor.

Most children prefer their mothers to stay with them during their first dental visit. With children under five, it may be advantageous to have the mother be with the child for his entire visit. After one or two visits, separation will probably be less distressing (Offord 1963).

Brown and Smith (1979) insisted that it is important for the dentist as well as the parents to be frank and concise. If pain is involved, the child should be told to expect it, because if a child is told a procedure will not hurt and experience pain, s/he may lose faith in the adult involved and generalize the fear to all similar situations. If, on the other hand, the information given is too detailed, the child may be so tense that pain tolerance is lowered. Therefore the information should be sufficient for the child to have a realistic expectation.

Cecil and Coleman (1986) pointed out the advantage of taking the child to the dentist at an early age for a routine check so the child might get to know the dentist before an emergency develops. Dental instruments and routine procedures may be frightening to the child especially on the first visit. Therefore, most dentists agree that they should be introduced with time taken to explain their use and answer any questions the child might have about them. In this way, the innate curiosity of children could be used here to lessen their fears. Also enough time to relax and sit down should be taken by the dentist in order to talk with and get to know the child on the first visit. It is always preferable to leave restorative treatment for a subsequent visit, while the first visit should be devoted to an introduction and examination only (Davies and King 1961, Goose and Kurer 1973, Offord 1963).
The relationship of the mother and child is the first and undoubtedly one of the most significant kinships the individual experiences in a lifetime (Stuart, Pruch, et al. 1960). The newborn infant is completely helpless, unable to move about, to keep warm, to feed her/himself, and to avoid danger. The infant is entirely dependent on the mother or some other person who takes her place. Other individuals are to be found in the infant's social environment, but they are as a shadowy background to the emerging foreground of the mother figure. The average infant is in continuous contact with the mother. "Fed", "fondled to", "changed", and "carried about" express only a few of these forms of contact. This contact is a constant source of stimulation and in this atmosphere of contact between mother and child, the infant learns to reach out to the surrounding environment and become a social creature. So, what the mother does in caring for an infant is more than simple carrying out a series of acts, she is also communicating something of herself.

Sensitivity on the part of both mother and infant to one another's touch, bodily tensions, and (later) expressions are an important source of communication between them (Watson 1959). Escalona (1953) distinguishes between communication, a purposive attempt to convey information, and contagion, the process by which a feeling state is transmitted from the mother to the infant. A tense and anxious adult may engender crying in an infant who, if shifted to a relaxed adult, may quiet down. Contagion is not entirely subject to voluntary control. A worried parent trying to convey assurance to the infant may find that the infant responds to the parent's actual feeling state and not to what s/he wants the child to feel.

During the early childhood period, the child will show greater functional independence of motor abilities than during infancy, and the child's emotions continue to show the differentiated patterns already established in infancy. These emotions are either the unpleasant, disruptive emotions such as anger and fear or the pleasant, integrative emotions such as elation, affection, and joy. Patterns of parental behaviour expressed in attitudes and home atmosphere have been found
to be related to characteristic behaviour in the children exposed to these patterns (Watson 1959).

In later childhood, great changes take place in various facets of individual development. The physical growth proceeds at a somewhat slower pace than it did in earlier years. Motor skills continue to develop, showing both increase in speed and strength and greater refinement and adaptness (Watson 1959). Fear and anxiety is still very much present in this age range, as has been brought out by the study of England (1946), and a large proportion of those fears persists into adult years (Jerslid and Holmes 1935).

The present section is aimed to provide a review of different studies that have investigated the influence of the mother on her child's anxiety both in medical and dental situations.

2.6.1 Studies in Medical Situations

Almost all children are exposed to medical procedures. Experiences, such as, hospitalization for surgery or outpatient diagnostic procedures are often highly stressful. Such events may predispose an individual to the formation of maladaptive anxiety responses. In some children, these responses are of sufficient duration and intensity to interfere with their future adjustment to medical situations. In addition, these maladaptive anxiety responses may generalize to other settings and people.

The body of psychological research indicates that the mother should be a source of security and so reduce the anxiety of her child (Arsenian 1943, Harlow 1958, Liddell 1954, Rosenthal 1967). Therefore many researchers have investigated the effects of inconsistent mothering and separation from the mother. The overwhelming majority of this research has been based on long term situations. Institutionalized children and those children transported to safer areas of Great Britain during World War Two make up the bulk of the test material.

Sigmund Freud (1943) described the effect of inconsistent mothering and separation from the mother in infancy respectively.
Then this was followed up by many researchers who illustrated dramatically the psychological disturbances produced as the result of maternal deprivation. Among them are Spitz (1945) who described the depressive mental reaction and physical destruction that maternal deprivation produces in infants. Similar findings of later studies by Bakwin (1949) and Bowlby (1960-a) substantially corroborated the findings of Spitz.

However, the concept of maternal deprivation has been criticised by Rutter (1972) who stated that most of the long-term consequences are due to privation or lack of some kind, rather than to any type of loss. Accordingly, he suggested that the 'deprivation' part of the concept is somewhat misleading. The 'maternal' half of the concept was also suggested to be inaccurate in that, with but few exceptions, the deleterious influences concern the care of the child or relationships with people rather than any specific defect of the mother.

Shirley and Poyntz (1941-a) were the first investigators to analyse the behaviour of children who were separated from their mothers for a single day. One hundred and ninety-nine children from ages of two to eight were examined at half-yearly intervals at a public health centre. Examination included orthopedic, pediatric, anthropometric, mental, dental, and roentgenologic surveys which necessitated the child remaining apart from the mother for the entire day. Shirley found that "many children do suffer anxiety at their separation from the mother; some of them more, some of them less, a few of them little or not at all". Their anxiety is attributed partly to the physical immaturity, because it diminishes as they grow older.

Using a similar examining situation Shirley and Poyntz (1941-b) made a qualitative study of the different types of protests made at different age levels. They discovered that the earliest verbalized protest was a call for "mamma" or "daddy" which continues from birth to five but decreases with age, followed shortly by "I wanna go home". Therefore they concluded "...... such protests are perhaps a proof from the lips of the child himself that parents and home are the basis of whatever security he feels".

In (1942) Shirley and Poyntz examined the emotional adjustment of the preschool child to a comprehensive health examination at the
same health centre. The data were collected over a two year period consisting of semi-annual visits of one hundred and eighty one children from age two to six. This schedule enabled the examiner to study the children for a total of four visits. Results of this study demonstrated that children aged two to two and a half years adjusted as well as the median of all ages whereas three -year-olds starting their first visit were less well adjusted in relation to the median. Significantly, the increased maturity of the three -year- olds made them more aware of the demands of the day unlike the two-year-olds who exhibited no reluctance to leave home for the examination. In fact the groups beginning their visits at three or three and a half years maintain a consistently poorer level of adjustment than the median of all ages. Moreover, the fourth year was shown to be an undesirable age for unusual experiences to be initiated. Shirley concluded that "a child's level of adjustment depends little upon the extrinsic features of the day and little even upon the child's health".

In yet another study (Shirley and Poyntz 1945) regarding the emotional responses of children to a health examination, it was demonstrated that the tenseness in anticipation and resistance that was directed towards the examiner or the situation gradually increased from two to four to five years of age and then declined. In using specific verbal protests and in the development of tension and resistance toward the examiner, girls appeared to be about six months ahead of boys in all aspects of maturation up to puberty.

Although age has been shown to be a factor in both of her studies, Shirley concluded that in general, "a child's level of adjustment depends much more upon the wholesomeness of the child's upbringing in the home, and the security, confidence and affection given him by his parents". Three years is considered a most suitable age for the introduction of children to dentistry, but this age is not in concert with optimum age adjustment levels.

For the young child, particularly under age three, the basic concerns appears to center around the fear of separation from the parents, particularly the mother (McDermott 1963). The emotional patterns for these concerns has been best explained by the attachment theory, which perhaps because of its biological basis, has been the most
influential theoretical contribution to the understanding and the practice in medical and nursing professions in relation to the plight of the young child in hospital. The theory has been mainly developed by Bowlby (1969) and is based on the general statement that there is a progression from simple to increasingly complex behavioural patterns as the child ages, behavioural patterns mediated by homeostatic control mechanisms, the general goal of which are biological survival of the organism.

Attachment behaviour is just such a pattern. Its specific goal is the maintenance of a certain set of relationships between the child and the mother which maximises the probability of survival of the child. Two classes of environmental events serve to elicit attachment behaviour in the child: an enforced or accidental disruption of the close proximity of the child and the mother, and the perception of a threat.

Admitting a child to a hospital ward without its mother can be seen as invoking both kind of events. The environmental condition that terminate attachment behaviours are the sound, sight and tactile phenomena of the child's mother.

The observation that the young child may be acutely distressed in hospital can not be disputed. Many authors have recorded such phenomena (Bowlby 1960-b, Eldeston 1943, Robertson 1970). Bowlby (1960-b) and Roberston (1970) have further proposed that three sequential stages characterise the child's response during such separating and traumatic episodes.

The first phase labelled "protest" can last from a few hours to a week or more. The child cries, shakes the cot sides, expresses evident rage, and engages in repeated visual and verbose searches for mother. The next phase, "despair", is characterised by a reduction in physical movement, monotonous crying, and a withdrawal from any social contact. The third stage is "detachment" and is often interpreted in the practical setting as a sign of diminution of distress.

These stages of behaviour were observed on children during separation in hospital. Thus the attachment-theory position predicts that much of the traumatic impact of the hospital experience can be offset by the frequent presence of the child's mother on the ward, if not her permanent residence there (Brown 1979).
Yarrow (1964) has also emphasised the early and continuing importance of the bond between mother and child. His views were shared by Fegin (1964) who found that some children adjusted better to hospitalization with the mother present.

2.6.2 Studies in Dental Situations

In dental situations, the mother could be seen as both an aetiological factor and a treatment factor that could influence the child's dental response. For example, the mother's anxieties and her dental attitudes could be considered as an aetiological factors. While the mother's presence in the treatment room and her behaviour during the visit could be considered as a treatment factors. The following sections will review different views in regard to these issues.

2.6.2.1 Maternal presence and the child's adjustment in dental settings

In dental settings, the effect of the mother's presence in the treatment room on her child's response has been also investigated. A controversy has existed both in the dental literature and among clinicians regarding this subject. For example many clinicians (Besombes 1958, Finn, Cheraskin, Volker, Hitchcock, Lazansky, Parfitt, Thomas, and Sharry 1957, Tuma 1954) associated with dentistry adopt a liberal attitude by expressing the belief that some parents have a positive influence on a young child and they argued against routine exclusion of the parent, while other practitioners (Lemons and Morgan 1952, Morgan 1940, Wolff 1957) have a strong feeling that parents disrupt the office routine, have a deleterious effect on their child's behaviour and often project their own anxiety.

However both philosophies appear to be based on personal clinical experience, and the negative effects described by many clinicians have not been documented. Conversely, several studies of affiliation have demonstrated the stress-reducing effect of the presence
of a familiar person (Amorso and Walters 1969, Kissel 1965, Walters, Marshall, and Shooter 1960), and more direct evidence was provided by Arsenian (1949) and Rosenthal (1967), when they found that the mother's presence had a positive influence on the security and coping behaviour of young children in a stressful situation (the stressful situation used in both studies was an unfamiliar room).

Results of controlled investigations in the dental situation have demonstrated inconsistent findings relating to the effect of the mother's presence in the treatment room on her child's adjustment to the dental setting. Lewis and Law (1958) have tested eighteen children with regard to their psychophysiological reactions to the presence or absence of the parent from the dental room while being administered an oral prophylaxis. The polygraphic technique for measuring heart rate, face and hand temperature, and galvanic skin response was utilized. The authors report, "practically no significant differences were determined in the psychophysiological reactions of the child of this age who had had previous dental experience regardless of whether or not the parent was in the operating room". However, it is necessary to note that these children were dealing with a structured situation, having been exposed to the dentist previously. The children were five and a half to seven years old and the treatment rendered was relatively non-threatening.

Almost similar findings were noted by Frankl et al (1962) who examined children with no previous dental experience. In their study they investigated the child's reactions in the dental office to separation and non-separation from the mother. The subjects were one hundred and twelve children (Negro and Caucasian), three and a half to five and a half years of age. They were from low and middle socioeconomic backgrounds, and had no previous dental experience. The children were divided into two groups. Those in one group were separated from their mother during dental treatment, while children in the other group were not. When present the mother sat in clear view of the child with instructions to be a passive observer. The children in the two groups were paired and matched according to age, sex, race, and socioeconomic background. Each child received two appointments. The first visit consisted of an examination, prophylaxis, and X-rays. The
second involved the administration of local anesthesia and restorative procedures. The behavior of the child was rated on five specified points during the dental procedure for both visits. The child's reactions were recorded by the dentist and two observers using a four point scale (Frankl Scale). The possible ratings were definitely negative, negative, positive, and definitely positive. In determining the final rating for a child, the scale was collapsed to positive and negative. If the child received five or more positive ratings for the ten procedures, the child's final rating was positive.

Results of this study showed that when the mother was present with the child in the treatment room this yielded more positive responses by the pre-school child (41-49 months). Older children (50-60 months) displayed an equal frequency of positive responses with their mother present or absent. Race, sex, socioeconomic background, and attendance in nursery school did not appear to affect the subject's response to dental care. The authors concluded that mothers could be considered a valuable aid in establishing rapport between child and dentist.

In yet another study regarding the influence of the mother's presence or absence in the treatment room a videotape recorder was used by Allen and Evans (1968) to record the behavior of the child to the dental situation. The subjects were twenty-two children, three through seven years of age, and their mothers. The mother's attitude toward twenty concepts related to dentistry was assessed using a semantic differential questionnaire. Each concept was rated on a 7-point scale, the extremes of which are labeled with bipolar objectives. Each child was given two eight minute sessions in which his/her teeth were cleaned. The mother was present for the first session for half the children. Sessions were viewed by two raters who rated each minute on a three point scale. Cooperativeness was judged by observing the reactions of the child to commands given by the dentist. No significant difference was found in cooperativeness between the mother present and the mother absent situation. No relationship was found between the mother's attitude toward dentistry and the child's level of cooperativeness. However, it is necessary to note that these children were dealing with a structured situation, having being exposed to the
dentist previously. In addition the results could be questioned by the fact that the investigation have employed a small number of patients and the criteria used for rating the child's behaviour were not specifically defined and the treatment rendered was relatively non-threatening. The authors found the videotape a very satisfactory tool for recording behaviour in their study.

Again, to answer the question as to whether the mother should remain with the child during treatment, Cecil and Coleman (1966) believe that if the mother is not unduly anxious her presence is helpful but they emphasise the importance of maternal anxiety in the development of dental anxiety.

In an attempt to examine the consequences of leaving the decision of parent-child separation to the parent and the child, Venham, Bengston, and Cipes (1978) conducted a study in which they selected sixty-four preschool children, thirty boys and thirty-four girls, with no previous dental experience. Subjects ranged from two to five years old. The children received an initial examination visit, a series of treatment visits, and a final visit to polish restorations. The child's response to each visit was assessed, using a combination of five measures; heart rate, basal skin response (BSR), rating of clinical anxiety and cooperative behaviour (Venham, Gaulin-Kremer, Munster, Bengston-Audia, and Cohen 1980) and the picture test which is a self-report anxiety measure. The parents presence or absence in the treatment room was neither encouraged nor discouraged and the decision was left to the parent and the child.

Results of this study indicated that, given the option, most parents and children initially preferred to remain together during the child's dental visit. Although the percentage dropped as the series of dental visits continued, nearly half of the parents and children continue to prefer to remain together through the last visit. Although parents and children were free to choose, parent's presence was not associated with a more negative response by the children.

During the following year, Venham (1979) in a two part clinical study, examined the effect of the mother's presence or absence on the child's response to dental treatment. Eighty-nine children took part completing a combination of physiological, behavioural, and self-report
measures to assess their response to dental stress. Results showed that the child's anxiety was unrelated to the mother's presence. However younger children were significantly more anxious than older ones. He stated that the lack of a significant effect related to the mother's presence may be misleading as several other factors were not controlled such as the mother's attitudes toward dentistry, the mother's feelings and perceptions about her child's experience, and the mother-child relationship. Moreover he pointed out the influence of the mother's behaviour in the treatment room on her child. He observed that some children clearly received strong support and security from their mother's presence. A child may grasp the mother's hand. This contact provides the child with the security needed to cope with stressful situations. On the other hand, some mothers clearly exhibited behaviour that would tend to increase the child's anxiety. For example, some expressed openly their fear of the dentist and specific dental procedures in front of their children while others displayed exaggerated facial signs of fear and emitted sounds associated with fear and anxiety, all in full view of their children. Unfortunately, these were only reported observations which have not been studied in a controlled way.

In the second part of this study the effect of experience of dental treatment, age, and sex of the child were studied in relation to the mother's presence and child anxiety and behaviour during sequential dental visits. A negative effect of sequential dental visits has been shown. Following a treatment visit, children anticipate a more stressful experience, develop greater anxiety and display greater resistance to demand for compliance. This visit effect was strongest for younger children. The significant age-effect found in this study suggest older children were less affected by the stress of the dental situation than the younger children, and were more susceptible to social stimuli. Older children were generally more cooperative and less anxious. In addition, an increase in cooperative behaviour occurred in the mother's presence. These results suggests that when the dental situation is perceived as less threatening, other factors, such as the mother's presence, may exert a greater influence on the child's response.
In conclusion, the lack of consistent results among studies may be due to methodological differences, such as, age, clinical procedures involved, the amount and type of previous experience and the methods used to measure the child's response. However, a very important, yet uncontrolled factor namely, 'the mother's behaviour, could have led to this discrepancy in findings. In these studies, although mothers were asked to sit quietly and passively, they might have expressed some behaviours (as observed by Venham 1972, 1979, Venham, Bengston, and Cipes 1978) that had influenced their child's anxiety and behaviour. This issue remained unresolved as there is no previous studies that have investigated the influence of the mother's behaviour towards her child in moderating the child's stress response.
2.6.2.2 Maternal anxiety and the child's adjustment in dental settings

Other investigators have studied the effect of the mother on her child from a different angle. They were concerned with the effect of the mother's anxiety on her child's behaviour and anxiety. For example Hagman (1932) claimed that children tend to have fears similar to those of their mothers and that these fears may be acquired through imitation learning and behaviour modeling. Presumably much of this learning which is both physical and emotional in character takes place within the context of the home, where through the intimate network of family interaction the child's personality and response patterns are shaped. Many of the child's fears are also learned there, which may and do include dental fears.

Similar findings were found in a study conducted by Shoben and Borland (1954) in which a number of hypotheses were tested, which were thought to be related to dental fears. These included pain tolerance, previous traumatic medical experiences, facial injuries, personality factors and family background and attitudes towards dental work. Surprisingly, the hypotheses in relation to pain and trauma were not borne out and the two hypotheses that emerged with fairly convincing conclusiveness were those relating to family background and family attitudes toward dental work. The following conclusion was drawn; fearful dental patients come from families in which unfavorable attitudes toward dental work are typically expressed and from families whose experience has been unfavorable.

What is of significance is that dental fears may be learned outside the context of the dental situation and specifically in the home. Clearly, a child's responses may be determined by family members in general, but the influence of the mother in particular is considered to be the strongest.

Many other clinical investigations have been undertaken in order to test this influence. For example, Johnson and Baldwin (1968) found
a significant relationship between the behaviour of children undergoing a dental extraction and the anxiety level of their mothers. The subjects were sixty children, three through seven years old, and their mothers. Using the behavioural rating scale developed by Frankl (1962), the child's behaviour was observed and rated at six intervals during the visit. These intervals were the child's reaction to separation from mother, to initial exposure to the dental environment, to administration of anesthesia and medication, to the dentist and assistant, and the child's reaction during and after the operation. Mothers were requested to complete a brief history form, a short questionnaire, and the MAS (Taylor's Manifest Anxiety Scale, one of the most widely known tests for measuring trait anxiety, developed in 1953 by J.A. Taylor).

Results of the investigation showed a highly significant relationship between the level of manifest anxiety in the mothers and the behaviour of their children in the dental situation. Also there was a significant relationship between the children's behaviour and their mothers' answers to questions concerning the child's past and expected behaviour, but not with the mother's ratings of her own anxieties. Sex, age, purpose of visit, and history of previous unpleasant dental and medical experiences were not related to the children's behaviour. Johnson and Baldwin (1968) concluded that maternal anxiety is a major factor affecting the behaviour of young children in the dental situation.

In order to establish that the relationship between maternal anxiety and the child's behaviour is not specific to the stressful surgical procedure itself, Johnson and Baldwin (1969) studied a second group of patients receiving a simple dental examination. Sixty-seven children (three through seven years of age), and their mothers served as subjects. The procedure followed was the same as used in their previous study. The findings confirmed the results of the previous investigation.

Johnson and Baldwin's findings were also supported in a later study by Wright and Alpern (1971) in which they arranged for two independent observers to rate the behaviour of sixty-two children,
three to six years of age at four predetermined intervals, and on the occasion of their first visit to the dentist. Mothers were asked to provide basic information by completing a questionnaire. The authors established a highly significant relationship between maternal anxiety, as measured by the MAS, and the child's behaviour. Moreover it was found that the subject's awareness of dental problem, the quality of past medical experience, and the child's attitude toward physicians had an influence on the child's behaviour.

Then an attempt was made by Koenigsberg and Johnson (1972) to investigate the previously found relationship in treatment that involves more than one appointment. In other words, they wanted to determine the possible effect of sequential dental visits and generalized or chronic anxiety of the mother on the behaviour of young children with no previous dental experience. They selected eighty-six children, three to seven years old, who underwent an oral examination on their initial dental visit, and a restorative treatment on their second and third visit. Mothers were administered a brief history form, a short questionnaire and the MAS. The history form was an attempt to learn something about the child's past medical experience and the family environment. The questionnaire was designed to secure the mother's evaluation of her child's behaviour and reactions, past and present, in the medical or dental settings. The MAS was used to assess the level of manifest anxiety in the mother. Using Frankl behavioural rating scale, the child's behaviour was observed and rated at six intervals, before, during, and after three sequential dental visits.

Results showed that on the first visit there was a highly significant relationship between the mother's manifest anxiety as measured by the MAS, and the behaviour ratings of their children. This relationship was not demonstrated for the second and third visit, during which restorative procedures were performed. Items from the history interview, such as sex, age, number of children in the family, order of the child in the family, purpose of visit, history of nursery school attendance, age of mother and father, history of unpleasant
medical experience, and mother's evaluation of her own anxiety were not related significantly to the dental behaviour of children.

In another study by Robins, et al (1973) the effect of the mother's state anxiety on the behavioural response of young children to dental procedures was investigated. In their study they asked the mothers of thirty children, ages three to seven, to complete a preoperative questionnaire and a short anxiety test (the Spielberger "State" Anxiety Inventory). By using this test they measured the state anxiety level of the mothers, i.e., her disposition to become anxious in certain situations and not her chronic anxiousness in all situations. The Frankh behavioural scale was used by the dentist to rate the child's behaviour during the dental visit. Mothers were asked to complete the preoperative questionnaire which was designed to obtain the child's sex, birth order, socioeconomic status, whether or not this was the child's first dental visit, the mother's evaluation to her child's past and present reaction to the dental situation and her evaluation of her anxiety and that of her child. Results yield a significant relationship between the mother's anxieties and the behavioural response of young children. They concluded that it may be necessary and helpful to deal with the mother before treatment on the child begins. Moreover, they recommended that the child's behaviour can be predicted from the state anxiety of the mother. This conclusion could be criticized by the fact that the study has employed a small sample and the relationships obtained were somewhat low.

Baily, Talbot, and Taylor (1973) studied the relationship between maternal anxiety levels and anxiety level manifested in the child dental patient in an older sample. For their study they selected eighty subjects, thirty-eight males and forty-two females, with ages ranging from nine to twelve years. For many of the patients, this was their first dental visit. Patients and their parents were given a questionnaire form, Taylor (MAS), and child manifest anxiety scale (CMAS, the children's form of the Manifest Anxiety Scale) with instruction for their completion. After completing the questionnaire the child's behaviour
was evaluated using Frankl scale. Results showed that the child’s manifest anxiety score was highly and significantly related to the maternal anxiety score. And the child’s dental behaviour was related to the maternal assessment of the child’s anxiety level and behaviour. However, there was no significant relationship between the dental behaviour rating and the mother and child MAS scores. The absence of a significant relationship could be due to numerous reasons. For example, the behavioural ratings were made once for the duration of the visit whereas in earlier studies a rating was made at selected intervals during the visit. In addition, earlier studies have utilized much younger children. This could suggest that older children are less influenced by their mothers' anxieties, in addition, they might not express their own anxieties in term of behavioural disorders due to social constraints.

In an attempt to assess the maternal influence on experienced pedodontic patients, Klorman et al (1978) examined two groups of children with prior dental experience. The first group went through various dental procedures including appliance checks, fluoride treatments, restorations and extractions. For the second group, each had a restoration completed and were assessed while under treatment for the procedure they had undergone in the past. Prior to treatment, all children were interviewed and rated their dental and state anxiety while the mothers completed different anxiety scales (for some of which no details were given) and a questionnaire form which contained items dealing with child’s prior exposure to medical and dental interventions. In addition, they were asked to rate their child’s and their own state anxiety. Using Frankl behaviour rating scale, all children were rated for their co-operation during the treatment.

The authors stated that the results confirmed the predictive validity of knowledge of a child’s prior exposure to medical and dental intervention. However, this statement could be questioned as the correlations obtained between the child’s behaviour and the past medical and dental experience were only modest and low ones. The authors also felt that there is a need to re-evaluate the hypothesis that
children's dental anxiety is acquired through imitation of their mothers' attitudes or by direct maternal reinforcement of such fears. A hypothesis that could be true on the occasion of the first visit to the dentist, when the child might be influenced primarily by the mother's attitudes. But the behaviour during future sessions would be guided to a greater extent by prior dental experience.

However, two later studies (Klorman et al 1979, Melamed et al 1978) have found this relationship between the mother's anxiety and the child's behavioural response to be absent even on the child's first dental visit.

Different findings were found by Shaw (1975) in his study investigating the part that parental dental experiences play in the cause of the child's dental anxiety. One hundred dentally anxious and non-anxious children and their mothers were interviewed. The results supported previously held views on the influence of the mother. More mothers of anxious children reported to be frightened of dental treatment than those of the control group. They remembered being anxious about dental treatment as children. The prevalence of dental extractions was high in both groups of mothers but general anesthesia had been used more for the anxious than control group.

A different approach to the problem of parental influence on the child in stressful situation was taken by many other workers who were concerned with the positive effect on the child which might result from a reduction in the stress experienced by the mother. For example Skipper and Leonard (1968) studied eighty children, three through nine years old, admitted to the hospital for tonsillectomy and having no previous hospital experience. The experimental variable was the communication of information and emotional support given to the mothers of the experimental group by a special nurse. The dependent variable was the behaviour of the children. This information was gathered from charts and records, observation by nurses, and the questionnaire completed by the mother eight days after discharge.
The results demonstrated the effectiveness of the procedure in reducing the mother’s level of anxiety in the experimental group. The data supported the hypothesis that lowering her stress will result in less stress for the child. The experimental group experienced less ill effects from the operation and hospitalization and made a more rapid recovery. They also displayed less social and psychological problems in a short period after returning home from the hospital.

In Pinkham and Fields study (1976) another preparatory procedure was tested, which was a visit to the reception room by the mother and the child a week prior to the dental visit. They found that this procedure was effective in reducing maternal anxieties but still did not modify the child’s behaviour. The same preparatory procedure along with mailing an instruction for preparation and an educational booklet to be read to the child, was used by Rosengarten (1961). He found that these three preappointment procedures had a significant effect in reducing behavioural problems in younger group children (thirty-six to fifty-four months).

Other experimental studies have used a preappointment letter as a single preparatory method. Wright, Alpern, and Leake (1973) were able, in their study, to demonstrate that a letter, containing brief explanation of the procedure to be used at the first appointment and an expression of the dentist’s concern for the child’s welfare, decreased the mother’s manifest anxieties. In this study, however, no significant difference was found between the behaviour of the children whose parents received the preoperative letter and those who did not.

Almost similar findings were found in a study by Hawley, McCorkle, Wittemann, and Ostenberg (1974), in which forty-seven children were selected all with no previous dental experience. They were divided into an experimental and a control group. Those in the control group were mailed the standard appointment postcard, while those of the experimental group were mailed a letter and an appointment slip. It was found that the preappointment letter did not significantly influence cooperative behaviour but it had a positive effect
on the parents in that there were significantly fewer broken appointments in the experimental group than in the control group.

Thus it seems that the preappointment letter when used as a single preparatory method, did not influence cooperative behaviour in children. However, it did have a positive effect on the mothers, either by reducing their anxieties (Wright et al 1973), or by reducing the number of broken appointments (Hawley et al 1974). Both of these studies suggested the need for further investigation as to explore the effectiveness of this preappointment procedure.

In conclusion, it seems that the relationship between maternal anxiety and child behaviour is a fragile one. The tendency for more anxious mothers to have less cooperative children has been shown to occur on initial visits only and to disappear on later ones (Koenigsberg and Johnson 1972). Studies examining younger children (Wright and Alpern 1971, Wright et al 1973) seem to report more evidence of this correlation than investigations of older subjects (Klorman, Ratner, Arata, King, and Sveen 1978, Klorman, Michael, Hilpert, and Sveen 1979). In addition, this relationship between maternal anxiety and children cooperativeness was found to be non-significant among experienced pedodontic patients (Klorman et al 1978, 1979, Melamed, Yurcheson, Fleece, Hutcherson, and Hawes 1978). The latter two studies have found this relationship to be absent even on the child’s initial dental experience. Other experimental studies have found that the relationship between maternal anxiety and children’s behaviour could be easily disrupted by simple experimental interventions (Johnson and Machen 1973, Pinkham and Fields 1976, Wright et al 1973). It could be concluded that evidence on this relationship is inconclusive and it is clearly need to be re-examined.
2.6.2.3 The mother-child relationship and the child's adjustment in dental settings

It has been pointed out in several previous studies that, the child's dental fears may be learned outside the context of the dental situations and specifically in the home. Family members, in general, may determine the child's responses but the parent-to-child relationships are the most intimate and hence the most potent in determining the emotional behaviour of the child under stressful situations. The mother effect, in particular, is considered to be strong (Hegman 1932, Johnson and Baldwin 1968, 1969, Johnson and Machen 1973, Koenigsberg and Johnson 1972, Shoben and Borland 1954, Wright and Alpern 1971, Wright et al 1973).

Finn et al (1957) have described a number and variety of emotional factors manifest in parent-to-child attitudes such as affection, hostility, rivalry, dependency, and domination. These emotional variations can modify the individual child's personality. If parental attitudes are negative, the children's behaviour may be so altered as to make them an unsatisfactory dental patient. On the other hand, if parents have healthy attitudes toward their children, the children will be properly reared, well behaved, and generally good dental patients. The parental attitudes therefore can determine whether a child will be amenable or hostile, cooperative or rebellious. In most cases, the child's behaviour in the dental office is an excellent indicator of the parent's attitudes toward him/her.

Brand (1976) described the complex nature of the child-mother relationship. He stated that this relationship is characterised by its unequal status and asymmetrical power structure and dependence. Its uniqueness depends largely on the personality traits and behaviour of the mother. It is she who directs, manipulates, influences and instigates rewards and punishments. Although behaviour patterns of both mother and child are reciprocal and the influence of one upon the other is bilateral, emphasis is placed on the mother for it is she by her
position of power and dominance who is considered to be the psychologically more important partner in the relationship. It is her personality and enactment of the maternal role that will ultimately determine the form and structure of the relationship with her child.

Finn et al (1957) have described some of the extremes of maternal behaviour toward the child such as, overprotection, rejection, overanxiety, and overauthority. They also explained that children of the same family might have different attitudes which are formed primarily by the parents. This will vary depending on the number of children in the family and the birth order of each child. For example, the last born child has the most difficulty with parental attitudes. The oldest child, on the other hand, is born in a command position, for, although the parents may lack the knowledge learned from previous experience, they have the enthusiasm and youthful endurance sometimes necessary for administering proper and just discipline. Therefore the oldest child often expresses conservative and moderate behaviour while the youngest child, if born some years after the others, has a tendency to be spoiled by the parents or older siblings. This seem to be contradictory to the finding of Defee and Himelstein (1969) in which they showed that first born and only children (5-10 yrs) had more fears than children who were born later, suggesting that the presence of an older model might reduce anxiety, or that parents become more self-assured with practice.

Finn et al have also stated that parental behaviour in the dental office and the quality of the relationship to her child might have a great effect on the child's behaviour. Although there are times when the mere presence of a parent instills confidence in a child, they advised that the parent should assume her role of a passive guest if she is to be allowed to accompany her child to the treatment room.

Venham (1972) in his study on the influence of the parents presence in the dental surgery on the behaviour and anxiety of young children, addressed the importance of the quality of the mother-child relationship. He stated that a close warm relationship seemed to
provide the greatest potential for a positive effect, resulting from the mother's presence while a poor or non-existent mother-child relationship would not appear to have a high potential for anxiety reduction through the mother's presence. Moreover, he observed that the mother's behaviour in the treatment room could have had influenced the child's response to the dental setting. Unfortunately, these were only recorded observations which have not been studied in a controlled way.

2.6.2.4 Summary

In summarising the maternal influence on moderating the child's negative response in dental situations, different studies have taken different approaches as to investigate this issue. Some of these studies have investigated the effect of the mother's presence in the treatment room on her child's response to the dental situation. They found no significant difference in the children's cooperativeness between the mother present and the mother absent situation. However, it was reported that the lack of a significant difference could be misleading as other uncontrolled factors, such as, the mother's behaviour could have had influenced the results.

Another approach was to investigate the relationship between maternal anxiety and the child's behavioural response in dental setting. Earlier studies that have examined children at their initial dental visit, have found this relationship to be significant, with children of anxious mothers being less cooperative than those of non-anxious mothers. However, these views were not held by subsequent investigators who have found this relationship to be not significant on the child's subsequent visits and even on the first dental visit. In addition this relationship was found to be easily disrupted by simple experimental interventions. Therefore it was concluded that the relationship
between maternal anxiety and the children's behaviour is a fragile one and future research is needed to re-evaluate this relationship.

Many authors have suggested that the mother-child relationship might be a factor that could affect the child's behaviour in dental settings. These suggestions seem to be based on the experience of individual clinicians and usually unsupported by measured evidence. However, these authors attempted to describe the mother-child relationship and its influence in determining the child's response to the dental situation.
2.7 Research Hypotheses

Consideration of previous literature suggests that inconsistent and non-significant findings were drawn from studies that have investigated the effect of the mother's presence or absence on the child's adjustment to the dental situation. These findings could be attributed to another uncontrolled factor namely, the mother's behaviour in the treatment room. As suggested by some researchers, (Venham 1972,1979, Venham, Bengston, and Cipes 1978) mothers, when present, display different kinds of behaviours that would tend to increase or decrease their child's cooperativeness.

Thus, it seems logical to suggest that the mother's behaviour and what she says in the treatment room is what counts and not her mere presence or absence. In other words, children's response to their first dental visit will be greatly guided by the mother's behaviour and the way in which she communicates to the child during such visit. If the mother's behaviour and her attitudes are faulty, the child's behaviour may be also altered as to result in an unsatisfactory dental patient. On the other hand, if the mother has a healthy attitude, then the child will be well behaved, and generally a good dental patient. However, this issue remains unresolved as it has not been empirically investigated.

Previous literature also suggests inconsistent findings from studies that have investigated the relationship between maternal anxiety and the child's response to dental settings. This could suggest that maternal anxieties do not necessarily transmit to the child and other more direct maternal factors such as the mother's behaviour towards her child during the dental visit might have greater influence in determining the child's response to the dental visit. In such case, children's behaviour would be expected to relate more highly to maternal behaviour than to maternal anxiety. The following hypothesis is formulated to test the above issues.
H1: The mother's behaviour in the treatment room will be directly related to her child's behaviour. This means that mothers who behave favourably towards their child by being reassuring and informative will have more cooperative children. In addition, the child's behaviour during the first dental visit will be more highly related to the mother's behaviour than to her anxieties.

In the light of the above discussion, if the mother's behaviour proves to be an important factor in determining the child's response to the dental situation, then it would seem useful to find predictors for such factor. In other words, if the mother is to behave in a negative way during the child's dental visit, then it would be better to exclude her from the child's visit. While if the mother is to behave favourably and to be helpful in providing assurance to her child then it is not to the child's or the dentist's best advantage to deprive the child from such support when it is most needed. Therefore, a predictor could aid clinicians to decide whether or not to allow the mother to stay with her child during the dental visit.

Two questions were formulated to be tested for their predictive validity. Each describing different stressful situation that could happen to any child during the early years. These are when the child visits the doctor and when s/he starts school. Six responses were formulated for each question describing different ways in which a mother might behave in such situations.

Since the child's first visit to the dentist is a normal situation that could be stressful to any child, therefore, it is hypothesised that the mother's behaviour toward her child during the dental visit would be the same as during a visit to the doctor or when the child starts school (see section 3.6.6). Thus, the following hypothesis is to be tested:

H2: The mother's behaviour during her child's dental visit will be directly related to her behaviour in other everyday life situations where her child expresses anxiety and distress.
Previous literature have also explored different methods of preparing the child and the parent for the dental visit. A letter of advice is the most simple and inexpensive method, however, very little have been done to investigate its effectiveness. Two studies found the letter ineffective in improving the child's adjustment to the dental situation, but on the other hand, it had a positive effect on mothers by reducing their anxieties and reducing the number of broken appointments (Wright et al 1973, Hawley et al 1974).

Since the letter proved to have a positive effect on mothers, it is expected that such a letter could also modify the mother's behaviour by encouraging her to behave in a more positive way during the child's dental visit. Unfortunately, this effect has not been investigated by previous research since mothers were asked to remain in the reception room during their child's visit.

Therefore, the present study will re-evaluate the effectiveness of the advice letter and will focus on investigating its effect on modifying the mother's behaviour. It is hypothesised that such a letter will provide the mother with an elementary understanding of the child's first dental visit and will emphasis the responsibility of the mother to prepare her child for the visit. In this way, such a letter could alter the mother's understanding and attitude toward the situation which might lead her to behave in a more positive way by providing the child with information and assurance as to make the visit a pleasant and a successful one. This in turn might lead to a less anxious and more cooperative child. The following hypothesis will address this issue.

H3: A letter of advice that will be sent to the mothers a week prior to their child's first dental visit will have an effect on modifying the mother's behaviour during such a visit, thus leading to less anxious and more cooperative children.

The present investigation will also attempt to examine the relationship between several aspects of the mother's perception of her child's dental visit and the child's response to such visit. The aim was
to provide predictors for the child's response to the first dental experience. Previous literature suggests that maternal perceptions could influence the child's response (Venham 1979). However, this issue has not been empirically investigated. The following hypothesis is to be tested.

H4: The mother's perception of her child's first dental visit is related to the child's anxiety and behaviour during such visit. In other words, mothers who have positive perceptions of their child's dental visit will be more relaxed and will behave more positively during the visit, this in turn will lead to less anxious and more cooperative children.

The following aspects of the mother's perception of her child's dental visit are to be examined: if the mother thinks that her child will suffer emotionally or physically during the visit, if she thinks that there is something wrong with the child's teeth, how important is her presence with the child in the treatment room, and if she had explained to the child what to expect during the visit.
CHAPTER 3: METHODOLOGY

3.1 Clinical Setting
3.2 Criteria for the Research Subjects
3.3 Patient Selection
3.4 Pre-appointment Procedure
3.5 Clinical Procedure
3.6 Instrumentation
3.1 Clinical Setting

This study was planned to be carried out at a National Health Service clinic in Loughborough. A letter was sent to the Health Authority [Ethical Committee] asking for permission to conduct the research [Appendix A]. Permission was granted and the study was carried out at the Dental Clinic at the Loughborough Health Centre. This clinic consists of a 8x10 feet waiting room, two 12x12 feet treatment rooms and 12x12 feet recovery room in between the treatment rooms. The waiting room contains green plastic cushioned chairs and coloured child's size chairs. The recovery room contains one couch, one chair and a wash basin. The study was conducted in one of the treatment rooms which contains complete dental unit, sterilizer, wash basin, and cabinets.

Videotape equipment was used to record the visits. The camera was mounted on its holder and placed in front and slightly to the right of the dental chair. The lens was approximately 4 feet above the floor and 5 feet from the patient's head.

The room staff consists of one male dentist and one female dental assistant, both of them were wearing a white coat on all occasions throughout the study. The investigator was present in all cases and she was wearing ordinary clothes. All children were examined during the clinic's morning sessions.
3.2 Criteria for the Research Subjects

1. Children with no previous dental experience.
2. Children who were not identified as being mentally or physically handicapped.
3. Children who were accompanied by their mothers.
4. Children who spoke and understood English.
Patient Selection

Invitations to participate in the study were issued to 93 mothers of children who met the sampling criteria. Twenty-one of these refused to cooperate because they did not like the idea of being videotaped. Some eighteen others declined because of shortage of time due to other commitments such as work or because they preferred to take their children to private dental clinics. An interesting and incidental finding was that mothers of two children were so dentally anxious that they could not possibly attend their child's dental visit.

The final sample, then, consisted of 52 infant school children and their mothers. They were selected by the community dental officer during his routine school inspections in the Borough of Charnwood area. There were 35 male and 17 female children, aged 2.5-11 years. They were selected on the basis that they had no previous dental experience. The initial dental visit is chosen because it represents a pure new experience that is not contaminated by any possible effect of a previous dental exposure, yet, such experience is an anxiety producing one for many children. Children were divided equally and randomly into two groups, experimental and control.

When the study was established it was intended that children would be examined during their first two visits (an initial visit that would include examination and prophylaxis, and a subsequent visit that would involve restorative treatment). After examining a few subjects, it was clear that such a course of action was not possible in the present investigation due to the lack of a need for restorations in most of the subjects. Therefore the present study aimed to investigate the child's first dental visit only.
3.4 Pre-appointment Procedure

Mothers of all subjects were mailed a letter, a consent form, and an appointment card [Appendix B and D]. The letter explained the nature of the study and asked the mother for her participation. If she agreed then she was required to sign the consent form and to accompany her child on the visit.

The same procedure was performed for both groups of children except that mothers of those children in the experimental group received a letter of advice, a week prior to the visit [see Appendix C]. In this letter the experimenter tried to offer advice to the mother about how to prepare her child for the first dental visit. The advice was simple and avoided dental terminology.
3.5 Clinical Procedure

3.5.1 Pretreatment

Upon arrival to the dental clinic and while sitting in the waiting room, the mother was greeted by the experimenter and asked for her signed consent form. Then she was given a paper and pencil questionnaire, the Corah Dental Anxiety Scale (DAS) and the Spielberger State Trait Anxiety Inventory (STAI Y-1) to complete. The questionnaire elicited information related to the child’s age, birth order, social class, the mother's evaluation of her own anxiety and the mother's expectation and predictions about her child's visit. In addition, the questionnaire contained two questions designed to learn something about the mother's behaviour when her child become anxious in everyday life stressful situations [see Appendix E].

At the same time, the experimenter introduced the self report measure of anxiety to the child by saying, "I have some pictures of little boys, which I want you to look at". The booklet was placed in the child’s lap allowing him/her to explore it for few moments. Then the experimenter turned the pages back to the first page and started turning the pages one by one, without saying anything, making sure that the child looked at all the pictures. Introducing the picture test in this way, the experimenter aimed to help the child to become familiar with the pictures so as to answer the questions more easily and quickly when this test was carried out in the treatment room.

3.5.2 Treatment

When the mother completed the questionnaire, the experimenter left the waiting room for the treatment room and switched on the video recorder. At this point the dental assistant escorted the child and mother to the treatment room where they were greeted by the dentist. Then the child was seated in the dental chair and the mother was
allowed to sit in a chair placed next to her child, allowing as much visual, and physical contact as possible between the child and mother. The videotape equipment was then switched off and the experimenter introduced the picture test to the child. When completed, the experimenter thanked the child and the videotape equipment was switched on again. Then the dentist asked several questions in order to help the child relax and get acquainted with the situation. These questions related to such topics as age, peers, school and weather. He also talked to the mother so as to help her relax and to express her feeling freely.

Following this brief interview the dentist said to the child "I am going to count your teeth". The child underwent an oral examination, which included examination of the soft and hard oral tissues using a mouth mirror and if necessary, an explorer. Then the dentist said "I am going to polish your teeth to make them nice and clean". With all subjects, the dentist applied the "Tell-Show-Do" method [This is a reconditioning method which is characterized by first telling the child about the coming procedure, showing the dental instruments that are going to be used and then trying to do the dental work]. The dentist standardised his approach by using the same explanation of treatment with all children. He was not aware of the group assignment. A dental prophylaxis was carried out using a contra angle hand piece with a rubber cup. The cup filled with an ordinary tooth paste (mild mint Macleans), was revolved against all exposed tooth surfaces at 5000 rpm. The inspection light was turned off during the procedure in order to get a clearer picture of the child's face.

When finished the dentist asked the child to get off the dental chair and the videotape equipment was switched off. Finally, the investigator thanked the child and the mother for their cooperation. A similar approach by the dentist and investigator was followed with all subjects.

The investigator was present in the treatment room throughout the procedure. Her function was understood by the child and mother but she did not enter at any time into conversation with any of the
participants and placed herself in front and slightly to the right of the
dental chair and next to the videotape equipment.

3.6 Instrumentation

3.6.1 Videotape Equipment and Procedure

A Sony video camera was mounted on its stand in front and
slightly to the right of the dental chair. The lens was approximately 4
feet above the floor and 5 feet from the patient's head. The microphone
was attached to the camera. No attempt was made to hide the camera
because, for ethical reasons all mothers were informed about the
videotape recording procedure and their consent was obtained
accordingly. The Sony videorecorder and the transformer were put on a
bench nearby the camera. The equipment was turned on and off and
adjusted by the investigator. Recording began as the patient and
mother entered the treatment room, was discontinued briefly in the
middle of the appointment to collect the picture test data, and then
continued until the end of the visit. The use of videotapes provided a
record of the behaviour which could be played back repeatedly until a
decision was made concerning the most appropriate rating.

Analysis of video tapes

When the study was completed, videotapes were analysed. The
child's behaviour was rated using the Frankl behaviour rating scale
[Appendix H]. Ratings were made at three separate intervals (on
entering the treatment room, on examination, and on prophylaxis). An
assessment of the mother's behaviour was also made at the end of the
taped appointment using the categories designed especially for this
study [Appendix J].
The mother and the child were in the same picture, which helped the viewer to observe both at the same time. The tapes were viewed by two judges, the investigator and a postgraduate student who was given thirty minutes of training in order to familiarise her with the rating categories. Seventeen hours of videotapes were observed and rated. Any disagreement on the ratings was resolved by discussion. To determine the rating reliability, a record was maintained prior to the resolution of the disagreements. (Reliability of ratings of the child's and mother's behaviour are discussed in Chapter 4). Strong interobserver agreement was found. This proved that, although the ratings may seem to be biased by the experimental knowledge of videotape assignment and familiarity with the subject's responses, it showed a high association with the blind observer.

3.6.2 The Picture Selection Test

This is a self-report measure of situational anxiety suitable for use with children. It was developed by Venham (1972), who in his initial studies evaluated and refined preliminary forms of this test. Later studies provided reliability and validity data for the final version of the picture selection task (Venham and Gaulin-Kremer 1979). The final test developed was a rapidly administered task, which was readily understood and accepted by children as young as three years of age, yet it was found to be a valid and reliable index of young child's response to situational stress (Venham and Gaulin-kremer 1979).

This test was designed using a male cartoon figure as a stimulus. The figure was drawn with a large head with broad lines to attract attention to the face. The rest of the body was drawn proportionally smaller and with thin lines. The hair and facial feature were stylized to avoid any obviously identifiable racial characteristics. Clothing was also stylized to minimize socioeconomic class identification. The cartoon figure was portrayed in varying states of emotional arousal seen in the clinical setting, including happiness, fear, sadness, and anger. The test
consists of eight items, [Appendix I], each containing two male figures displaying different emotions. The anxious member of each pair occupies the left and right position with equal frequency to control for a possible position set.

Introducing the picture test, a child will be asked "which little boy feels most like you do right now". This statement is repeated for each of the items. The frequency of choosing the more anxious pair member from the eight successive presentation defines the anxiety score. Scores can range from 0 to 8, with 8 representing the most anxious response.

Procedure for the picture test

Upon seating the child in the dental chair, the experimenter placed the picture test booklet in the child’s lap and said "we are going to have a look at these pictures". Then the experimenter pointed to the face of both boys on the first page and said "which little boy feels the most like you do right now?". The instructions were repeated for the second item and then shortened to "which of these two little boys feels the most like you?". Upon completion of the eight items, the child was thanked and the book was removed.

3.6.3 Dental Prophylaxis

Dental prophylaxis consists of the mechanical removal of soft and hard deposits from the tooth surface. Children develop mostly soft plaque deposits, which can be easily removed using a polishing paste along with the assistance of a dental engine. Prophylaxis is a mean of cleaning, polishing, and fluoridating children's teeth, thus reducing the effect of caries and gingival inflammation.
3.6.4 Ratings of Child’s Behaviour

The Frankl behaviour rating scale was used to rate the child’s behaviour. The scale was developed by Frankl et al (1962). It consists of four categories of behaviour, definitely negative, negative, positive, and definitely positive [Appendix H]. The child’s behaviour was rated by two observers, the investigator and a postgraduate student. Any disagreement was resolved by discussion. For each subject ratings were made on three different occasions:

a- on entering the treatment room;
b- on examination;
c- on prophylaxis.

An overall score was reached simply by summing the ratings an individual receives on the different measurement occasions. The interobserver agreement is discussed in Chapter 4.

3.6.5 Categories of Mother’s Behaviour

To assess the mother’s behaviour during her child’s first dental visit, a six-point scale was designed. The scale included the following categories which were devised according to the author’s professional experience and to findings and suggestions from previous literature [see Section 3.6.6 the preoperative questionnaire].

1- The mother is relaxed and focuses her attention on her child’s behaviour. She tries to give reassurance - in case it is needed - by informing the child about the coming procedure in a simple way, or describing appropriate behaviours for the dental session. In addition to that, she might try to give more assurance by using verbal empathy like telling the child that it will not hurt, it will not be so bad, etc or verbal praise like telling the child s/he is mature, brave, strong, capable,
doing fine, etc. The mother might also encourage more cooperative behavior by distraction, through engaging in conversation with the child on unrelated topic or to redirect the child's attention away from dental related object(s) in the room.

2- The mother focuses her attention on the child's feelings and attempt to reduce fear through physical contact like petting, stroking, hugging, kissing, etc. She might also assure her child through use of verbal empathy or verbal praise.

3- The mother will try to obtain cooperative behavior from her child by promising a reward for good behavior.

4- The mother will try to obtain cooperative behavior from her child by putting him/her in comparison with others or by blaming him for being anxious or uncooperative.

5- The mother will attempt to obtain cooperative behavior from her child through the use of verbal commands, threats and physical intervention, with no attempt to reduce her child's fear or anxiety.

6- The mother will remain passive. Either she remains uninvolved (sometimes without even making eye contact with her child) or she engages in other activity like talking to the dentist or assistant on subjects unrelated to the dental situation.

Each mother was assigned to one category after observing the videotaped appointment. The reliability and validity of the categorising scheme are discussed in Chapter 4.
3.6.6 The Preoperative Questionnaire

Previous studies have suggested that parents can provide much information that can be helpful in predicting the child's response to the initial dental visit (Johnson and Baldwin 1968, 1969, Johnson and Machen, 1973, Wright and Alpern 1971). This information can be gathered easily by means of a written questionnaire, completed by the parent upon arrival for the initial visit.

The present study used a questionnaire form that was completed by the mother while waiting for her child's visit. It elicited demographic information and data related to several variables. The questions were designed especially for this study except two of them that were adopted from previous studies [question 3 adopted from the work of Johnson and Baldwin (1968,1969) and question 4 modified from the work of Wright and Alpern (1971)].

The questionnaire contains eleven questions. The first nine questions attempted to elicit information about the mother's level of anxiety and her perceptions about the child's dental visit. The last two questions were designed to get information about the mother's behaviour towards her child in two different every-day life situations when the child might become anxious. These two situations were, when the child visits the doctor, and when the child first goes to school. They were chosen because it is believed that these are naturally stressful situations that could happen to any child during the early days of life. Six responses were provided to each of these questions. The first one describes the mother's behaviour when she is understanding, informative and assuring to her child. The second choice is similar to the first one except that mother will show more emotional feelings towards her child by being more sympathetic. The third choice describes the mother's behaviour as promising a reward for good behaviours. The fourth and fifth choices describes the mother's behaviour as being blaming and threatening (respectively) to the child. The sixth one describes uninvolved, passive behaviour.
These six kinds of behaviours were based on the author's professional experience and findings and suggestions of previous literature. Venham (1979) suggested that children receive great support when their mothers provide them with assurance by physical contact. It is also assumed that when the mother provides information and explanation about the dental procedure, this will encourage more positive behaviour on the child's part. On the other hand, promising a reward to the child, was suggested as an undesirable behaviour. Tuma (1954) warned mothers about the dangerous consequences of promising a reward to the child. He stated "if you promise your child a reward for good behaviour, this will suggest to the child that you rather expect him/her to misbehave. The child might even think that worse behaviour brings greater rewards".

Research on the use of punishment procedures has shown that punishment can sometimes backfire and actually produce increases in undesirable behaviour, especially tantrums and aggressive behaviours (Ingersoll 1982). Recently the same situation has been documented in dental setting when criticism or blame has been used with uncooperative children (Melamed, Bennett, Hill, and Ronk 1979).

Finally, passive behaviour on the parent's part could be interpreted by the child as desertion. Brown and Smith (1979) suggested that a small, active, supporting role should be provided for the parent, for example holding the child's hands, as this would increase the child's security and and the feeling that parents are available to provide love and support.

Thus, in the light of these studies, it is assumed that only the first two choices in question 10 and 11 of the questionnaire form could be considered as acceptable and positive behaviours for a mother to follow in demanding good behaviour from her child. The rest of the choices would be considered as unfavourable. The same treatment is applied to the mother's behaviour categorising scheme, since these categories correspond to the different choices of question 10 and 11 of the questionnaire form.
As has been discussed earlier (in Sections 1.2 and 2.7), the purpose for including question 10 and 11 in the questionnaire form was to examine their predictive validity for the mother's behaviour in the treatment room. Thus, the mother's behaviour in the dental situation is to be related to her behaviour in other everyday life situations when her child becomes anxious. The basic assumption was that the mother's behaviour towards her child will be the same during different stressful situations whether dental or not.

Reviewing the psychological literature most personality theories assume the existence of underlying mental structures that affect behaviour in a general way to bring about a generalized consistency in behaviour or predispositions such as dependancy, shyness, aggression and so on (Fonesy and Higgitt 1984). However, Mischel (1981) radically questioned this assumption, writing: "with the possible exception of intelligence, a highly generalized behavioural consistencies have not been demonstrated, and the concept of personality traits as broad dispositions is thus untenable".

Mischel refused to accept the common assumption that generalized consistencies in behaviour exist and he argues instead that it is particular situations which may consistently elicit, for instance, an aggressive response from an individual. Consistency in behaviours which are not attributed to intelligence must therefore be the result of similarities between situations in which individuals find themselves.

Mischel has criticised the traditional personality theories on both conceptual and empirical issues. He proposed the situationist approach by which he puts such heavy emphasis on the importance of situations in determining behaviour. Consistencies in behaviours are attributed as the result of similarities between situations in which individuals find themselves.

Unlike a laboratory situation, dental treatment represents a common, relatively stressful experience in the daily lives of children. Therefore, in the light of the above discussion, the assumption that a mother will behave similarly on similar situations when her child become anxious, whether these situations were dental or not seems not
to conflict either the trait or the situationist approach to personality since the three situations (when a child visits the doctor, when a child starts going to school, and when s/he visits the dentist) are more or less similar ones.

3.6.7 Social Status Index

Since previous studies indicated that children's cooperative behaviour may vary significantly with social class (Neisser, 1978, Wright and Alpern, 1971), social status was determined for all subjects in the study using the Registrar General Classification of Social Class -1970, (Reid, 1981). This index uses the occupation of the head of the household to group families into five classes:

1 Professional, etc.
2 Intermediate.
3 (N.) Skilled non-manual.
3 (M.) Skilled manual.
4 Partly skilled.
5 Unskilled.

The number of subjects that fell into each social class was small, therefore for the purpose of reporting and statistical analysis these previous classes were summarised into:

1 Non-manual. (class 1 and 2 collapsed together).
2 Skilled. (class 3N and 3M collapsed together).
3 Other manual. (class 4 and 5 collapsed together).

Table 4.4 gives social class distributions.
3.6.6 The State-Trait Anxiety Inventory (STAI)

The State-Trait Anxiety Inventory (STAI) form Y-1 was developed by Spielberger et al. (1980) and has been used extensively in research and clinical practice. It comprises separate self-report scales for measuring state and trait anxiety.

The S-Anxiety Scale (STAI form Y-1) consists of twenty statements that evaluate how respondents feel "right now, at this moment" such as "I feel calm", "I feel upset", and "I feel pleasant". The T-anxiety scale (STAI form Y-2) consists of twenty statements that assess how people generally feel such as "I feel nervous and restless", "I am happy", and "I feel inadequate". Four choices are printed to the right of each statement, each choice describing different intensities of the feeling. The STAI-Y (S-Anxiety and T-Anxiety Scales) are printed on opposite sides of a single page test form.

In the present study the STAI S-Anxiety Scale has been used to assess the level of state anxiety of the mother [see Appendix G]. The essential qualities evaluated by the STAI S-Anxiety Scale are feelings of apprehension, tension, nervousness, and worry. In addition to assessing how people feel "right now", the S-anxiety scale may also be used to evaluate how they felt at a particular time in the recent past and how they anticipate they will feel either in a specific situation that is likely to be encountered in the future or a variety of hypothetical situations. It has been found that the S-Anxiety Scale is a sensitive indicator of changes in transitory anxiety experienced by clients and patients in counselling, psychotherapy and behaviour modification programmes. The scale has also been used extensively to assess the level of S-anxiety induced by stressful experimental procedures and by unavoidable real life stressors such as imminent surgery, dental treatment, job interviews, or important school tests (Spielberger 1983).

The STAI was designed to be self-administering and may be given either individually or to groups. The inventory has no time limits. College students generally require about six minutes to complete either the S-anxiety or the T-Anxiety Scale. Less educated or emotionally...
disturbed persons may require ten minutes to complete each scale.

In responding to the STAI S-Anxiety Scale, examinees blacken the number on the standard test form to the right of each item-statement that describes the intensity of their feeling: (1) not at all; (2) somewhat; (3) moderately so; (4) very much so. For the purpose of scoring, each STAI item is given a weighted score of 1 to 4. A rating of 4 indicates the presence of a high level of anxiety for ten of the S-Anxiety items. A high rating indicates the absence of anxiety for the remaining ten S-Anxiety items. The scoring weights for the anxiety-present items are the same as the blackened numbers on the test form. The scoring weights for the anxiety-absent items are reversed, i.e. responses marked 1, 2, 3, and 4 are scored 4, 3, 2 and 1, respectively.

Scores for the S-Anxiety Scale could be obtained simply by adding the weighted scores for the twenty items that make up the scale, taking into account the fact that the scores are reversed for the ten anxiety-absent items. Therefore scores can vary from a minimum of 20 to a maximum of 80. A template key is available for scoring the scale by hand. For respondents who omit one or two items of the scale, the prorated full-scale score can be obtained by determining the mean weighted score for the scale items to which the individual responded, then multiply this value by 20, and round the product to the next higher whole number. If three or more items are omitted, however, the validity of the scale is questionable. Reliability, validity, and normative data are available in the manual for the State-Trait Anxiety inventory (form-Y) (Spielberger 1983). According to the normative data for this scale, the mean for the female state anxiety scores (age 19-39 years) was 36.17.
3.6.9 The Dental Anxiety Scale [DAS]

In the development of this scale, Corah (1969) made use of a video simulation of the dental procedure to induce psychological stress. The results led to the development of a formal scale for the assessment of dental anxiety. The scale consists of four questions [see Appendix F], each with five choices [a-e]. Points to be assigned for the subject's choices, with one point for the (a) and five points for the (e) choice. The total score ranges from 4-20. In a sample of 1232 college students the mean score was 8.99 ±2.99. In the present study this scale was used to measure the mother's dental anxiety.
CHAPTER 4: RESULTS

4.1 Introduction
4.2 The Interobserver Reliability for the Children's and Mothers' Behavioural Ratings
4.3 Recording Data For The Mother's Behaviour Variable
4.4 The Effectiveness of the Advice Letter
4.5 The Mothers' Observed Behaviour as Related to the Children's Behavioural Responses
4.6 The Relationship Between the Mother's Behaviour Toward Her Child During the First Dental Visit and Her Behaviour in Two Everyday Life Situations
4.7 Summary for Variables Related to the Mother's Observed Behaviour
4.8 The Mother's Perceptions of the Child's Dental Visit, as Related to the Children's Response to Such a Visit
4.9 The Mothers' State and Dental Anxiety as Related to the Children's Response and to Several Other Variables
4.10 Other Relationships of Interest
4.11 Summary
4.1 Introduction

The entire data were entered into the Honeywell Multics Computer, and were analysed using the Statistical Package for the Social Sciences, version ten (SPSSX) (1983). For the purpose of presentation, the statistical analysis of the data was organised into eight sections:

The first one describes methods of determining the interobserver reliability for rating the child's and mother's behaviour. The second section discusses procedures for recording data for the mothers' behaviour variable. The third section offers comparative analysis between the control and the experimental group to examine the effectiveness of the preappointment letter (the advice letter). It is thought that the effectiveness of the preappointment letter should be examined first, as, if no difference could be found between the control and the experimental group due to the letter, then it would be reasonable to combine the two groups into one sample for further analysis. This means that the third hypothesis will be tested first. If no difference was found between the control and the experimental group, then all the data will be treated as one sample which will be analysed to test the rest of the hypotheses.

The fourth section examines the relationship between the mothers' observed behaviour in the treatment room and the children's behavioural response to the dental visit. It further provides correlational analysis between the mothers' behaviour and several other variable such as the mothers' age and their perceptions of the child's visit.

The fifth section describes the relationship between the mother's observed behaviour during the child's dental visit and her behaviour in other two everyday life situations in which the child might become anxious. The purpose was to examine the value of two questions in predicting the mother's behaviour during her child's dental visit. The sixth section provides a summary for all variables that were related to the mother's observed behaviour.
The seventh section reports the correlations between several aspects of the mother's perception of her child's visit and the child's anxiety and behaviour. Section eight will describe the relationship between maternal anxiety and the children's response to their first dental visit. The last section will describe several other relationships of interest.
4.2 The Interobserver Reliability for the Children's and Mothers' Behavioural Ratings

The data for children's and mothers' behaviour were obtained through viewing the videotaped visits by two independent raters. The children's behaviour was rated at three intervals. Since a four-point scale was used, the total range possible for the rating of behaviour was between 3-12. Children exhibiting the best cooperative behaviour had the highest ratings. The observed mother's behaviour was categorised according to six categories designed for this study. If there was any rating discrepancy between the two observers it was resolved through discussion. To determine the rating's reliability, a record was maintained before the resolution of any disagreement.

The analysis of reliability in epidemiological studies has generally been performed using either Pearson's Product Moment Correlation Coefficient, or Percentage Agreements between observers. Positive conclusions on reliability of criteria based on these statistics may be open to criticism on the grounds that the correlation coefficient is not capable of demonstrating the effects of systematic bias of an observer and percentage agreements between observers does not adjust to agreement expected by chance, particularly when using short scales. Both statistics may therefore give an impression of spuriously high levels of agreement. This problem has been reviewed by Hunt (1986) and more reliable alternatives suggested, in particular the Kappa Coefficient which directly compares observed levels of agreement with that which might be expected due to chance.

However, the Pearson and Percentage statistics do retain the common advantage of being readily understood and available on numerous standard computer statistical packages. They therefore remain convenient tools of initial analysis of levels of agreement, always providing that the danger of overestimation of those levels are borne in mind.
Reliability of ratings was determined using the standard rating reliability formula:

\[
\text{number of agreements/number of observations} \times 100
\]

The interobserver reliability for rating the children's behaviour was found to be 92.3 percent. This degree of agreement was considered to be acceptable according to previously published studies (Bailey et al 1973, Johnson and Baldwin 1968, 1969, Koenigsberg and Johnson 1972, Wright et al 1973). The interobserver reliability for rating the mother's behaviour was found to be 94.23 percent.

To further test for agreement between the two raters, the Pearson product moment correlation coefficient was computed for the scores given by the two raters. The results for the children's behaviour ratings was \( r = 0.91, p = 0.0005 \) and for the mothers' behaviour ratings \( r = 0.69, p = 0.0005 \). This high correlation shows strong interobserver agreement (Table 4.1).

<table>
<thead>
<tr>
<th></th>
<th>Children's Behaviour</th>
<th>Mothers' Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using the Formula</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Agreements</td>
<td>92.3%</td>
<td>94.23%</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>( \times 100 )</td>
<td></td>
</tr>
<tr>
<td>Using the Pearson Product Moment Correlation</td>
<td>( r = 0.91 )</td>
<td>( r = 0.69 )</td>
</tr>
<tr>
<td></td>
<td>( p = 0.0005 )</td>
<td>( p = 0.0005 )</td>
</tr>
</tbody>
</table>

Table 4.1 Tests for the Interobserver Reliability.
4.2.1 Reliability and Validity of the Mother's Behaviour Categorising Scheme

In addition to its reliability (discussed above), the mother's behaviour categorising scheme proved to be valid as there were a significant relationship between the mother's behaviour towards her child in dental and non-dental situations (See Section 4.6)
4.3 Recording Data for the Mother's Behaviour Variable

This section explains how data for the mothers' behaviour variable was coded. Before that, it would be useful to summarise the measures that have been used to record the data for this variable.

The first aim of the study was to look for the relationship between the mother's behaviour in the treatment room and the child's behavioural response to the dental visit. For this purpose, a six-point nominal scale was developed in order to categorise the mother's observed behaviour towards her child (Appendix J).

Furthermore, the study attempted to find out if the mother's behaviour during her child's first dental visit to the dentist is related to her behaviour in other everyday life situations in which her child might express anxiety. The aim was to provide ways of predicting the mother's behaviour in the treatment room if she is to be allowed to accompany her child during the dental visit. Two questions (question 10 and 11 in Appendix E) were introduced in the preoperative questionnaire asking the mother how she would be most likely to behave in two different situations in which her child might become anxious. The idea was to look for the relationship between the mother's behaviour during her child's dental visit and her behaviour on these two everyday life situations. If a significant relationship proved to be true, then these two questions could possibly be used by clinicians to predict the mother's behaviour when she is allowed to accompany her child during the visit. These two questions describes two occasions, first, when the child visit the doctor and second, when the child starts school. These situations were chosen because they were believed to be realistic and natural stressful events that could happen to any child during the early days of life.

For each of these questions, six responses were formulated each describing different kinds of behaviour. The mother was asked to choose the one that most closely describes her behaviour. The six responses corresponded to the categories that were used to rate the mother's behaviour in the treatment room.
Table 4.2 demonstrate the frequencies and percentage of the mothers' rated behaviour in the treatment room and their responses to questions 10 and 11 of the questionnaire form.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>The mothers' observed</td>
<td>47</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>behaviour in the</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>treatment room</td>
<td>90.3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9.6%</td>
</tr>
<tr>
<td>n=52</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The mothers response</td>
<td>29</td>
<td>19</td>
<td>3</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>to question 10</td>
<td>55.7%</td>
<td>36.5%</td>
<td>5.7%</td>
<td></td>
<td></td>
<td>1.9%</td>
</tr>
<tr>
<td>n=52</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The mothers response</td>
<td>42</td>
<td>6</td>
<td>3</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>to question 11</td>
<td>80.7%</td>
<td>11.5%</td>
<td>5.7%</td>
<td></td>
<td></td>
<td>1.9%</td>
</tr>
<tr>
<td>n=52</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2 Frequencies and Percentages for the Original Data of the Mother's Behaviour Categories.

The above table shows that when the behaviour of the mothers in the treatment room was observed during their child's visit, most of them (90.3%) were rated in category 1. This means that most of the mothers were informative, reassuring, and helpful to their children. They were understanding of the child's feelings and at the same time tried to demand good behaviour by explaining and informing the child about the coming procedure. Only five mothers (9.6%) were passive and remained uninvolved during the whole visit. The table also shows that mothers fell into either category 1 or 6, and none of them were categorised in 2, 3, 4 and 5.

This sort of distribution may have happened due to one of three different reasons: one, the fact that most of the sample (75%) represented subjects having moderate to high social backgrounds (social class 1 and 2, see Table 4.4). Mothers who come from such
backgrounds are more likely to use an informative and reassuring policy in communicating with their children. Second, the dental treatment provided for the children was a non-stressful one, which involved the examination and cleaning of the child’s teeth. It is thought that a stressful dental procedure, for example filling or extraction, is expected to lead to more uncooperative behaviour on the child’s part thus encouraging more involvement and displaying of different sort of behaviours on the mother’s part. Third, all mothers in the study knew that they were taking part in an investigation, and they also knew that the visit was being videotaped. This might have restricted the mother from displaying her true and normal behaviour; in other words, some mothers might have tried to behave as good as possible in order to provide a good image of themselves. Moreover the presence of the video-recording equipment and the investigator in the treatment room during the visit might have had an added effect. This factor could not be possibly avoided because for ethical reasons the investigator had to inform all mothers about the whole procedure beforehand.

Table 4.2 also shows the frequency of the mother’s response to question 10 and 11 of the preoperative questionnaire. As can be seen from the table, the majority of the mothers have ticked choices 1 or 2, few have chosen 3 or 6, and none of the mothers have chosen response 4 or 5. Again this might have happened due to one or more of the three following reasons: One, most of the subjects came from high and middle social background. This means that mothers were more likely to follow appropriate policies in demanding good behaviour from their children. Second, mothers might have wanted to give a good image of themselves, therefore they might have chosen the response that does not describe their real behaviour. And third, responses 1 and 2 were similar to each other, the only difference being that response 2 emphasised more the mother’s emotional feelings towards her child. In other words, both of the responses (1 and 2) shows the mother’s behaviour as reassuring to the child except that in response 2 there are also feelings of pity and empathy that the mother shows to her child. Therefore, on reading these two responses if the mother was not
careful and concentrating enough, she might not realize the small difference between the two responses, and therefore treat them as similar ones. This might explain why the majority of the mothers' responses were divided between response 1 and 2. This same point might also explain the difference in the mother's responses to question 10 and 11 in regard to choices 1 and 2. A closer examination of Table 4.2 shows that the frequency of mothers who have ticked response 1 has increased from question 10 to question 11; on the other hand, the reverse has happened for response 2. (Fifteen mothers have changed their choice from response 2 to response 1 over the two questions).

Since these two questions were similar and with corresponding choices, one explanation may be that some mothers did not understand the difference between response 1 and 2 when they first read question 10, but on reading question 11 they realized the difference and were more inclined to choose response 1. The frequency of mothers who have ticked response 3 and 6 were almost the same on both questions.

To find out the relationships between the mother's behaviour during the visit and her behaviour in everyday life situations in which her child might show signs of anxiety and distress, it was thought that the data relevant to these variables should be organised and recoded before applying any statistical procedures.

As discussed earlier, a closer examination of the data suggested that the discrepancy in the mother's responses to question 10 and question 11 might have occurred due to the similarity between the first two choices. This might have led the mother to confuse them. One mother was not quite sure as to which response she should choose. She felt that her behaviour is best described if both of the choices were combined together. Therefore, it was felt that perhaps these first two choices should be collapsed into one category, and the remaining ones into another. Thus mothers who ticked choices 1 or 2 were placed into category 1, while mothers who ticked the remaining choices (3, 4, 5, 6) were put into category 2.

The same recording of the data was applied to the ratings of the observed mothers' behaviour. Therefore mothers who were categorised
as 1 or 2 were recorded as category 1, and those categorised as any of the other categories (3, 4, 5, 6) were reassigned into category 2. The frequency of the recorded data is as follows:

<table>
<thead>
<tr>
<th></th>
<th>Category 1</th>
<th>Category 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>The mothers' observed behaviour in the treatment room</td>
<td>47</td>
<td>5</td>
</tr>
<tr>
<td>The mothers' response to question 10</td>
<td>49</td>
<td>4</td>
</tr>
<tr>
<td>The mothers' response to question 11</td>
<td>48</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 4.3 Frequencies and Percentages for the Collapsed Categories of the Mothers' Behaviour

As has been discussed earlier in Chapter 3 (3.5.6 The preoperative questionnaire), the behaviour categorised as 1 is considered as positive for a mother to follow in demanding good behaviour from her child, while that in category 2 was considered as unfavourable.

The measure of mothers' behaviour clearly did not discriminate too well amongst mothers as 90% were classified in the same category. It is possible that the classification scheme could have been made more discriminatory by adopting subdivisions of this category. However, the classification scheme which was used was guided by the previous research literature and observations. It is difficult to offer refinements to the scheme based on these. It would be useful for future research to examine the distribution of these behaviours in dental surgeries not subject to an intensive research programme. (C.f. p.116.)
4.4 The Effectiveness of the Advice Letter

The demographic information for both the control and the experimental group is offered in Table 4.4. The two groups were compared for age, sex, and social class (Table 4.5).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total sample n= 52</th>
<th>Control group n= 26</th>
<th>Experimental group n= 26</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>35</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>Female</td>
<td>17</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td><strong>Mean Age (months)</strong></td>
<td>62.55</td>
<td>66.73</td>
<td>58.57</td>
</tr>
<tr>
<td><strong>Social Class</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Manual</td>
<td>9 (17.3%)</td>
<td>3 (11.5%)</td>
<td>6 (23.0%)</td>
</tr>
<tr>
<td>Skilled (M &amp; N)</td>
<td>30 (57.6%)</td>
<td>14 (53.8%)</td>
<td>16 (61.5%)</td>
</tr>
<tr>
<td>Other manual</td>
<td>13 (25.0%)</td>
<td>9 (34.6%)</td>
<td>4 (15.3%)</td>
</tr>
</tbody>
</table>

Table 4.4 Demographic Characteristics of the Sample
<table>
<thead>
<tr>
<th>Variable</th>
<th>Test used</th>
<th>Test value</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>t-test</td>
<td>1.47</td>
<td>0.149</td>
</tr>
<tr>
<td>Sex</td>
<td>$X^2$</td>
<td>0.3495</td>
<td>0.55</td>
</tr>
<tr>
<td>Social class *</td>
<td>$X^2$</td>
<td>1.3</td>
<td>0.3</td>
</tr>
</tbody>
</table>

*To carry out Chi-square to test for difference in social class, it was necessary to collapse the original six social classes into two, class 1 (included class 1, 2, and 3 N), and class 2 (included class 3 M, 4, and 5). This sort of classification was used in this instance only.

**Table 4.5** Statistical Comparison Between the Experimental and Control Group on Several Variables.

In these three variables no significant differences were found between these two conditions. Therefore it appears that the two groups were similar in regard to these variables.

Table 4.6 shows a comparison of the means and standard deviations of several variables. As can be seen from this table, children in the experimental group show slightly higher behavioural ratings than those in the control group. The mothers' state anxiety was also slightly lower in the experimental group.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Experimental</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Means</td>
<td>SD</td>
</tr>
<tr>
<td>Children's Behaviour Ratings</td>
<td>9.12</td>
<td>1.28</td>
</tr>
<tr>
<td>Children's Self-report Anxiety</td>
<td>2.60</td>
<td>2.36</td>
</tr>
<tr>
<td>Children's Age (months)</td>
<td>58.58</td>
<td>13.71</td>
</tr>
<tr>
<td>Mother's State Anxiety Scores</td>
<td>37.15</td>
<td>12.59</td>
</tr>
<tr>
<td>Mother's Dental Anxiety Scores</td>
<td>11.35</td>
<td>4.49</td>
</tr>
<tr>
<td>Mother's Age</td>
<td>32.69</td>
<td>7.00</td>
</tr>
</tbody>
</table>

Table 4.6 The Means of Several Variables in the Experimental and Control Group.

To find out the effectiveness of the preappointment procedure (the letter), several variables that were expected to be modified or changed due to the letter were tested for any significant difference between the two groups. These variables were: the mother's behaviour in the treatment room, her state anxiety and her child's behaviour and anxiety. In addition, several items of the questionnaire form that were designed to elicit the mother's perception for her child's visit were also tested for any significant difference.

A crosstabulation of the mother's observed behaviour in the treatment room is offered in Table 4.7. Both groups exhibited almost similar distribution of the mothers' behaviour. This means that the letter did not modify the maternal behaviour.
Mothers’ observed behaviour

<table>
<thead>
<tr>
<th>Category 1</th>
<th>Category 2</th>
<th>Row total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>Experimental group</td>
<td>23</td>
<td>3</td>
</tr>
<tr>
<td>Column total</td>
<td>47</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>S.D</th>
<th>t-Value</th>
<th>2-Tail prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children’s behaviour ratings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>8.88</td>
<td>1.53</td>
<td>-0.59</td>
<td>0.55</td>
</tr>
<tr>
<td>Experimental</td>
<td>9.11</td>
<td>1.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children’s state anxiety (Picture Test)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>2.71</td>
<td>2.45</td>
<td>0.16</td>
<td>0.87</td>
</tr>
<tr>
<td>Experimental</td>
<td>2.60</td>
<td>2.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mothers’ state anxiety</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>39.31</td>
<td>15.13</td>
<td>0.56</td>
<td>0.57</td>
</tr>
<tr>
<td>Experimental</td>
<td>37.15</td>
<td>12.59</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.7 A Comparison of the Mother’s Observed Behaviour in the Experimental and Control Group.

The t-test was used to test for any significant difference between groups in regard to the observed children’s behaviour, their self-rated state anxiety, and the mother’s state anxiety as measured by the STAI. No significant difference was found on any of the above variables (Table 4.8).

Table 4.8 A Comparison between the Experimental and Control Group on the Children’s Behaviour, Their Anxiety and the Mothers’ State Anxiety.
Moreover, using a chi-square test, no significant difference was found on the mother’s self rated anxiety (her response to question 3 of the questionnaire form) (Table 4.9).

<table>
<thead>
<tr>
<th></th>
<th>The mother’s self-rated anxiety *</th>
<th>Row total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High anxiety</td>
<td>Low anxiety</td>
</tr>
<tr>
<td>Control group</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Experimental group</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>Column total</td>
<td>18</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>34.6%</td>
<td>65.4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chisquare</th>
<th>D.F</th>
<th>Sig.</th>
<th>Min. E.F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.764</td>
<td>1</td>
<td>0.382</td>
<td>9.00</td>
</tr>
<tr>
<td>1.359</td>
<td>1</td>
<td>0.243</td>
<td></td>
</tr>
</tbody>
</table>

*Because few cells contained a very small size, Chi-square test was only appropriate after collapsing the responses to question 3 into two categories, any high anxiety response by the mother (1 or 2) categorised the total response as high.

**Table 4.9 A Comparison Between the Experimental and Control Group on the Mother’s Self-rated Anxiety.**

The mother’s perception of her child’s visit was also expected to have changed due to the advice letter. Using the Chi-square test, no significant difference was found on the mother’s answers to question 5, 7, and 8 of the preoperative questionnaire (Question 5 ask the mother if she thinks that her child will be unhappy during the visit, question 7 ask the mother how important is her presence with the child during the visit, and question 8 asks her if she had explained to her child what
to expect during the visit). (Table 4.10, 4.11, and 4.12).

<table>
<thead>
<tr>
<th></th>
<th>The mother's answers to Q 5</th>
<th>Row total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Control group</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental group</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Column total</td>
<td>14</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>26.9%</td>
<td>73.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chi-square</th>
<th>D.F</th>
<th>-Sig.</th>
<th>Min. E.F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.097</td>
<td>1</td>
<td>0.754</td>
<td>7.00</td>
</tr>
<tr>
<td>1.390</td>
<td>1</td>
<td>0.531</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.10 A Comparison Between the Experimental and Control Group on the Mother's Perception of Her Child's Emotional Feelings.
### The mother’s answers to Q. 7

<table>
<thead>
<tr>
<th></th>
<th>Important</th>
<th>Not Important</th>
<th>Row total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>24</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50.0%</td>
</tr>
<tr>
<td>Experimental group</td>
<td>23</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50.0%</td>
</tr>
<tr>
<td>Column total</td>
<td>47</td>
<td>5</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>90.4%</td>
<td>9.6%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chi-square</th>
<th>D.F</th>
<th>Sig.</th>
<th>Min. E.F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.000</td>
<td>1</td>
<td>1.00</td>
<td>2.500</td>
</tr>
<tr>
<td>0.221</td>
<td>1</td>
<td>0.638</td>
<td></td>
</tr>
</tbody>
</table>

**Table 4.11** A Comparison Between the Experimental and Control Group on the Mother’s Response to Question 7 of the Questionnaire Form.

* Although Chi-square test seems inappropriate to be used here because few cells contained such a small size, it is clear from the crosstabulation that the responses were almost similar on both groups.
<table>
<thead>
<tr>
<th></th>
<th>The mother's answers to Q 8</th>
<th>Row total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Control group</td>
<td>21</td>
<td>5</td>
</tr>
<tr>
<td>Experimental group</td>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>Column total</td>
<td>45</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>86.5%</td>
<td>13.5%</td>
</tr>
</tbody>
</table>

Chl-square | D.F | Sig. | Min. E.F.* |
0.660 | 1   | 0.416 | 3.500 |
1.485 | 1   | 0.222 |       |

* Same note for Table 4.11.

Table 4.12 A Comparison Between the Experimental and Control Group on the Mother's Response to Question 8 of the Questionnaire Form.

To further test for any difference between the two groups due to the advice letter, the Pearson correlation coefficient between different variables in each group were obtained (Appendix K and L show the correlation matrix for the experimental and control group respectively, each cell expressed the coefficient, number of cases, and the level of significance). Differences in the size of several correlations were compared using the Z test. Several relationships concerning the children's and maternal anxiety and behaviour were tested for any difference due to the advice letter. No significant difference was found on any of these relationships (Table 4.13).
Table 4.13 Tests for Difference in Relationships Between the Experimental and Control Group.

<table>
<thead>
<tr>
<th>Relationships</th>
<th>Z Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother's behaviour &amp; children's behaviour</td>
<td>-0.698</td>
<td>n.s</td>
</tr>
<tr>
<td>Mother's behaviour &amp; children's anxiety</td>
<td>-1.016</td>
<td>n.s</td>
</tr>
<tr>
<td>Mother's anxiety (STAI) &amp; children's behaviour</td>
<td>1.1193</td>
<td>n.s</td>
</tr>
<tr>
<td>Mother's anxiety (STAI) &amp; children's anxiety</td>
<td>0.993</td>
<td>n.s</td>
</tr>
<tr>
<td>Mother's anxiety (Q3) &amp; children's behaviour</td>
<td>-0.656</td>
<td>n.s</td>
</tr>
<tr>
<td>Mother's anxiety (Q3) &amp; children's anxiety</td>
<td>-0.781</td>
<td>n.s</td>
</tr>
</tbody>
</table>

Since the above analyses show no significant difference between the experimental and the control group, it was possible to combine the two groups into one sample so that the whole data could be used for further analyses.

Table 4.14 shows the means, standard deviation, minimum, and maximum for the following variables: children's age, children's behaviour and anxiety, mothers' age, and the mothers' state and dental anxiety. As can be seen from the Table, the mean for the children's behavioural ratings and for their anxiety scores were 9 and 2.6 respectively. It seems that children exhibited positive behaviour and low anxiety at their initial dental visit.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Means</th>
<th>SD</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children's Behaviour</td>
<td>9.00</td>
<td>1.40</td>
<td>4.00</td>
<td>11.00</td>
</tr>
<tr>
<td>Children's Self-report</td>
<td>2.65</td>
<td>2.38</td>
<td>0.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Childrens' Age (months)</td>
<td>62.65</td>
<td>20.19</td>
<td>30.0</td>
<td>133.0</td>
</tr>
<tr>
<td>Mothers' State Anxiety</td>
<td>38.23</td>
<td>13.83</td>
<td>20.0</td>
<td>78.0</td>
</tr>
<tr>
<td>Mothers' Dental Anxiety</td>
<td>11.86</td>
<td>4.56</td>
<td>5.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Mothers' Age</td>
<td>31.94</td>
<td>8.10</td>
<td>22.0</td>
<td>60.0</td>
</tr>
</tbody>
</table>

Table 4.14 The Means and Standard Deviation for Several Variables for the Whole Sample.

In order to compare the children's behavioural ratings to those reported in other studies, it was necessary to obtain the percentage of children who had received an overall positive rating. Each child was rated on three different occasions using the four point rating scale (Definitely negative, Negative, Positive, and Definitely positive). Table 4.15 shows the frequency of children's behaviour during each of the three measurement occasions.
Table 4.15 Children's Adjustment to Different Measurement Occasion of the Dental Visit.

Since the dental visit was a relatively non-stressful one, it was decided that any negative rating will categorise the whole visit as negative. Therefore to rate the child's behaviour as positive, the subject should have received a positive rating on the three measurement occasions. This criteria for categorising the child's behaviour has been used by previous studies (Hawley et al 1974, Koeingsberg and Johnson 1972, 1975). Table 4.16 shows the frequency and percentage of childrens' behavioural ratings for the entire visit. The percentage of positive behaviour was found to be 80.7%. This percentage was almost similar to those found in previous studies (Johnson and Machen 1973, Frankl et al 1982).
## Table 4.16 The Frequency of Children's Behaviour Rating for the Whole Visit.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>42</td>
<td>80.7%</td>
</tr>
<tr>
<td>Negative</td>
<td>10</td>
<td>19.3%</td>
</tr>
</tbody>
</table>

*Any negative behaviour categorised the whole visit as negative.*

The Pearson product moment correlation coefficients were obtained for all variables in the study (Appendix M show correlation matrix, again each cell expressed the coefficient, number of cases, and the level of significance).
4.5 The Mothers' Observed Behaviour as Related to the Children's Behavioural Responses

This section aimed to find out if mothers who behaved positively by being informative and reassuring, had children who displayed more cooperative behaviour. As can be seen from Appendix M, no significant relationship was found between the mother's observed behaviour in the treatment room and the child's behavioural response to the dental visit. However, when the children were divided into two age groups (age of 60 months was the dividing point), a significant relationship existed in the older group, between the mother's behaviour and her child's behaviour ($r=-0.34, p=0.05$). This same relationship was also significant in subjects with lower social class ($r=-0.66, p=0.008$). This finding indicates that for these two groups of subjects (older and working class subjects) mothers who behaved positively towards their children had more cooperative children. At this point it was necessary to check if lower social class had consisted mainly of older children. A oneway analysis of variance showed no significant difference between the social classes in regard to the subject's age (Table 4.17).

<table>
<thead>
<tr>
<th>Source</th>
<th>D.F</th>
<th>Sum of squares</th>
<th>Mean squares</th>
<th>F-Ratio</th>
<th>F-Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>2</td>
<td>348.0462</td>
<td>174.0231</td>
<td>0.417</td>
<td>0.6614</td>
</tr>
<tr>
<td>Within groups</td>
<td>49</td>
<td>20455.7231</td>
<td>417.4637</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>20803.7692</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>Count</th>
<th>Mean</th>
<th>S.D</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social class 1</td>
<td>9</td>
<td>57.00</td>
<td>17.93</td>
<td>32.0</td>
<td>89.0</td>
</tr>
<tr>
<td>Social class 2</td>
<td>30</td>
<td>63.80</td>
<td>19.47</td>
<td>33.0</td>
<td>133.0</td>
</tr>
<tr>
<td>Social class 3</td>
<td>13</td>
<td>63.92</td>
<td>23.94</td>
<td>30.0</td>
<td>119.0</td>
</tr>
<tr>
<td>Total</td>
<td>52</td>
<td>62.65</td>
<td>20.19</td>
<td>30.0</td>
<td>133.0</td>
</tr>
</tbody>
</table>

Table 4.17 Summary of One-way Analysis of Variance of Different Social Class on Subjects' Age.
The mothers' behaviour in the treatment room was also significantly related to several other variables, such as the mothers' age ($r=0.54$, $p=0.0005$). This relationship suggests that, the older the mother, the more passive she was. On the other hand, mothers' age was directly related to their children's age ($r=0.31$, $p=0.012$), which might explain why older mothers were passive. In other words, older mothers may have behaved passively because they had older children, therefore they thought that their children are old enough to cope with the situation without the need for their mother's intervention.

The mother's observed behaviour in the treatment room was also related to their response to question 7 ($r=0.35$, $p=0.007$), and to question 8 ($r=0.25$, $p=0.035$) of the questionnaire form. This means that mothers who were informative and helpful to their children believed that their presence in the treatment room is important for their child to relax and to be more cooperative. They also appeared to have explained to their children what to expect during the dental visit. The mothers' age appeared to be significantly related to their response to question 7 ($r=0.39$, $p=0.002$). This means that the older the mother, the less important, she thinks, is her presence in the treatment room with her child.
In an attempt to find a way to predict the mother's behaviour during the child's dental visit, two questions were formulated and included in the preoperative questionnaire (question 10 and 11, Appendix E), each with six different choices. The mother is asked to select the one that most closely describes her behaviour. Using the Pearson correlation coefficients, the mother's response to these two questions was found to be significantly related to her observed behaviour during the child's visit (r=0.40, p=0.002 for each of the questions). However, a correlation of this magnitude could not be considered to support the validity of these two questions in predicting the mother's observed behaviour.
4.7 Summary for Variables Related to the Mother's Observed Behaviour

Table 4.18 summarises all variables that are significantly related to the mothers' observed behaviour in the treatment room. The table provides the coefficient, significance level, and conclusion. The mother's age was the strongest related variable, which suggested that the older the mother the more passive she was.
<table>
<thead>
<tr>
<th>Factors</th>
<th>r</th>
<th>p</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behaviour of Children 60-133 months of age</td>
<td>0.34</td>
<td>0.05</td>
<td>Mothers who were informative and reassuring had cooperative children.</td>
</tr>
<tr>
<td>Behaviour of working class Children</td>
<td>0.66</td>
<td>0.005</td>
<td>Mothers who were informative and reassuring had more cooperative children.</td>
</tr>
<tr>
<td>Question 10 of the questionnaire form. How mothers behave on the child's visit to the doctor</td>
<td>0.40</td>
<td>0.002</td>
<td>Mothers tended to behave similarly during the child's visit to the dentist and the doctor.</td>
</tr>
<tr>
<td>Question 11 of the questionnaire form. How mothers behave when the child starts school</td>
<td>0.40</td>
<td>0.002</td>
<td>Mothers tended to behave similarly during the child's dental visit and when the child starts school.</td>
</tr>
<tr>
<td>Question 7 of the questionnaire form. Importance of the mother's presence in the treatment room</td>
<td>0.34</td>
<td>0.007</td>
<td>Mothers who believed their presence with the child is important, behaved positively.</td>
</tr>
<tr>
<td>Question 8 of the questionnaire form. Has mother told child what to expect during the visit</td>
<td>0.25</td>
<td>0.035</td>
<td>Mothers who had explained to the child what to expect during the visit, behaved positively.</td>
</tr>
<tr>
<td>Child's age</td>
<td>0.36</td>
<td>0.004</td>
<td>The older the child, the more passive is the mother.</td>
</tr>
<tr>
<td>Mother's age</td>
<td>0.54</td>
<td>0.0005</td>
<td>The older the mother, the more passive she was.</td>
</tr>
</tbody>
</table>

Table 4.18 Factors Related Significantly to the Mothers' Observed Behavior. (N = 52)
4.8 The Mother’s Perceptions of the Child’s Dental Visit, as Related to the Children’s Response to Such a Visit

The preoperative questionnaire included five questions that would elicit information about the mother’s perceptions for her child’s visit (question 4 to 9 in Appendix E). As can be seen from Appendix M, only one aspect of the mother’s perceptions for her child’s visit (question 5) appeared to be related to the child’s behavioural response, as mothers who thought that their children will be unhappy during the visit had children who behaved uncooperatively \((r=0.28, p=0.022)\).
4.9 The Mothers’ State and Dental Anxiety as Related to the Children’s Response and to Several Other Variables

The mothers’ state anxiety as measured on both the self-evaluation questionnaire (STAI) and the answers to a single question on the preoperative questionnaire (question 3) were not related to their children’s behavioural ratings or anxiety scores.

The child’s behaviour was less highly related to maternal anxiety as measured by the self-evaluation questionnaire than to maternal behaviour. However, the difference was small and both relationships were non-significant.

The mothers’ state anxiety as measured by the self-evaluation questionnaire was significantly related to their social class ($r=0.29$, $p=0.019$). The mothers’ state anxiety was also significantly related to their responses to question 4 ($r=0.25$, $p=0.037$), question 5 ($r=0.34$, $p=0.006$), and question 9 ($r=0.23$, $p=0.048$) of the questionnaire form (see Appendix E). It was not surprising that mothers will be more anxious if they believe that their children have problems with their teeth or that they will suffer emotional distress. It was also expected that mothers who are attending the clinic for the first time will show more anxiety.

The mothers’ dental anxiety as measured on both the dental anxiety scale and on her response to question 1 of the questionnaire form was not related to their children’s behaviour or anxiety. Yet, dentally anxious mothers believed that their children will suffer emotional pain during the visit. They also tended to avoid explaining to the child what to expect throughout the visit.

The mother’s dental and state anxiety as rated by herself (question 1 and 3 of the questionnaire form) was found to be highly related to her dental and state anxiety scores (on the DAS and STAI respectively). This finding suggests that these two questions could be used by clinicians to substitute larger scales that could be needed to assess the subject’s dental or state anxiety.
4.10 Other Relationships of Interest

To determine the most relevant variable related to children's cooperative behaviour, a stepwise regression analysis was used. The mother's perception of her child's emotional feeling during the visit appeared to be significantly related to children's cooperative behaviour (p=0.0078), (Table 4.19 ). This means that mother's who thought that their children will be unhappy during the visit had uncooperative children. Other variables such as the mother's behaviour and anxiety, and the child's self-rated anxiety were found not to be related significantly to the children's behavioural ratings.

<table>
<thead>
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<th>B</th>
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<th>Beta</th>
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Table 4.19 A Stepwise Multiple Regression Analysis for the Strongest Variable Related to the Children's Behaviour Ratings.

A t-test was performed to test for any significant difference in the children's behaviour or anxiety between sexes. Results showed no significant difference (Table 4.20). The t-test was also used to test for any difference in cooperative behaviour between first and later born children. Both groups exhibited the same mean for behavioural ratings (Table 4.20).
<table>
<thead>
<tr>
<th>Factor</th>
<th>Mean</th>
<th>S.D</th>
<th>t-Value</th>
<th>2-Tail Prob.</th>
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</thead>
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</tr>
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<td>1.172</td>
<td>1.72</td>
<td>0.103</td>
</tr>
<tr>
<td>Female</td>
<td>8.4706</td>
<td>1.700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children's State Anxiety</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(the Picture Test)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2.9412</td>
<td>2.546</td>
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<td>Female</td>
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<td>Children's Behaviour Ratings</td>
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<tr>
<td>First Born</td>
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<td>1.330</td>
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</tr>
<tr>
<td>Later Born</td>
<td>9.000</td>
<td>1.500</td>
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</tbody>
</table>

Table 4.20 Relationship of the Children's Behaviour and Anxiety to Their Sex and Birth Order.

The children's self-rated anxiety appeared to be related significantly to their age ($r=-0.24$, $p=0.05$). This means that older children were less anxious than younger ones. However, the children's behaviour was not related to their age. This could suggest that anxious children do not necessarily show negative behaviour.

The mothers' response to question 7 appeared to be related to their children's birth order ($r= 0.21, p=0.06$). This could indicate that mothers who were having their first child examined believed that it is important for them to stay with their child more than did mothers who were having their later born child examined. This could be explained that with experience the mother's concern and overprotectiveness for her child will be decreased.

The mother's response to item 6 of the questionnaire form was the same for all the subjects of the study. All mothers believed that their child would not suffer any physical pain during the visit.
4.11 Summary

The main findings of this study could be summarised as:

1- The mother’s behaviour in the treatment room (whether it is positive by being informative and helpful, or negative by being passive) was not related to their children’s behavioural ratings. Therefore, the first research hypothesis was not supported. However, when the sample was divided into two age groups, a significant relationship between maternal and children’s behaviour existed in the older age group (60-133 months) \( (r=-0.34, p=0.05) \). This same relationship was found to be significant in subjects from lower social class \( (r=-0.66, p=0.008) \). These findings indicate that for these two groups of subjects (older and working class subjects) mothers who behaved positively by being informative, reassuring, and helpful to the child had more cooperative children.

In addition, the child’s behaviour was more strongly related to the mother’s behaviour than to her anxiety. However, the difference between the two relationships was very small and both were non-significant.

2- The mother’s behaviour towards her child during the first dental visit was significantly related to her behaviour in two everyday life situations in which the child might become anxious (these two situations were described to the mother by two questions in the preoperative questionnaire). Thus, the second research hypothesis was confirmed.

Though encouraging, this relationship was relatively low therefore the above mentioned two questions could not be recommended for predicting the mother’s behaviour toward her child in dental setting.

3- The pre-appointment procedure (the letter) did not have any significant effect in modifying the mothers’ behaviour or in improving the children’s adjustment to the dental situation. However, this finding
could be misleading as several limitations to the design of the present study could have affected the results. It would seem important to avoid these limitations in future research, this will be discussed in the following chapter.

4- The child's behaviour in the initial dental visit appeared to be related to one aspect of the mother's perception for her child's visit, namely, the mother's prediction about the child's emotional state during such visit, (children's behavioural ratings were significantly related to their mothers answers to item 5 of the questionnaire form which asks the mother if she thinks that her child will be unhappy during the visit). This finding proved the fourth research hypothesis. However, the relationship was so low that it did not encourage the use of this item of the questionnaire in predicting the child's behaviour.

5- A scheme, that was devised for categorising the mother's behaviour appeared to be reliable and valid.

6- When the whole sample was examined, most mothers (90.3%) were found to behave in a positive way, providing the child with assurance, explanation, and information about the dental procedure. Only few mothers were passive (9.6%), sitting quietly and not interacting with their child. This finding could suggest to dentist that most mothers behave positively on the occasion of the child's first dental contact.
CHAPTER 5: DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

5.1 DISCUSSION AND CONCLUSION
5.2 RECOMMENDATIONS
5.2.1 RECOMMENDATIONS FOR PRACTITIONERS
5.2.2 RECOMMENDATIONS FOR FUTURE RESEARCH
5.1 Discussion and Conclusions

The mothers' behaviour in the treatment room was not related to their children's behaviour. This finding did not support the first research hypothesis. However, the mother's behaviour in the treatment room appeared to be related significantly to the behaviour of older children in the sample. This could be due to the older child's increasing cognitive sophistication that might make him/her more sensitive and susceptible to the mother's behaviour which the young child is not likely to perceive.

The mother's behaviour was also related to the children's behaviour with lower social class subjects (social class 3). This finding has a practical implication for clinicians. It suggests that with subjects from lower social strata a greater emphasis and consideration should be given to the mothers' behaviour as a factor that could affect the children's response to dental treatment.

Older mothers were expected to show better behaviour due to their experience. The reverse was shown implying that the older the mothers the more passive they were. On the other hand, there was a direct significant relationship between the mother's behaviour and their children's age and between the mother's and children's age. This means that mothers who behaved passively during the child dental visit had older children and were older themselves than those who behaved positively. This might explain why older mothers were passive, in other words, older mothers might have thought that their children are old enough to cope with the dental procedure without the need for their mother's intervention.

In addition, the mother's behaviour in the treatment room was significantly related to two aspects of her perception for her child's visit. The first one was how important she thinks her presence with the child is during the first dental visit (Item 7 of the questionnaire form). This finding implies that when the mother thinks her presence in the dental room is important for her child to be more relaxed during the visit, this same mother will show better behaviour by being
informative and helpful if she is to be admitted with her child. However, this relationship was relatively low therefore item 7 of the questionnaire form could not be recommended as a predictor for the mother's behaviour in the treatment room. It should be mentioned here that children's age was almost significantly related (p=0.08) to the mothers answer to the same question, therefore mothers of older children might not have found it necessary to accompany their child to the dental room because they might have believed that the child is old enough to cope with the situation.

The second aspect of the mother's perception of the child's visit that was significantly related to her behaviour in the treatment room was her answer to item 8 of the preoperative questionnaire (which asks the mother if she had explained to her child what to expect during the visit). This indicates that mothers who behaved passively during their child's dental visit did not even take the effort to explain to their children what to expect during such a visit. This relationship is questioned due to the significant relationship which existed between the child's age and the mother's answer to question 8. In other words, mothers might have thought that their children did not need an explanation because they were old enough.

On observing the videotaped visits, four mothers appeared to have displayed facial signs of anxiety, such as biting their nails and grinding their teeth. It was observed that these sort of behaviours were displayed at a time when the children were not looking at their mothers therefore, those behaviours were not noticed by the children. In addition those same mothers were informative and helpful to their children throughout the visit. This might suggest that an anxious mother does not necessarily show her anxiety to her child, on the other hand she might pretend to be brave and try to behave in a favourable way for the benefit of the child.

Since there is no other study that has investigated the effect of the mother's behaviour on the child's response to the dental visit, no comparison could be made in regard to this variable.
The mother's behaviour in the treatment room was also significantly related to her answers to two items of the questionnaire form (question 10 and 11) that were designed to elicit information about the mother's behaviour toward her child when the child visits the doctor and when s/he starts school. This significant finding confirms the study's second hypothesis and suggests that when the child become anxious in situations other than visiting the dentist, the mother's behaviour toward her child and her strategies in demanding good behaviour would be the same as at the dentist's. This means that mothers who behave positively by providing information and reassurance will tend to behave similarly in all situations when the child becomes anxious. The relationship was relatively low therefore, although encouraging it did not support the use of the above mentioned two questions in predicting the mother's behaviour in the treatment room.

When the data were analysed to find out the effectiveness of the pre-appointment procedure, there was no significant difference in the observed mother's behaviour between the experimental and control group. The absence of a significant difference could be misleading due to the fact that there was already little variation in the observed mothers' behaviour in the control group, which might have happened due to one of three different reasons. One, the fact that most of the sample represented subjects having moderate to high social background. Second, the dental treatment provided for the children was a non-stressful one. And third, all mothers in the study knew that they were taking part in an investigation, and they also knew that the visit was being videotaped (these factors were explained more extensively in earlier Section 4.2). The conclusion was that, most of the mothers in the control group have already shown good behaviour. Therefore even if the advice letter have had an effect on improving the behaviour of mothers in the experimental group, there was little opportunity for the difference to be shown.

This finding could suggest that, in future research it would be wise to control factors that were expected to have led to this little variation
in the mothers' behaviour, such as, not mentioning to the mothers that a study is under way, and to examine the children prospectively during subsequent dental visits. Such visits could involve procedures (filling or extraction) which might generate sufficient stress to allow different intensity of the child's response and subsequently different coping behaviour for mothers.

Several previous studies have suggested that the initial dental visit, when restorative procedures are not involved, do not cause sufficient anxiety, even in unprepared patients, for the effect of preparation to result in a significant difference in behaviour ratings (Purcell, Albino, and Bernat 1983, Pinkham and Fields 1976, Johnson and Machen 1978). When the present study was established, it was the intention to examine children on initial and subsequent visit which should involve restorative treatment. Unfortunately, this course of action was not possible due to the lack need for restorations in most of the subjects.

Another limitation of the design of this study was the difference in the mean age of the control and the experimental group. Although on comparing age of the control and experimental group no significant difference could be found (Table 4.5), yet there was a difference in mean age that should be acknowledged. As can be seen from Table 4.6 the mean age for the control group was almost sixty-six and a half, while that of the experimental group was fifty-eight and a half months. Since some of the previous investigations have found the age to be a significant factor to influence the child's reaction to an initial dental visit (Frankl et al 1962, Hawley et al 1974, Neuburger 1978, Oppenheim and Frankl 1971, Venham 1979), the difference of almost eight months could have a significant influence on the results of the study. In other words, the experimental subjects were at an age when they were more prone to certain fears than the control subjects, and they were also a more difficult group with which to reason, due to their age, therefore, they were less influenced by what their mothers say.

However when an attempt was made to evaluate this hypothesis, correlations obtained between age and behaviour ratings were not significant (r = 0.17, P = 0.121). Nevertheless, in future studies it would
seem important to avoid the large group differences for age that occurred in this study.

The mean of the mother's anxiety scores in the experimental group was slightly less than those in the control group, but this difference was not significant.

Other studies that have investigated the effect of a preappointment letter on the child's behaviour and anxiety reported no significant reduction in the incidence of behaviour problems as a result of mailing the preappointment letter (Hawley et al 1974, Wright et al 1973). However, in one study, the letter had modified maternal anxiety by decreasing the mother's anxieties at her child's first dental appointment (Wright et al 1973). In another study, the letter had a positive effect on the parent in that there were significantly fewer broken appointments in the experimental group than in the control group (Hawley et al 1974). Findings from the present study were in accordance with earlier findings, as there was no improvement in children's behaviour or anxiety due to the letter. This could be explained that, in addition to the fact that the dental procedure itself was a non-stressful one (examination and cleaning of the child's teeth), the dentist and his assistant were friendly to the children. Therefore this might have led to good cooperative behaviour that was shown by most of the subjects. Moreover, a close analysis of the dialogue used by the dentist showed that the "tell-show-do" management approach was used with all the children thus providing them with some degree of preparation which might have masked any possible effect due to the advice letter.

Although the letter did not improve the behaviour or anxiety of the children or their mothers, it could have possibly affected children and their mothers in ways not measured by this study. For example, it is assumed that the letter had served as a tool to educate the mother by emphasising the importance of the child's first dental visit and providing her with principles about how to prepare her child for a subsequent visit. Such preparation by the mother may improve the child's adjustment to subsequent dental visits that might involve
stressful treatment like fillings or extractions. Moreover, the letter could have also improved the children’s attitudes toward dental care which may affect their later propensity to follow preventive routine and to accept dental treatment with minimal stress throughout their lives.

When maternal anxiety was investigated as to its relationship to the children's behaviour in dental settings, several previous studies found a significant relationship while a few did not. The reason for this is not clear. Some studies suggested the need to re-evaluate the popular belief that the child's dental anxiety is acquired through imitation of the mother's attitudes or by direct maternal reinforcement of such fears. Whereas most previous research in this area has emphasised trait anxiety, this work considered state anxiety. Results showed a non-significant relationship between the children's behaviour or anxiety and their mothers' state anxieties. This finding was in accordance with findings from other studies (Klorman et al 1978, 1979, Melamed et al 1978, Pinkham and Fields 1976). As suggested earlier by Klorman et al (1979) who had also examined the maternal state anxiety, this theoretical tendency to blame the mother for most of the child’s psychological disorders, may well have to be reconsidered. It might be applied to phobic levels of fear of dentistry, but parental influence appears much less important for the moderate disruptiveness or anxiety observed in the unselected samples like the one in Klorman's and the present study.

In addition, results indicated that children’s behaviour was more highly related to maternal behaviour than to maternal anxiety. However, the difference between the two relationships was very small and both relationships were non-significant. Therefore, these results could not prove the earlier hypothesis which stated that maternal behaviour is more important than maternal anxiety in determining the child’s response to the dental situation. It should be mentioned though that there were little variation in the ratings of the mothers’ behaviour which could have happened due to several reasons explained earlier (see Section 4.3). This could have contributed to the weak relationship between the children’s behaviour and the mothers’ behaviour in general.
While on the other hand, ratings of maternal anxiety showed more variation. Thus it would be expected that children's behaviour would be related more highly to maternal anxiety than to maternal behaviour. Since this was not the case in the present investigation, it could be suggested that the above mentioned hypothesis could be possibly demonstrated in future research that would include a wide range of ratings of all of the variables concerned.

The mothers' state anxiety was significantly related to their social class. This could be explained in that mothers in the lower class, not having received correct dental attention, might express a greater anxiety than those of higher social classes who have been raised with the correct dental attention. This might lead us to think that lower social class mothers, if they are predominantly in charge of the rearing of their children might have a greater effect on them than higher social class mothers. However this belief was not supported in this study because there was no significant relationship between children's behaviour or anxiety and their social class.

A significant relationship was found between the mother's anxiety scores as measured by the Spielberger self-evaluation questionnaire and her perception about the child's dental state and emotional feelings during the first dental visit. In addition, the later aspect was significantly related to the child's behaviour. This could suggest that when a mother thinks that her child will be unhappy during the visit, it will tend to increase her anxiety and decrease the child's cooperation. Or it could be that mothers might know their children quite well and accurately predict what they will do. However, the relationship was relatively low therefore, it did not recommend that a knowledge of the mother's perception of her child's emotional feelings during the dental visit, could be used in identifying anxious mothers with uncooperative children.

It was not surprising that mothers who have not been to the surgery before will express a higher state anxiety than those who have. Although this relationship did not seem to have affected the children's behaviour in the dental setting, it could suggest that clinicians should
give special consideration to those mothers who have not been to the surgery.

A highly significant relationship was found between the mother's dental and state anxiety scores as measured by the DAS and the STAI respectively ($r=0.66, p=0.0005$). This confirms previous findings (Weisenberg, Kredl, and Schachat 1974) that have reported a relationship between the DAS and the state subscale of the STAI ($r=0.48, p=0.001, df=71$). It supports the validity of the DAS as a measure of situationally aroused anxiety.

The mothers' dental anxiety was not significantly related to their children's behaviour. When observing the videotapes, very few mothers showed facial signs of fear of the dental sounds and equipment, but meanwhile they tried to hide their feelings by being informative and helpful to their child. This could suggest that even fearful and anxious mothers might behave in a positive way for the benefit of their child. The absence of a significant relationship between maternal dental anxiety and children's behaviour supported findings from another study (Klorman et al. 1978, 1979) which clearly do not support the belief that fear of dentistry is acquired by the child through exposure to an anxious mother.

The means of the children's behavioural ratings and their anxiety scores (Table 4.16) suggests that most of the children in the sample showed positive behaviour and low anxiety. This could have happened due to several factors. First, all children knew beforehand that the dentist was going to clean and polish their teeth. This meant that the visit would not involve any threatening procedure. Second, the visit itself was very brief. It took the dentist 5-10 minutes on the whole to treat each child. Third, the dentist and his assistant approached the children in a friendly and kindly way. Moreover, the tell-show-do method was used by the dentist for most of the children in the study. However, the children's behavioural ratings were consistent with those reported in several previous studies (Frankl et al. 1962, Johnson and Machen 1973, Oppenheim and Frankl 1971).
The children's state anxiety as measured by the picture test appeared to be related to their age. This suggests that as the children grow older they will express less dental anxiety. This finding was found to be in accordance with the finding from other studies (Venham 1972, 1979). However, the children's anxiety was not significantly related to their behavioural ratings. Previous studies who have used the same test (the picture test) have found low to modest correlations between performance on the picture test and behavioural ratings of cooperation (Klorman et al 1978, 1979, Sonnenberg and Venham 1977, Venham and Gaulin-Kremer 1979). Factors that could lead to discrepancies between different measures of anxiety have been discussed earlier (see section 2.4.5). However, the low relationship between the self-report and behavioural measures in this particular instance could be explained either due to measurements inadequacy or methodological problems.

The self-report measure for anxiety (the picture test) portrayed pictures of boys only. Thus the fact that there was no female version for the test could question the test's validity in measuring anxiety in female subjects. This is the only criticism that could be applied to the measurements used in the present investigation as several previous studies have demonstrated that the measures are reliable and valid (Frankl et al 1962, Koenigsberg and Johnson 1975, Machen and Johnson 1974, Venham and Gaulin-Kremer 1979).

This could lead to the suggestion that the problem could lie in the methodology of using the measures, such as the fact that the self-report measure was used at the outset of the dental visit while behavioural ratings were obtained throughout the visit. Therefore the discrepancy between the two measures could be explained as the self-report measure reflected the child's initial response to the dental visit while the behavioural measure represented an average response to procedures occurring throughout the visit. The problem could also be explained in the little variation among the behavioural ratings of the subjects. Most of the children in the present study behaved in a cooperative way, this could contribute to the low correlation found between the self-report and behavioural measures, as the reduction in
the variability of scores reduces the size of the correlation coefficient (McCall 1970).

Finally, all mothers in the study believed that their children would not suffer any physical pain during the visit (according to their response to question 6 of the questionnaire form). This could be explained by the fact that all mothers in the study were informed beforehand about the dental procedure their children would receive (cleaning and polishing of the child's teeth). This procedure could not possibly cause much physical harm.
5.2 Recommendations

Based on the results of this study, the following recommendations are made in regard to both practitioners and researchers:

5.2.1 Recommendations for practitioners

1- This work suggests that dentists must recognise the influence of the mother's behaviour during the dental visit on moderating the child's response, especially when dealing with older and working class subjects. In such case, it may be helpful and necessary to deal with mother before treatment on the child begins. Therefore, communications and procedures must be structured in an attempt to know, and then, modify the mother's behaviour towards her child during the dental session.

2- In the present study, although the mothers' behaviour in the treatment room was not related to the children's behaviour in general, most mothers appeared to behave in a favourable, desirable way. This suggests that there is no harm in including the mother in her child's visit, at least at the occasion of the child's first dental visit.

3- The study examined the validity of two questions (question 10 and 11 of the questionnaire form) in predicting the mother's behaviour toward her child during the dental visit. While the results were encouraging, it is apparent that additional research is needed before extensive clinical usage can be employed.

4- Based on the results of this study, the letter of advice can not be recommended as an effective preparatory method for young children at their first dental visit. However, the letter could be helpful if used prior to subsequent dental visits when the child undergoes a more stressful
procedure. Previous research has suggested that many children demonstrated anxiety during certain phases of restorative treatment, such as administration of local anesthetic, which may be more likely to show significant difference with preparation. However, this could be established by further research that would examine the subjects prospectively to determine the actual effect of the advice letter on mothers' and children's behaviour during the child's initial and subsequent dental visits.

5.2.2 Recommendations for future research

1- The present study represents the first attempt to investigate the effect of the mother's behaviour in the treatment room on the child's response to dental settings. There are no other studies of the dental situation which have attempted to investigate this aspect, therefore no comparison can be made. Continued research is needed to investigate this aspect, especially with children undergoing more stressful procedures, for example, fillings or extractions. Such procedures might generate sufficient stress to allow different intensity of the child's response and subsequently different coping behaviour for mothers.

2- The present study suggests that the heavy emphasis put by previous research on investigating the influence of maternal anxiety on the child's dental response may well be shifted to investigate a more direct maternal factor, namely, maternal behaviour.

3- In future studies, it is advisable not to mention to the subjects that a study is under way. Also to have all the research equipments (video-recorder and camera) hidden. This may not be possible to do due to ethical reasons, as was the case in the present study. However, it is believed that mothers did not behave as they would normally do
because they knew that a study is in progress. In fact, a few mothers frequently looked at the camera, one even smiled and tided herself as if to make herself presentable to be photographed. However, a separate investigation would be necessary to establish the effect that the camera, the video-recorder, or any other research equipment could have on the behaviour of the children and their mothers.

4- The effectiveness of the preappointment letter needs to be re-investigated. So far this method had only been investigated at the child's initial visit to the dentist. Therefore, future research should choose to examine children under subsequent, more stressful procedures like fillings or extractions.

5- In the present study a six-point scale was found to be valid and reliable for categorising the mother's behaviour toward her child during the dental visit. This scale could be useful for future research.
5.3 Contributions

This thesis increases our understanding of maternal influences on the child's response in dental settings. It presents the first attempt to investigate the effect of the mother's behaviour in the treatment room on the child's adjustment in such settings, thus promoting awareness among dentists and researchers of the importance of the mother's behaviour factor in determining the child's dental response.

A rating scheme was developed for rating the mothers' behaviour during child's dental visit. This scheme is simple, quick, and non-intrusive, it is easily integrated into ongoing clinical activities or research designs. Such rating scheme potentially provide standard tool which could be used for the comparebility of findings of different future pedodontic research.

Finally, the present investigation have described an experimental situation for the study of behaviour in the dental or medical setting which can be utilised in future investigations.
References


Research., 68, 1664-1671.


Appendices

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Appendix D: Consent form for Children's Dental Fear Study
Appendix E: The Preoperative Questionnaire
Appendix F: The Dental Anxiety Scale
Appendix G: The State-Trait Anxiety Inventory
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Appendix M: Pearson Correlations Between All Variables of the Whole Sample
Appendix A

Letter Sent to Health Authority
Dear Mr. Bettles,

I am writing to you on behalf of Huda Jergeas, who is undertaking a part-time postgraduate research degree in this department under my supervision. She is a qualified dentist who wishes to study the relationship between the behaviour of the mother and her child in a dental setting. The aim of this research is to identify which behaviours of the mother are associated with cooperative behaviour on the part of the child. Further details of the research project are described below.

Huda would like to carry out this research in dental surgeries in the Loughborough area. She has already contacted Mr. Alan Jones, the school dentist in Loughborough Health Centre, who is willing to take part in this research provided that permission is granted for it to be carried out.

We are writing to you to ask you to allow this research to be undertaken. The research is intended to involve the voluntary participation of about sixty mothers and their children who are attending the dentist for the first two visits. The consent of mothers will be sought by the dental nurse who will be responsible for arranging the visits. The dental nurse will give children who will be visiting the dentist a letter to give to their mothers which will contain a brief description of what the research will entail and will also ask them if they would be willing to participate in this research. A copy of this letter is enclosed.

Mothers who agree to take part will be asked to answer a few questions about their general and dental anxiety and other aspects of their child's visit to the dentist. We would be happy to send you a full copy of these questions should you want this.

The behaviour of the child and the mother will be videotaped in the dental surgery. The content of the videotape will be observed later by trained judges, who will be required to rate in terms of predesignated categories. The information obtained will be kept strictly confidential and will only be used for research purposes. None of the participants will be identified in the reporting of this research.
We will be happy to provide you with any further details of this research that you may need to assess whether it meets your ethical standards. We shall also be happy to incorporate any additional requirements that you may think necessary to do so. We would like to thank you in advance for considering this request and look forward to hearing from you.

Sincerely Yours

D. M. Cramer
Appendix B

Letter Sent to Mothers
Dear Mrs.,

I am writing to you to ask you if you and your child will be willing to take part in a study that I am carrying out which is looking at the way that mothers and their children behave during the child's first visit to the dentist. One of the aims of the research is to try and help make children less anxious about visiting the dentist.

If you agree to take part in this study, all that you will be required to do is to answer some questions about how you feel about you and your child's visit to the dentist, as well as how anxious you are feeling. In addition, you and your child will be videotaped in the treatment room, and your child will be asked few questions about how s/he feels while sitting in the dentist's chair. The videotapes and the answers that you and your child give will be treated in strictest confidence and will only be used for research purposes. Neither you nor your child will be named when this study is discussed.

If you would like to take part in this study, please would you read and sign the enclosed consent form. If you agree to take part, please bring this form along with you when you come with your child to the dentist. I would like to thank you for the trouble that you've taken so far to help in this research.

Yours sincerely

Huda Jergeas, B.D.S.
Appendix C

Letter of Advice Sent to Mothers
Advice

Your child is going to have his/her first experience at the dentist, and since a mother has the main responsibility for looking after her child's teeth, I am writing to you in the hope that you will be able to make this an easier, even pleasant experience for your child.

On his/her first visit your child will have his/her teeth examined, cleaned, and treated if necessary. For most children this proves to be an interesting occasion.

Parents play a most important role in getting children started with a positive attitude toward dental care, and since the child's initial visit to the dentist is a new and unique experience for him/her, I believe that the way s/he is prepared for this first visit will affect his/her behaviour and possibly his/her general attitude to dental care throughout life.

One of the ways in which you can help is to be completely natural and matter of fact when you tell your child about his/her appointment with the dentist and to give very simple and brief information about it. You could for example, tell him/her that the dentist is going to look after his/her teeth for him/her and make them especially nice and clean. It is important to use positive statements and avoid such words as hurt and pain. This approach will enable him/her to view it as an opportunity to meet some people who are interested in him/her and want to help him/her to stay healthy, and to expect and understand what might s/he see, feel, and experience throughout his/her visit.

In this way I do hope that you will be able to help us to help your child as well as other children, and your cooperation will be very much appreciated.
Appendix D

Consent form for Children's Dental Fear Study
CONSENT FORM

Child's Name:__________________________

I give my permission to Huda Jergeas, who is a postgraduate student in the Social Sciences Department at Loughborough University of Technology, to include me and my child in her study, which is looking at the way that mothers and their children usually behave during their child's first visit to the dentist.

I understand that my child and I will be asked to do the following:

(1) I will answer questions about how I feel about me and my child's visit to the dentist, as well as how anxious I am.

(2) My child and I will be videotaped in the treatment room.

(3) My child will be asked to answer some questions about how s/he feels while sitting in the dentist's chair.

(4) A letter containing advice about dental care may be sent to me a week before my child's visit.

I understand that the videotapes and any information given by me and my child will be kept strictly confidential and will only be used for research purposes.

I understand that there will be no risk for my child if s/he takes part in the study.

I understand that any questions I have about the study will be answered by Mrs. Jergeas who will be present at the surgery.

I understand that my child and I will be able to withdraw from the study at any time and without anyone's permission, and that should this happen it will not affect, in any way, the dental treatment that is given.

I have read the consent form, I understand it, and my child and I are willing to take part in this study.

/__________________________
Mother's signature:

Date:__________________________
Appendix E

The Preoperative Questionnaire
Please fill in or circle number

Child's name ..................................  Today's date ..........

Date of birth ................................ Sex  Male .............................. 1
                                            Female .............................. 2

Child's birth order in the family (for example, the birth order of a child who is the first in a family with three children will be 1/3) ...........................................................................

address ..............................................  Tel. No.  ................................

.............................................................................

Current occupation of the head of household ..................................

1 How anxious do you generally feel when you go to the dentist?
   a- high (very nervous).............................. 1
   b- moderately high ................................. 2
   c- moderately low .................................. 3
   d- low .................................................. 4

2 Do you think your child understands how you feel about dental treatment?
   a- yes .................................................. 1
   b- no .................................................... 2

3 How would you rate your own anxiety (fear, nervousness) at this moment (i.e. while waiting with your child for his/her dental treatment)?
   a- high (very nervous).............................. 1
   b- moderately high ................................. 2
   c- moderately low .................................. 3
   d- low .................................................. 4

4 Do you think that there is anything wrong with your child's teeth such as chipped tooth, decayed tooth, gumboil ....... etc?
   a- yes .................................................. 1
   b- no .................................................... 2
5 Do you think that your child will be unhappy during this appointment?
   a- yes ........................................ 1
   b- no ........................................ 2

6 Do you think that your child will suffer any physical pain during this appointment?
   a- yes ........................................ 1
   b- no ........................................ 2

7 For your child to be relaxed and to behave more co-operatively at his first dental visit, do you think that your presence in the treatment room is:
   a- extremely important .......... 1
   b- Important .............................. 2
   c- Not important ....................... 3
   d- Don't know ............................ 4

8 Have you explained to your child what might he/she experience on this visit?
   a- yes ........................................ 1
   b- no ........................................ 2

9 Have you ever been to this surgery?
   a- yes ........................................ 1
   b- no ........................................ 2

Here are two paragraphs, each with different choices. Circle the one which most describes your behaviour:

10 Imagine that you took your child to the doctor, but he was reluctant to be examined or even to enter the doctor's room. What would you be most likely to do?

a Understand his feelings, try to convince and assure him by simply describing how the doctor is going to examine him and appropriate behaviours for examination session ................................. 1

b Give him assurance by telling him that he can cope, it will not be so bad ...etc, and show your empathy by telling him that you understand his situation, kissing, hugging, or petting him. ................................................................. 2
Tell him that you will give him something he likes if he acts differently ................................................. 3

Tell him that you don’t love him for his stupid behaviour .......... 4

Threaten to punish him ................................................................. 5

Don’t do any thing .................................................................................. 6

A child may behave anxiously on his first week at the nursery or school. He may express his anxiousness by being upset, angry, he may even cry, scream, hold his mother tightly and ask her to stay with him. If your child had this behaviour persistent through his second week at the school, how would you be most likely to do?

Give him assurance by explaining the advantage of being at school, show him how other children are coping and try to stay with him for a short while if he needs that .......................... 1

Give physical assurance by petting, hugging and or kissing him, with some verbal assurance and stay with him as long as he wish ................................................................. 2

Tell him that you will give him some thing he likes if he acts differently ................................................................. 3

Tell him that he is not as good as other children and that you don’t love him for his stupid behaviour ................................................. 4

Threaten to punish him ................................................................. 5

Don’t do any thing .................................................................................. 6
Appendix F

The Dental Anxiety Scale
Please circle number

1 If you had to go to the dentist tomorrow, how would you feel about it?

a- I would look forward to it as a reasonably enjoyable experience. ......................................................... 1
b- I wouldn’t care one way or the other................................................. 2
c- I would be a little uneasy about it. ................................................. 3
d- I would be afraid that it would be unpleasant and painful. 4
e- I would be very frightened of what the dentist might do. ... 5

2 When you are waiting in the dentist’s office for your turn in the chair, how do you feel?

a- Relaxed. ........................................................................................................ 1
b- A little uneasy. ............................................................................................... 2
c- Tense. ........................................................................................................... 3
d- Anxious. ....................................................................................................... 4
e- So anxious that I sometimes break out in a sweat or almost feel physically sick. ................................................................. 5

3 When you are in the dentist’s chair waiting while he gets his drill ready to begin working on your teeth, how do you feel?

a- Relaxed. ........................................................................................................ 1
b- A little uneasy. ............................................................................................... 2
c- Tense. ........................................................................................................... 3
d- Anxious. ....................................................................................................... 4
e- So anxious that I sometimes break out in a sweat or almost feel physically sick. ................................................................. 5
You are in the dentist's chair to have your teeth cleaned, while you are waiting and the dentist is getting out the instruments which he will use to scrape your teeth around the gum. How do you feel?

a- Relaxed. ................................................................. 1
b- A little uneasy. .......................................................... 2
c- Tense. ........................................................................ 3
d- Anxious. .................................................................... 4
e- So anxious that I sometimes break out in a sweat or almost feel physically sick. .................................................. 5
Appendix G

The State-Trait Anxiety Inventory
SELF-EVALUATION QUESTIONNAIRE

Developed by Charles D. Spielberger
in collaboration with
R. L. Gorsuch, R. Lushene, P. R. Vagg, and G. A. Jacobs

STAI Form Y-1

Name _________________________ Date __________ S __
Age __________ Sex: M __ F __

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

1. I feel calm
2. I feel secure
3. I am tense
4. I feel strained
5. I feel at ease
6. I feel upset
7. I am presently worrying over possible misfortunes
8. I feel satisfied
9. I feel frightened
10. I feel comfortable
11. I feel self-confident
12. I feel nervous
13. I am jittery
14. I feel indecisive
15. I am relaxed
16. I feel content
17. I am worried
18. I feel confused
19. I feel steady
20. I feel pleasant

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Appendix H

Frankl Behaviour Rating Scale
Rating 1: Definitely Negative
Refusal of treatment, crying forcefully, fearfull, or any other overt evidence of extreme negativism.

Rating 2: Negative
Reluctanct to accept treatment, uncooperative, some evidence of negative attitude but not pronounced, i.e. sullen, withdrawn.

Rating 3: Positive
Acceptance of treatment; at times cautious, willingness to comply with the dentist, at times with reservation but patient follows the dentist's directions cooperatively.

Rating 4: Definitely positive
Good rapport with the dentist, interested in the dental procedures, laughing and enjoying the situation.
Appendix I

Child’s Self Report Anxiety Measure (The Picture Test)
Appendix J

Categories of Mother's Behaviour
CATEGORIES OF MOTHER'S BEHAVIOUR

1- The mother is relaxed and focuses her attention on her child's behaviour. She tries to give reassurance - in case it is needed - by informing the child about the coming procedure in a simple way, or describing appropriate behaviours for the dental session. In addition to that, she might try to give more assurance by using verbal empathy like telling the child that it will not hurt, it will not be so bad, etc or verbal praise like telling the child s/he is mature, brave, strong, capable, doing fine, etc. The mother might also encourage more cooperative behaviour by distraction, through engaging in conversation with the child on unrelated topic or to redirect the child's attention away from dental related object(s) in the room.

2- The mother focuses her attention on the child's feelings and attempt to reduce fear through physical contact like petting, stroking, hugging, kissing, etc. She might also assure her child through use of verbal empathy or verbal praise.

3- The mother will try to obtain cooperative behaviour from her child by promising a reward for good behaviour.

4- The mother will try to obtain cooperative behaviour from her child by putting him/her in comparison with others or by blaming him for being anxious or uncooperative.

5- The mother will attempt to obtain cooperative behaviour from her child through the use of verbal commands, threats and physical intervention, with no attempt to reduce her child's fear or anxiety.

6- The mother will remain passive. Either she remains uninvolved (sometimes without even making eye contact with her child) or she engages in other activity like talking to the dentist or assistant on subjects unrelated to the dental situation.
Appendix K

Pearson Correlations Between All Variables of the Experimental Group.

Abbreviations used in the Appendix:

- BO: Birth Order
- SC: Social Class
- DAS: Dental Anxiety Scale
- MAGE: Mother Age
- STAI: State Trait Anxiety Inventory
- PT: Picture Test
- CB: Child's Behaviour Rating
- MB: Mother’s Behaviour
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(COEFFICIENT / (CASES) / SIGNIFICANCE) (A VALUE OF 99.0000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)
Appendix L

Pearson Correlations between All variables of the control Group

Abbreviations used in the Appendix:

BO  Birth Order
SC  Social Class
DAS Dental Anxiety Scale
MAGE Mother Age
STAI State Trait Anxiety Inventory
PT Picture Test
CB Child's Behaviour Rating
MB Mother's Behaviour
### Pearson Correlation Coefficients

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(COEFFICIENT / (CASES) / SIGNIFICANCE) (A VALUE OF 99.9999 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)
Appendix M

Pearson Correlations Between All Variables of the Whole Sample

Abbreviations used in the Appendix

BO Birth Order
SC Social Class
DAS Dental Anxiety Scale
MAGE Mother Age
STAI State Trait Anxiety Inventory
PT Picture Test
CB Child's Behaviour Rating
MB Mother's Behaviour
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(COEFFICIENT / CASES / SIGNIFICANCE)
## Pearson Correlation Coefficients

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*(Coefficient / (Cases) / Significance)*

*(A value of 99.0000 is printed if a coefficient cannot be computed)*
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(COEFFICIENT / (CASES) / SIGNIFICANCE) (A VALUE OF 99.0000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)