AN ASSESSMENT OF DENTAL ANXIETY IN CHILDREN

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ABSTRACT

This study was designed to assess why children become fearful of dentistry and what role relative analgesia (RA) plays in reducing a child's fear.

The dental literature indicated that dental anxiety could be divided into three major factors: medical/dental, individual and environmental. The psychological literature provided a model of anxiety based upon a conjunction of cognitive and behavioural theories.

The subjects were aged between 6 and 18 years, and comprised of 65 experimental subjects (selected from referrals for anxiety and/or non-cooperation) and 42 control subjects (matched for age and gender with the experimental group). All subjects were taken from one dentist's case list and were seen by the same dentist. Data were collected in three stages, firstly, from a pre-treatment questionnaire/interview based on the work of Williams et al. (1985) together with the Corah Dental Anxiety Scale (DAS) to measure parent's dental anxiety and the Child Manifest Anxiety Scale (CMAS) to assess children's general anxiety levels. Secondly, video data of children undergoing dental treatment were collected for analysis using the Venham Anxiety Scale, Melamed Child Behaviour Profile and Weinstein Dentist Behaviour Profile. Thirdly, further data were collected after treatment from parents and dentist. This information related to treatment given, measures of how anxious and cooperative the child had been and whether the child had had a GA or RA.

The major conclusions reached by this study were, firstly, that dental anxiety is a specific fear (phobia) of potential injury with a postulated temperamental factor, relating to vigilance and pain expectation. Secondly, a short checklist was developed to aid dentists in assessing children at initial examination for potential dental anxiety. Thirdly, no relation between dental fear and the use of RA could be found. Fourthly, dentist behaviour changes in both beneficial and non-beneficial ways with respect to rising child anxiety levels.

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1 INTRODUCTION

Fear of dentistry is a relatively common problem for patients, indeed 40% of adults in England and Wales avoid dental care unless they are in trouble: suffering from toothache, gum disease etc. (Todd & Walker, 1980). Of those who only visit the dentist when in trouble 29% are too afraid to attend more often and among all adults 41% delay visits to the dentist because of fear (Todd et al., 1982). Thus there are a large number of people who suffer unnecessarily because of a learned response to the dental situation. This fear response by patients also creates problems for dentists, with fear rated as the principle management problem encountered by dentists and implicated as an important factor in broken or cancelled appointments (Ingersoll et al., 1979). So, it appears fear is a major issue within dentistry for both patients and dentists.

The interconnection between, and definitions of, fear and anxiety require outlining for the project. As such, probably the most concise definition of both these terms is:

"Fear is a dread of something specific in the external environment; and anxiety is a more general non-specific feeling of apprehension. Anxious feelings signal the personality to brace itself for something dreadful about to happen, the sufferer does not usually know what it will be".

(S.K. Firestein, 1976)

A scared child confronted by a dentist can be either fearful or anxious. The child may fear something specific, e.g. the repeat of a previous bad experience, or may be anxious about what the dentist might do, without any knowledge of the procedure the dentist intends to carry out. Therefore, for this project, anxiety and fear will be treated as being functionally equivalent.

Fear of dentistry, like many other fears, develops through contact with a situation that is perceived (rightly or wrongly) to threaten harm to the person. These fears commonly develop during childhood when a child first confronts the dental situation or when something "bad" happens to the child during treatment. As such this project intends to concentrate on the reactions of children to dentistry.

The level of fear seen in childrens reactions to dentistry can vary from mild apprehension (which can be overcome by a calm and reassuring approach) to abject terror, which can often necessitate the use of General Anaesthetic (GA) to carry out essential conservative work. Whilst the use of a GA to carry out major surgery is often used with non-anxious children, the practise of using GA to carry out relatively non-threatening procedures (e.g. examination or fissure sealants) may solve the problem of decaying teeth but does nothing to improve the child's attitude to dentistry. This problem of having to use complex and potentially dangerous techniques to complete relatively simple dental treatment has contributed to the present interest in dental

anxiety.

The central issues in the study of childrens' fears are based upon the child's knowledge of a particular situation (acquired through the child's own experiences, general family attitude and peer group reactions) and the child's temperament and reaction to pain. This may be summarised as a child's genetic/environmental predisposition to develop specific fears. These fears once developed can be destructive to a child's general well being and can be very hard to dislodge. Most studies carried out in this area have been conducted by dentists using standardised psychological tools (such as the Eysenck Personality Inventory and the State Trait Anxiety Inventory), however the results of these studies are often contradictory, hampered by methodological problems and use pyschological techniques which have since been updated.

Therefore this project aims, through the use of recent advances in the psychological theories of anxiety and pain (as well as using psychological literature relating to family and peer group pressure), to isolate those variables which can most commonly predispose a child to fear dentistry and thus refuse treatment.

Recently a sedation technique known as relative analgesia (RA), has received considerable impetus (CF Langa, 1968). This technique is being promoted as a safe and effective means of reducing fear and pain, whilst at the same time allowing the child to experience what is feared, which in turn could improve the child's attitude to dentistry by showing the

child through personal experience that the situation he/she is frightened of is not as threatening as it seems. However, the role of RA in the management of anxious patients and its effect on the child's attitude towards dentistry has not been adequately investigated. This project intends to look at how RA affects the behaviour of children within a clinical setting.

The project is set up on practical lines, with all experimentation taking place within the normal clinic routine, to attempt to give as authentic a picture of the dental situation as it is possible to create experimentally. The technique used to carry out the experimental work centres around a questionnaire/interview whose function is to supply information on the child's environment, temperament, family dental attitudes, peer pressures, developed fears, reactions to pain and previous medical/dental experiences. This information provides a core of data about the family and child, which when compared with video tape data of the child and dentist's behaviour within the surgery and the dentist and parent's reaction to the child's behaviour in the surgery, is intended to give a global picture of the child's dental experience. This can then be analysed to isolate specific variables that are of major interest.

2 PROGRAMME OF WORK

1. To review the literature, relevant to dental anxiety in children, from the fields of dentistry and psychology. In addition to review the literature pertaining to the use and effectiveness of Relative Analgesia (RA) and the literature on anxiety measurement. The information obtained will be used to construct a questionnaire/interview that reflects the level of knowledge about dental anxiety within the literature.

2. To obtain a sample of approximately 50 child patients referred for treatment refusal, to compare their reactions with a control group of children referred for other reasons (fractured incisors, missing teeth, orthodontics etc.) by means of the questionnaire/interview and videotape data of the child's and dentist's behaviour.

3. To examine in greater depth, by comparison of behavioural response using video tapes, the effect of relative analgesia.

4. To evaluate the use of video tapes in the assessment of dental anxiety and to compare dentists and psychologists reactions to rating scales designed for assessing anxiety using video tapes.

5. To correlate results obtained with respect to level of threat in the dental procedure, degree of anxiety revealed by the questionnaire/interview and video tapes and to examine the effect of dentist behaviour upon a childs behavioural responses.

6. To isolate variables that are of practical use in detecting potential dental refusers with the intention of giving dentists a quick, easy to administer, checklist of questions/observations that may aid in assesing new patients.

3 LITERATURE REVIEW

The psychological theories about anxiety rest upon two interlinked theories concerning all human behaviour. Firstly, the behavioural theory initially developed by Skinner (1938) which suggests that people's likely behaviour is affected by previous experience of similar situations. Thus a person with dental phobia is likely to have had a previous bad experience with dentist(s). Secondly, as an extension to this behavioural theory is the cognitive theory developed by Beck, (Beck, 1976) which suggests that it is not just a person's previous experience which affects likely future behaviour, but also the person's cultural background, family attitudes, reaction to peer experiences, individual predisposition to react to certain stimuli etc. Thus a person who has had a bad experience with a dentist(s) may not necessarily develop dental phobia unless some other reinforcing attitudes to dentists combine with the experience itself to produce a phobia.

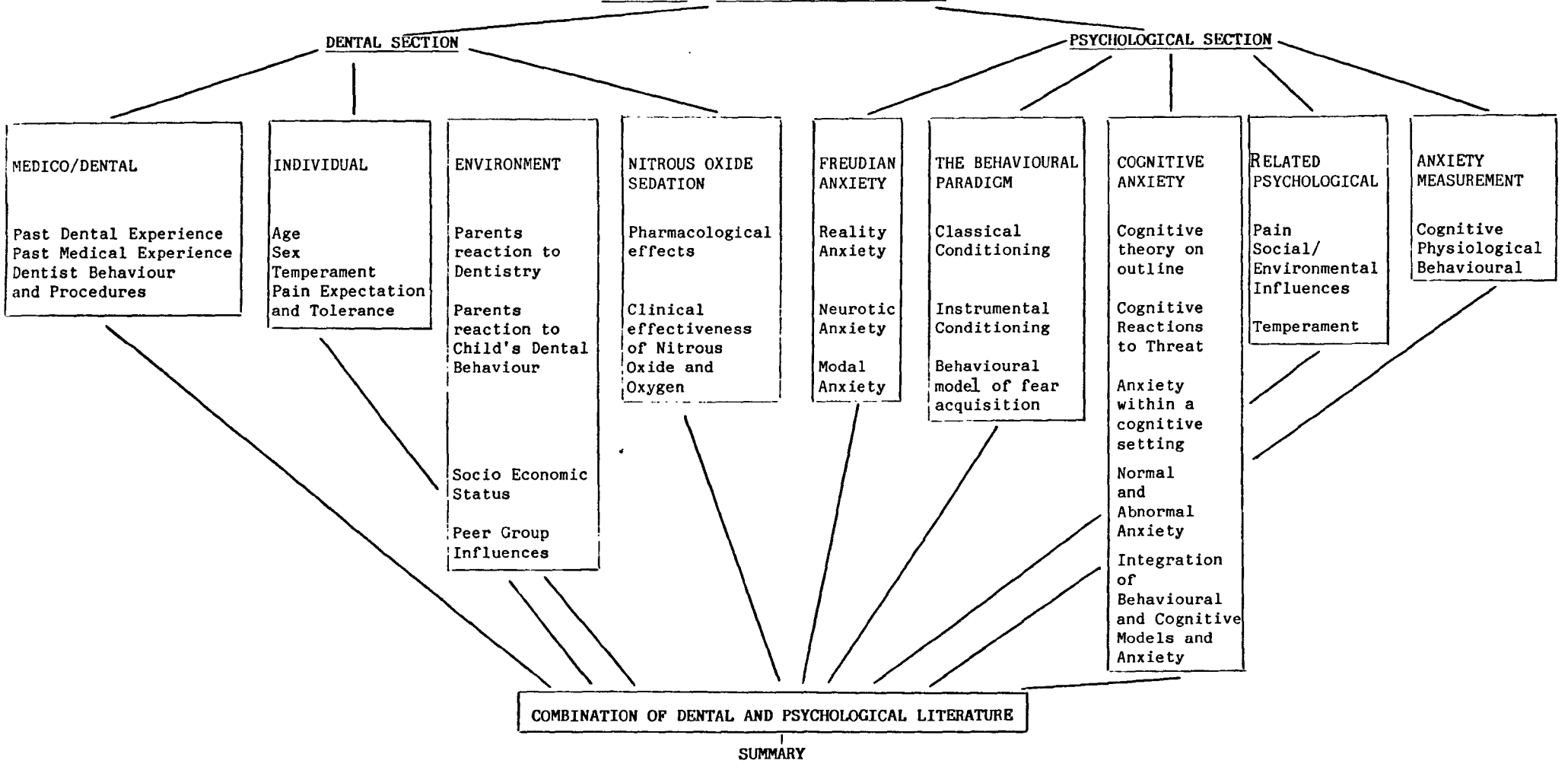
In this project it is necessary to use the accepted dental factors of anxiety in conjunction with the psychological theories of human behaviour. To do this the cognitive theories will be of paramount importance, though the behavioural base on which the cognitive theory rests must be explored in its own right, because the reaction to dentistry may not need cognitive components to explain, practically, people's reactions to dentistry. Therefore when exploring children's dental anxiety the aetiological factors discovered in dental research

will be viewed within the context of behavioural and cognitive theory to try and isolate the most important or widespread components of children's anxiety.

This review is divided into two major sections, a consideration of the dental literature followed by a review of the psychological literature (see Table 3.1). Previous work from the dental aspect can be divided into three main categories, medical/dental, individual and environmental. The psychological review requires a description of the major theories of anxiety and their relative merits in a rapidly developing field of psychological study. A smaller section will deal with the psychology of pain, family interactions, temperament, peer group pressure and the psychometric techniques and measurements necessary to the area of study. Finally, there will be a discussion of the integrated model of dental anxiety resulting from the review of the dental and psychological literature.

Throughout this project reference will be made to dentally anxious children. In most studies of dental anxiety an initial criterion for a child being dentally anxious has been the child's refusal of treatment. However, when using a cognitive model of anxiety, refusal of treatment need not necessarily imply anxiety, as the child may be refusing treatment for a myriad of reasons concerned with factors outside the dentist's control. Therefore, it is necessary to view a child's co-operation in the dental environment as a separate issue from his/her

TABLE 3.1 REVIEW OF THE LITERATURE



anxiety, as such, a child's treatability relies upon the conjunction of two variables: co-operation and anxiety.

Table 3.2 TREATABILITY AS A FUNCTION OF A CONJUNCTION OF CO-OPERATION AND ANXIETY

	HIGH ANXIETY	LOW ANXIETY
HIGH CO-OPERATION	POSSIBLE PROBLEMS WITH TREATMENT	EASIEST TO TREAT
LOW CO-OPERATION	DIFFICULT TO TREAT	POSSIBLE PROBLEMS WITH TREATMENT

Table 3.2 outlines the possible reactions to dentistry a child may develop, using the anxiety/co-operation model. When selecting children for the study it is possible to use the criterion of refusal of treatment as an initial criterion and then assess the anxiety component of refusal of treatment.

Therefore as a global concept this study aims to assess the predominance of anxiety as a reason for refusal of treatment among children, as well as attempting to isolate the most common factors associated with management problems in children.

3.1 DENTAL ASPECTS

Table 3.3 introduces three major factors under which the contributory factors, that have been to be associated with dental anxiety in children, can be subsumed. These three major factors correspond with the three major causes of anxiety that have been outlined by psychological theorists: the specific anxiety about particular external situations or things, i.e. phobias; the individual's temperamental susceptibility to destructive anxiety feelings. environmental stressors of family, peer group, work place, etc.

Table 3.3 THE MAJOR FACTORS OF DENTAL ANXIETY

MAJOR FACTORS	MEDICAL/DENTAL	INDIVIDUAL	ENVIRONMENTAL
CONTRIBUTORY FACTORS	Dental experience	Age	Parental attitude to dentistry
	Medical experience	Sex	Parental attitude to child's behaviour in a dental setting
	Dentist behaviour	Temperament	Socio Economic status
	Immediate effect of dental procedures and environment	Pain expectation and tolerance	Peer group pressures

3.1.1 MEDICO/DENTAL FACTOR

This section is concerned with the specific fear of medical and/or dental situations, and will follow the ordering of the contributory factors of the medical/dental factor outlined in Table 3.3.

3.1.1.1 Dental Experience

Dental experience can take two forms; the experience of routine dentistry and the experience of trauma associated with specific dental situations.

i) Routine Dental Experience:

Venham has carried out two major studies on the effect of routine dental experience by looking at the effect of sequential visits upon behaviour. In the first study (Venham et al., 1979) he found that across two visits, one examination and one treatment, there was an increase in anxiety and decrease in co-operative behaviour among young children (3-8 year olds). As this could have been due to the increased stress of the second (treatment) visit, Venham carried out a second study (Venham et al., 1977). In this he found that children's self report of their general feelings towards dentistry did not change significantly across sequential visits but their reactions to the experience of repeated visits to a dentist showed an increasingly negative response to dentistry from an examination visit through to the first three treatment visits, with an increasingly positive response to dental treatment from the fourth treatment visit onwards. This seems to

suggest that dental experiences sensitize children to dental procedures and that regular visits to the dentist eventually enable them to recognise the non-threatening aspects of dentistry and to cope with stressful dental procedures.

Other workers in this field have not reached the same conclusions as Venham. Using an examination and treatment visit, Frankl et al (1962) found that co-operative behaviour increased on the second visit. Oppenheim and Frankl (1971) found no change in co-operative behaviour. No change in co-operative behaviour was also found by Koenigsburg and Johnson (1975) in a situation involving an examination and two treatment visits.

Physiological testing of responses during sequential visits has been researched by Howitt and Stricker (1970), using 8, 10, 12 and 14 year old children, using heart rate as the measure of physiological stress. They found that arousal levels, as measured by heart rate, were significantly higher during restorative treatment than during initial examination and prophylaxis, which in turn were higher than the child's stress level at recall six months later. They also found variations in stress level during each area of dental procedure. During examination measures of stress were high on initial entry to the environment, increased as treatment began (reaching a peak of stress during the injection) with a gradual and statistically significant decrease in measured stress over the remainder of the treatment. Additionally, at

recall the same pattern of response was found but with lower levels of stress than for the original visit.

From this evidence it appears that physiological measures of stress show the child as being more stressed on entering the situation for the first time than afterwards and to show more stress during restorative treatment than at any other time. It is also interesting to note the pattern of responding which indicates an initial stress on entry to the surgery, whatever is being done, with a general decline in stress through the visit. The only factor which confounds this is the particular response to the imminence of restorative treatment. However, from this research we get no impression of the possible variance in responding to stress that anxious children would display. Howitt and Stricker (1965) looked at this problem, by using two groups of children, one a group of high anxiety children and the other low anxiety children. They found that high and low anxiety children respond very differently to dental procedures. Low anxiety children had higher cardic rates during examination than high anxiety children and had higher cardiac rates during examination than treatment sessions. During treatment sessions the high anxiety group had higher cardiac rates than the low anxiety group and patient management techniques were more effective with mildly anxious rather than highly anxious children. Dental experience was seen to have no effect on cardiac rates for either group and the overall effect of a minimal treatment procedure as opposed to an

examination had no effect on cardiac rates for either group.

Howitt and Stricker's work brings out an interesting finding that children in the control group with low anxiety had higher cardiac rates than those in a high anxiety group. This may indicate that the low anxiety group, having a higher arousal level and consequently attending more vigilantly, benefit by learning more about dentistry when not under threat (of treatment) enabling them to cope more effectively when treatment was necessary.

During this section on the effect of dental experience the primary difference between the studies looked at has been the method of measuring stress and anxiety levels in the children. It has been necessary to talk about stress as a separate measure when looking at heart rates because there is no necessary connection between heart rate and anxiety. In fact, when people have attempted to correlate these measures they are generally found to vary widely (see Anxiety Measurement Section 3.3.5). Thus it is safer to refer to increased heart rate as a measure of stress, rather than anxiety.

Despite this there is a remarkable similarity between the findings of people using both techniques with behavioural and physiological measures both showing:

(1) increase in stress/anxiety during restorative treatment.

(2) greater stress/anxiety at initial examination and restorative treatment than at recall.

(3) high level of stress/anxiety during first examination.

However, both techniques also tackle areas of their own. The behavioural analysis of sequential visits has been questioned by other workers in the field and as such must be treated with caution. The physiological analysis, bodily reaction to sequential visits, has not been replicated and as such should also be treated with caution.

ii) Traumatic Dental Experience:

Traumatic dental experience can be defined as the effect of an aversive dental procedure upon the future actions of a child. As such a dental extraction or deep filling could be considered traumatic and may lead a child to change his/her attitude towards dentistry in general. In a study of anxious and non-anxious children, Sermet (1971,1974) found that children having extractions at their first dental visit were more likely to be anxious of dentistry. These extractions were also more likely to take place under general anaesthesia for anxious children. There is corroborating evidence from Forgione and Clarke (1974) that traumatic dental experience is significantly related to dental fear, and from Bailey, Talbot and Taylor (1973) that if a child has a lot of problems with his/her teeth then they are more likely to be dentally anxious. Similarly when a child has had problems with his/her teeth before the first dental appointment children with greater pre-first visit problems showed higher anxiety. The effect of traumatic experiences has also been tackled from an adult perspective by Lautch

(1971). He studied a group of dental phobics and a matched group of non-phobics, and found that all 34 of the phobic group had had a traumatic dental experience during their lives whereas 10 of the non-phobics had had or could remember having a traumatic dental experience.

The evidence surrounding the effect of dental trauma is far from unanimous. Johnson and Baldwin (1969) found that traumatic dental experiences were not significantly related to children's behaviour. In a partial replication of Sermet's (1971,1974)) work, Lindsay et al. (1982) found that anxious children were no more likely to have had extractions than control subjects, these extractions were no more likely to have been carried out under general anaesthesia and extractions were no more likely to occur at the first dental visit. In another study looking at the effect of dental experience on behaviour Venham (1979) looked at the number of operative appointments and the number of teeth extracted compared to the child's present responses. He found no significant relation between past experience and present behaviour. In a study of adult dental behaviour Hall and Edmundson (1983) found that both anxious and non-anxious subjects had had similarly traumatic dental experiences, however, although the experiences reported were the same, the memory of the experience was much more vivid for the anxious subjects. The anxious subjects were able to recall the whole incident including what was said to them, in fact, the reinforcing of the trauma by interpretation of the dentist's

nts as verbal insults appeared to have a major impact upon dental
ty.

From the evidence in this section it appears that there are two
about the effect of dental trauma. On the one hand are studies
show that trauma is a factor in the genesis of anxiety and on the
are the studies which show dental trauma has no effect on the
is of anxiety. This appears very difficult to reconcile,
cularly the opposite findings Lindsay made when replicating
t's work. The work done on adults may shed some light on this area
Lautch and Hall and Edmundson indicated that memory of a traumatic
ent was an important factor in the effect the incident would have.
idea of the person's perception of what is and is not traumatic is
ncluded in the other studies and may, at least partially, explain
fference in their findings (see The Behavioural Paradigm, Section
3 and The Cognitive Model of Anxiety, Section 3.3.3.4).
Another component of dental trauma is the amount of prior knowledge
d has of an impending traumatic experience. It is generally
ered that if a child is aware of an experience 4-7 days in
e then the expectation of the event will be less traumatic, the
having had time to get acqainted with the reality of the
tion. Baldwin (1966) found greater anxiety levels in an unselected
of subjects when an extraction took place unpredictably, that is,
t any prior knowledge that the event would take place. This

experiment has not been replicated nor any other work carried out on this subject.

In conclusion, there appears to be some evidence for dental trauma being a factor in the genesis of dental anxiety. However, it may be more a person's perception of a traumatic event and not the trauma itself that is the most potent component of a dentally traumatic experience. It appears that this added component of trauma is something most studies do not take into consideration, for instance, how many people in the other studies had an unpredictable dental experience as opposed to a traumatic predictable experience cannot be ascertained from reviewing their studies.

3.1.1.2 Medical Experiences

The similarity between visiting a doctor and visiting a dentist has led researchers to postulate the existence of an overlap in fear between doctors and dentists. Bailey, Talbot and Taylor (1973) found that bad medical experiences were likely to increase a child's dental fear, also that the frequency of visiting the doctor affected dental response, with children having seen a doctor often in the previous year showing higher anxiety in a dental situation. Conversely, Johnson and Baldwin (1969) when questioning mothers about their child's previous medical experience and their history of medical experiences found no significant relation to their behaviour in a dental situation. Similarly Howitt and Stricker (1970) and Venham et al. (1977) found no correlation between medical experiences, reactions to sequential visits to a dentist and the child's behaviour at these visits. What is considered a bad or traumatic medical experience is not specified in these studies and thus the findings could reflect differing hypotheses about medical experiences.

Another area of medicine has been linked with dental anxiety, that of surgical experience. Martin et al. (1977) found that children with a history of surgical experience showed significantly more negative behaviour at their first dental visit. Questions concerning the child's reactions to past medical procedures and the parent's prediction of child's behaviour during treatment were both significantly related to

the child's behaviour. A question concerning the quality of the child's previous contact with physicians was not significant, though in an experiment by Wright and Alpern (1971) this question was found to be significantly related to the child's behaviour.

Thus from the evidence it appears that the effect of bad medical experiences is unclear, although definitions of what a bad medical experience consists of may account for some of the ambivalence of their results. Surgical experience appears to predispose children to developing dental anxiety, but with so little evidence any conclusions must be extremely tentative.

3.1.1.3 Dentists Behaviour

The effect of a dentists's behaviour upon children's reactions to dentistry has been studied using two techniques, analysing the effect of dentists' behaviour upon children's behaviour, and asking adults about their childhood experiences and the criteria they use/used to judge their responses to particular dentists.

A major analysis of dentist behaviour has been carried out by Weinstein (1982). In a large and complex study of the effect of dentist's behaviour on 3-5 year old children Weinstein used video tapes of children being operated on in a variety of settings, from examinations to extractions. The data were analysed using lagged sequential analysis to determine the effect of a dentist's behaviour upon a child's subsequent responses to dental operations. The scale of

dentist's behaviour used identified four areas of behaviour: vocalisation, direction, empathy and physical contact. From this information Weinstein (1982) found that problematic fear related behaviours in children were least likely to occur after specific directions about behaviour had been given by the dentist. Specific feedback about appropriateness of behaviour was seen to be a greater reinforcer than general feedback, directing behaviour by firm, assertive command was seen to be more effective than general rule setting (as it provides a more immediate response to an individual situation) and more effective than rhetorical questions such as "that didn't hurt did it ?" (which were seen as ambiguous and equivocal by the children).

Explanation of the procedures to be carried out appeared less effective than present dental management techniques (e.g. the tell-show-do technique) have supposed, only being effective during the low stress chair placement phase that Weinstein used. This finding is supported by Howitt and Stricker (1970) who concluded that "clarification" was more effective with mildly anxious than highly anxious children.

Coercion and coaxing of children were seen to be ineffectual management techniques which dentists use when frustrated by children; and if anything this frustration serves to exacerbate the child's fear. Empathic behaviour that questions for feelings and attempts to elicit and recognise the feeling of the child seems to be the most effective fear reducing technique. Reassurance about procedures, which

can deny or ignore feelings, is followed by a greater probability of fear related behaviours. Though interestingly ignoring or denying behaviours increases fear related behaviour immediately after the child has been ignored or denied and then gradually decreases fear related behaviour as time progresses. This effect is very similar to that seen during behavioural treatments when extinction of a particular behaviour is attempted (see The Behavioural Paradigm, Section 3.3.2.2). Reassurance was used most frequently during high stress procedures, such as injection, drilling etc., but had little effect in reducing fear related behaviour.

Physical contact with a child, by patting the child, is effective in reducing fear related behaviour. In fact, most management procedures such as distracting, explaining, reinforcing, directing or reassuring were more effective when the dentist was working in physical contact with the child, Weinstein (1982). Thus stopping dental procedures to manage children was seen to be less effective in reducing fear. Indeed, stopping treatment may inadvertantly reinforce the child's fear related behaviour because the child could conceive the stopping of treatment as a reward for the fear related behaviour.

Dentists' vocalisations to children increased as the child's fear increased, with vocalisation used to alleviate fear and prevent disruption of treatment. Dentists' silence and vocalisation to the dental surgery assistant increased when non-fear behaviours were

exhibited by the child.

Overall Weinstein (1982) concluded that dentists more frequently respond to children's fear related behaviours with behaviours that are counterproductive or ineffective in reducing fear; rules, coercian, coaxing, reassurances and put-downs. They were much less likely to respond with behaviours such as direction, reinforcement and questioning for feeling which have the highest probability of reducing fear related behaviour. Weinstein also implies that the range of dentists' responses seem to vary more from interpersonal style than management strategy. Thus, dentists' behaviour varied very little when dealing with fear or non-fear related behaviour in children.

Confirmatory evidence of Weinstein's findings have been produced by Melamed et al (1983) who studied children from 4-12 years old and found that in general children benefited most from clear instructions and feedback about the appropriateness of their behaviour. This was of particular importance for the first restorative treatment session. Use of criticism as a management procedure for inappropriate behaviour had the most detrimental effect on co-operation, and self report fear levels in children. The children who were most susceptible to the adverse effects of criticism (which was equivalent to Weinstein's poor management techniques) were children over 7½, who had had previous dental experience or who were initially low in concerns about dentists and treatment. Thus from Melamed et al's work it appears that by

focusing on inappropriate behaviours (which is what dentists do when they criticise a child) dentists can engender fear in children, by lowering their cooperation and increasing their anxiety.

There is much less information concerning childhood experiences and criteria for judging dentists, with only two studies having attempted to shed some light on the problem. Bernstein et al (1979) asked university students about their recollections of childhood dental experiences and found that in 91% of cases the students felt the dentists' attitude had affected their future attitudes to dentistry. If the dentist had been "cold" and "unpleasant" they were more likely to feel fearful, whereas if the dentist had been "warm" and "caring" they were more likely not to feel fearful. A similar study by Kleinknecht et al (1973), using college, high school and junior high school students, found that an important factor in determining the student's childhood attitude to dentistry was the perception of the dentist as a person. Subjects with a negative reaction to dentistry have attributed this to personal dislike of the dentist, whereas positive reaction to the dentist was often attributed to personal liking for the dentist.

The evidence presented in this section appears to indicate the central importance of the dentist's behaviour in the genesis and maintenance of dental fear. If a dentist appears warm, caring and likeable, he/she is more likely to use the good management techniques outlined in Weinstein's and Melamed's work. This is evident from the

techniques Weinstein and Melamed outline as most effective in reducing fear related behaviour; direction, reinforcement and questioning for feeling. All these behaviours show awareness of the child's position in dental treatment and are thus likely to engender trust and respect.

Weinstein's evidence also indicates that dentists all too infrequently use these techniques and if they do use them it is a matter of personal style rather than of behaviour management strategy. This raises fundamental questions about children's fear of dentistry, and the dentist's role in engendering this fear, and then labelling the child as fearful. As such many dentists may not possess the appropriate management skills. How many practitioners receive training in management skills ? Also, if they do possess these skills are they using them appropriately in the correct situation ?

3.1.1.4 Immediate effect of Dental Procedures and Surgery

This section is concerned with the immediate effect upon children that dental procedures and the dental surgery have in altering attitudes towards dentistry. This particular approach to dental anxiety has received very little attention and evidence is hard to come by. There appear to be two approaches to this problem; looking at the age and type of treatment a child has received, and looking at the general level of trauma produced by certain procedures and the effect of the surgery environment.

The evidence concerning age and type of treatment comes from two

opposing studies. Firstly, Sermet (1971, 1974) and Shaw (1975) found that anxious children were more likely to have visited the dentist before the age of 3 and that they were more likely to have started treatment earlier than controls and had more extractions than controls. In a contrast to this Lindsay (1982) in his replication of Sermet and Shaw's work found anxious children were no more likely to have visited the dentist any earlier than controls, to have started treatment any earlier than controls or to have had more extractions than controls. Thus the evidence there is extremely contradictory and consequently very little can be concluded.

The stressful nature of dental procedures is an area which is beginning to receive more attention from research workers. In two recent studies researchers have tried to assess how stressful certain procedures are rated as being by patients and how accurately these reflect actual stress. This work has been carried out on adults, as such extrapolation to children's reactions should be done with caution. Wardle (1982), in examining how stressful certain procedures are to patients, has found that extractions, drilling and injection are markedly more stressful procedures than filling, polishing, examination with probe, etc. This would seem to indicate that some expectation of discomfort, pain or trauma surrounds the three former procedures in particular. Thus when dealing with patients who are anxious the stress of the procedure plus the background anxiety may lead to problems with

treatment. In addition to this Lindsay, Wage and Yeats (1982) in a study of expectations of sensations of fear and discomfort found that patients discriminated among dental treatments as accurately as dentists. However, patients were more likely to overestimate the level of discomfort that accompanies various treatments. Thus, it would appear that although a dentist may be more aware of the actual level of discomfort a patient will feel this is underestimating the potential discomfort a patient expects and as such reassuring the patient that a procedure will only give minimal discomfort may not be effective because of this discrepancy. A final point about the dental surgery: it has been found that, despite the trauma of each dental procedure, the environment of the surgery can significantly reduce anxiety for children. Swallow, Jones and Morgan (1975) found that if all the dental instruments were initially out of sight when a child entered the surgery this reduced the measured anxiety of the child.

In conclusion, it appears that evidence about effect of the age and reason for the first dental visit is very contradictory. There is some evidence that the type of procedure carried out, the person's expectation concerning that procedure and the physical environment of the surgery can affect a child's response to the immediate dental situation.

In summary, from The Medical/Dental Section of the literature review it is concluded that:

1. During routine dental experience there is an increase in stress/anxiety during restorative treatment, a high level of stress/anxiety during an initial examination and that stress/anxiety at initial examination and restoration is greater than at recall.

2. Dental trauma may play a role in the genesis of dental anxiety, but it may be the person's perception and the predictability of the trauma that are fundamental to the development of dental anxiety.

3. Experiences of medical surgery may predispose children to dental anxiety.

4. The most effective way for dentists to reduce fear behaviour in children is by directing the child's behaviour using commands, to reinforce behaviours and to question the child for their feelings. There is evidence that where dentists use these techniques it is more a question of personal style than patient management.

5. The dental procedures used and the person's expectation of these procedures can influence a person's future reactions to dentistry. Having an environment in which all the dentists's instruments are out of sight helps to reduce patient's fears.

3.1.2. INDIVIDUAL FACTOR

This section of the literature review is concerned with the individual characteristics of children's personalities that can affect their reactions to dental treatment. Work in this area has concentrated on two aspects of personality development; fixed developmental characteristics (age and sex) and variable developmental characteristics (temperament and reaction to pain). These two aspects are not necessarily independent of each other and the combination of age and gender effects combined with dental/medical/environmental experience may produce changes in temperamental and pain conception attitudes in children. With that in mind it is advisable to treat the evidence from these two aspects of personality development in different ways. The fixed developmental characteristics can be seen as global characteristics that equally affect all children developing in a given sociological climate, whereas the variable developmental characteristics can be seen as specific characteristics that are influenced by a range of individual factors such as family dental attitudes, experience of dentists etc. The combination of fixed and variable developmental characteristics producing very individualised developmental changes in children's attitudes.

3.1.2.1 Age:

The evidence in this section concentrates on data that reflect differing responses to dental situations by groups of children of

different ages. Venham (1979) in a study of two groups of children, one group 3½-5 years old and the other 5-8 years old, found that the younger children were more anxious than the older children on an examination visit and a treatment visit, with the mother present at each visit. He also found that the younger children had higher anxiety scores over two treatment visits whether the mother was present at these visits or not. This is in direct contrast to Johnson and Baldwin (1969), who used a group of 3-7 year olds on their first dental visit and found no significant relation between age and child behaviour. Neiburger (1978), in a study of 3-12 year olds found low co-operation from 3-4 year olds with an increase in positive reactions to dentistry with age, with a slight reversal in this trend at 6-7 years old. This compares with a study by Kleinknecht, Klepac and Alexander (1973) in America which showed that college students (17-21) and junior high school students (13-16) were less anxious than high school students (16-18). Howitt and Stricker (1970) have added to this work in their study of arousal levels (measured by heart rate) in 8, 10, 12 and 14 year old children. They found a decrease in arousal with age from 8-14 year olds with 8 year olds having the highest arousal rates and 14 year olds the lowest arousal rates, the 11 and 12 year olds being in the middle and indistinguishable for arousal levels.

From the evidence presented here two major conclusions can be drawn. Firstly, the apparent difference between anxiety scores and behaviour,

thus Johnson and Baldwin (1969) could find no differences in behaviours in their study whereas Venham found younger children had higher anxiety scores than older children. Venham also found that younger children were less anxious with their mothers present. This leads to the conclusion that behaviour, and in particular, co-operative behaviour, and anxiety levels should be seen as separate entities. This is highlighted in the second major conclusion, that the relationship between age and anxiety is more complex than researchers have supposed. From Neiburger, Kleinkecht, Klepac and Alexander and Howitt and Stricker a picture of the overall effect of age on dental anxiety begins to become clearer. It appears that from 3-4 years old anxiety decreases, with a slight rise at 6-7 years old, until about 16 years old where there is another increase in anxiety until about 18 years old. It may be that anxiety and behaviour become more closely related during these critical periods of development and that the decrease in anxiety seen as a general pattern in the development of ageing may reflect an increase in co-operation rather than a decrease in anxiety. Thus to conclude, in the measurement of anxiety levels in children as they develop researchers may have undervalued the role of co-operation by the child, which could be masking a higher actual anxiety level about dentistry.

3.1.2.2 Sex:

When looking at gender effects in reactions to dentistry it is necessary to accommodate the difference between co-operative behaviour and

anxiety scores outlined above. Johnson and Baldwin (1969) found no significant relation between gender and child behaviour. In contrast, Venham (1979) when looking more closely at this problem found that boys were more co-operative when their mother was present whereas girls were equally co-operative with or without their mothers' presence. With regard to differences in reactions to dental procedures, Neiburger (1978) found no significant differences between boys and girls, though Kleinknecht, Klepac and Alexander (1973) found girls reported more fear of dentistry than boys. Thus it appears that in general boys and girls react very similarly to the dental situation, with the exceptions that boys appear more co-operative with their mothers present and girls report more fear of dentistry.

The reason for the first of these exceptions remains unclear whereas the second reflects a trend noted in much of the psychological research that females, in general, report higher levels of fear over a wide variety of settings.

3.1.2. Temperament

The studies of children's temperament have concentrated either on the child's reaction to particular environmental events (for example how well a child reacts to new situations) or on comparisons between behaviour in a dental setting and general behavioural predispositions (for example depressive, phobic etc.). As such, neither set of data refers directly to behaviour in dental settings, but emphasises the

generalisability of behaviour in dental settings to behaviour in general. Bailey, Talbot and Taylor (1973) found that if children reacted badly to novel situations then they were more likely to have a greater fear of dentistry. This finding was replicated by Williams et al. (1985) who also found that dentally anxious children were more likely to be less adaptable and have more negativity of mood. It has been speculated that these negative personality traits are more commonly found in intelligent children, however, Howitt and Stricker (1965) found no significant relationship between intelligence and dental anxiety for either high anxiety or low anxiety children. Thus, it appears that children who are more anxious of dentistry seem to approach a wide variety of environmental situations with more fear and to have greater difficulty with their mood states than less anxious children.

Sermet (1971, 1974; Shaw, 1975) found that dentally anxious children were more likely to be rated by their parents as having behaviour problems. This ties in with work done by Hall and Edmundson (1983) on adults, who found that people with a fear of dentistry also had a high prevalence of tension, anxiety, depression and obsession, and many of those frightened of dentistry suffered from low self-esteeem and the dentist is merely the uppermost problem they are facing at the time. Researchers have also found that phobic patients tend to be timid, shy, dependent and immature (Lauch, 1971). This accords with a finding by Williams et al. (1985) that the anxious children in their study could be

characterised by their behaviour; they had a more passive or "frozen" response to the dental situation. Thus it appears that dental anxiety and fear in general are inextricably linked in terms of individual temperamentaal responses to potentially threatening situations. It is also possible that for many people who display fear of dentistry, dentistry itself may have no direct connection to the events that precipitated the person's temperamental responses to threatening situations.

3.1.2.4 Pain Expectation and Tolerance

Bailey, Talbot and Taylor (1973) showed that the most commonly expressed fear about dentistry was fear of pain. Pain itself can take two forms, the expectation of pain associated with dentists and individual tolerance to pain in general. Wardle (1982) reported that there was a high correlation between the pain people associate with dental procedures and the anxiety people feel about these procedures. Further to this, Wardle found that anxious people expected a disproportionately high level of pain in connection with dental procedures. Thus anxious people expect far more pain than they experience and consequently feel proportionately more fearful about dental treatment. This concurs with work done by Kleinknecht and Bernstein (1978) who discovered people with a high dental anxiety rating experienced more pain than people with a low anxiety rating.

The experience of pain could relate to pain tolerance rather than

pain expectation. Shoben and Boland (1954) and Forgione and Clarke (1974) have shown that low pain tolerance is significantly related to dental fear. This finding has been replicated by Williams et al. (1985) who reported that children who have refused treatment have a lower pain tolerance than those who accept treatment. Thus it appears that both expectation of pain and pain tolerance are significantly different for dentally anxious and non-dentally anxious people. In an extension to this work Wardle (1984) found that with dentally anxious people there is a high expectation of pain and if these people do not experience pain at a particular appointment they feel they have "got away with it". Thus although the probability of pain in dentistry is very low nowadays the possibility of pain is still there so the fear of pain does not extinguish. This is a phenomenon researched more fully by psychologists, for instance, Epstein and Roupenian (1970) gave two groups of people mild electric shocks. One group was shocked 19 out of every 20 times whereas the other group was shocked only 1 time out of 20. They found the group shocked 1 time in 20 had a higher anxiety about the experiment than the other group.

Thus it appears that a high expectation and/or a low tolerance of pain can maintain a high level of fear long after a painful experience. This can lead to an exaggerated expectation of future pain in the mind of the patient, which may lead to the development of dental fear.

To conclude the individual factor section of the review it is evident that:

1. The effect of age on dental anxiety is more complicated than initially supposed, with the necessity of assessing anxiety and cooperation as separate variables being seen as a possible solution to a complex area.

2. There are very few sex effects noted in the literature, except that boys are more cooperative with their mothers present and girls report more fear of dentistry than boys. Within the psychological literature females almost always report more fear about situations than males, though why boys should be more cooperative with their mothers present remains unexplained.

3. Temperamentally, dentally anxious children seem to approach a wide variety of environmental situations with more fear and have greater difficulty with their mood states than non-anxious children. Additionally, it is not necessarily the case that dentistry itself is the precipitator of dental fear.

4. High expectation and/or low tolerance of pain can maintain a high level of fear long after a painful experience. This can lead to an exaggerated expectation of future pain in the mind of the patient, which may lead to the development of dental fear.

3.1.3 ENVIRONMENTAL FACTOR

This section of the literature review is concerned with the most prevalent influences on a child's thinking and behaviour that arise through contact with other people. The range of contacts and the level of influence of these contacts can be subdivided into two main areas; the child's family and the child's peer group. These two areas cover most experiences that a child may have. Unfortunately the dental literature concentrates on a very limited view of family and peer group influence on behaviour. Therefore this area of influence will be raised in greater detail in the psychological review.

3.1.3.1 Parental Attitude to Dentistry

Shoben and Borland (1954) and Forgione and Clarke (1974) found that amongst fearful patients there was a significantly more unfavourable attitude to dentistry among the patient's family, with more reports of dental trauma from these patients' relatives. In a replication of this work Shaw (1975) discovered the same significant effects and also that the mothers of anxious children were more anxious about dentistry than the mothers of non-anxious children. The anxious mothers were also more likely to comment on previous distressing dental experiences. Sermet (1971, 1974; Shaw, 1975) reported that the mothers and fathers of anxious children often described themselves as anxious of dentists as children and adults, with these parents more likely to have had extractions under general anaesthetic. This evidence indicates that the dental attitudes

and experiences of parents are important in the genesis of dental anxiety in children. The strength and longevity of this effect with regard to the child's own experience has been questioned by various researchers. For instance, Koenigsberg and Johnson (1972) found the relation between maternal and child anxiety held only for the first visit and after that the child began to develop his/her own response to the dental situation. Klorman et al. (1978), using dentally experienced children reported no relation between maternal anxiety and the child's perceived anxiety. Similarly, Bailey, Talbot and Taylor (1973) discovered a significant relationship between maternal anxiety and child anxiety as an overall measure of children between 9 and 12 years old, but this relationship was not significant for 11 and 12 year old children as a separate group. Pinkham and Fields (1975) could find no significant relationship between maternal anxiety and child behaviour. Whereas Johnson and Baldwin (1969) using a group of first dental visit children reported a significant relationship between maternal anxiety and child behaviour. Thus whilst a lot of the evidence points towards the parent's attitude to dentistry being a significant predictor of a child's behaviour, the position is not particularly clear cut.

3.1.3.2 Parental Attitude to Child's Behaviour in a Dental Situation

Bailey, Talbot and Taylor (1973) discovered that when a child thought his/her parents felt good about a dental visit then lower levels of fear were recorded for the child and vice versa. In contrast if a mother attempts to reduce a child's fear of the dentist this can serve to increase the child's fear of the dental procedure (Bailey et al., 1973). In a similar vein, Croxton (1967) working on management of problematic children in a dental situation suggests that over permissive parents can adversely affect their children by making them more prone to test any limits set them by authority figures. Thus the use of non-punitive limit setting in a dental situation was carried out to see if this would reduce problem behaviours. Croxton found this system worked extremely well, with more work being carried out in less time and an improvement in attitude at follow-up. In addition Croxton reports that the presence of parents in the dental situation can adversely affect the dentist's ability to set limits for the child. There is a lack of research in this area and very little can be concluded from the two studies presented. However, it does appear that parental attitudes to the child's dental treatment can affect the way a child perceives the treatment to be carried out, although this seems to a certain extent, to be surmountable by dentists using patient management techniques.

3.1.3.3 Socio Economic Status of Family

Neiburger (1978) concludes that there is a clear trend for greater

positive reactions to dentistry among families as income levels increase, with lower class children reacting less positively to dentistry than middle or upper class children. Sermet (1971, 1974; Shaw, 1975) made a similar finding, that the mothers of anxious children in low income groups sought dental care more infrequently than the mothers of non-anxious children in low income groups. Once again the picture is obscured, is it low income that determined non-attendance or anxiety levels ?. There could be greater anxiety among lower class people about dentistry, due to lack of knowledge about dentistry and dental procedures leading to non-attendance. This alternative is as likely as the implication given by Neiburger, though once again the evidence is sparse.

3.1.3.4 Peer Group Influences on Children's Behaviour

This influence on children's behaviour has been virtually ignored by researchers involved in dental anxiety; only one or two people mention it in their research. Sermet (1971, 1974; Shaw, 1975) discovered that anxious children were more likely to dislike school and make poor progress there. Kleinknecht et al. (1973) showed the most frequent reason given by children for fear of dental treatment was reports from other children of bad dental experiences. Thus it appears from these two pieces of information that peer group pressure has some effect on children's reaction to dentistry, but what this effect is, is impossible to say.

In conclusion it is important to note that the conception of environmental factors used by dentists researching this area has confined environment, principally, to the mother child relationship. This seems a very inadequate view of a child's experiential base for all behaviour. As such it is necessary to look into the psychological literature on environmental influences of behaviour to attempt to clarify some of the issues raised here (see Section 3.3.4.2).

From the environmental factor section of the review it is concluded that:

1. Whilst a lot of evidence indicates that a parents attitude to dentistry is a good predictor of a child's behaviour there is sufficient counter evidence to cast doubt on any firm conclusions.
2. From the small amount of evidence available there appears to be a significant relationship between parental attitudes to a child's treatment and the child's perception of the treatment.
3. There is very little evidence about the effect of socio economic status on a child's attitude to dentistry. The evidence there is is to ambiguous for reliable conclusion to be drawn.
4. There appears to be some peer group influence on children's reactions to dentistry, though with little evidence what this effect is cannot be reliably documented.
5. The environmental factors studied by dentists are concentrated on the mother/child relationship. This is a very narrow view of environment as can be seen from the psychological review (Section 3.3.4.2).

3.1.4 RELATIVE ANALGESIA (RA)

3.1.4.1 Pharmacological Details

Relative Analgesia is a sedation technique involving the administration of variable quantities of nitrous oxide and oxygen. This form of sedation has become increasingly popular during the last twenty years in the treatment of anxious children. The main reasons for its increasing popularity are, that the patient remains conscious and able to respond throughout treatment and that patient's recover from sedation very quickly as nitrous oxide enters and leaves the body through the lungs, producing no metabolytes requiring time to pass through the body.

Nitrous oxide is a non-irritating, sweet smelling, colourless gas, which has pharmacological effects upon the central nervous system and the cardiovascular system. The actual mechanism of action of nitrous oxide on the central nervous system is unknown, but almost all forms of sensation are depressed (sight, hearing, touch and pain), memory and ability to concentrated are also affected, with tasks requiring memory or intelligence harder to complete when sedated. When administered with physiological levels of oxygen (20% or more) nitrous oxide mildly depresses the central nervous system, primarily the cerebral cortex.

The effect of nitrous oxide on the cardiovascular system is to produce a slight depression of myocardial contraction at a ratio of 80%:20% of N_2O-O_2 by direct action of the drug on the heart. However,

present equipment does not allow a mixture below 70%: 30% N_2O-O_2, and as such this problem does not arise.

3.1.4.2 Evidence of the clinical effectiveness of RA

The effectiveness of RA has largely been accepted on purely clinical opinion, even Langa (1976) citing only clinical opinion of its effectiveness. There have been two studies of the effectiveness of RA yielding similar results. Major et al. (1981) found that RA can help in the management of most anxious patients, but that a significant minority (in Major et al.'s study 14.2%) will refuse to accept RA. Lindsay and Roberts (1977) found that RA can reduce disruptive behaviour in children and decrease the length of time necessary to carry out dental procedures with anxious children.

There is, in addition, evidence from Mitchell et al. (1985) that even with RA sedation, some anxious patients will refuse dental treatment necessitating the use of a general anaesthesic.

From the above, there appears to be evidence that RA reduces fear and disruption in the majority of fearful dental patients. This may not be the case, as the same effect could be produced with improved dental management techniques occurring alongside the administration of RA. Indeed, Langa (1976) and Allen (1979) recommend that administration of RA should be accompanied by a supportive approach from the dentist and information given to the children about the beneficial effects of RA. Thus there is a dilemma with the use of RA, is it producing a change in

management procedures in the dentist or changing the dental perspective of the child. O'Mullane et al. (1978) have shown that even with a carefully planned management structure, based on a psychological approach to patients, a small number still required nitrous oxide sedation to effect treatment.

From the above, it is evident that very little is known about the role RA plays in the management of anxious dental patients, but what is known seems to fall into 3 sections:

1. That a significant minority of patients will refuse treatment even with RA.
2. That in many cases whether RA or the dentist's manner is the major treatment technique is debatable.
3. That even with planned management techniques some patients need RA to effect treatment.

The present study aims to approach the use of RA from a different perspective to the purely experimental effect of RA used in the quoted studies. This research is concerned with assessing children's reactions within the dental environment and attempting to assess the importance of outside influences on behaviour in the dental surgery. As such RA will be viewed in terms of who is given RA, how the dentist's behaviour changes when a child has RA as compared to when that child does not have RA, how the child's behaviour in the dental chair changes when they are given RA and how both the children and the dentist's behaviour change

between those groups of children who have received RA and those who have not.

3.2 PSYCHOLOGICAL ASPECTS

Psychological theory provides a framework from which to judge children's reactions to dentistry, analyse anxiety responses, look at the role of learning in response to dentistry (through personal experience, family influences on personal behaviour, the role of pain in influencing behaviour and the effect of peer group experiences) and for the psychometric techniques of measuring the above responses.

To develop an understanding of the current psychological framework, it is necessary to give some general background to the development of thinking about anxiety and to put the dental literature within a framework of a psychological approach. It is important to concentrate on the concept of anxiety, for the following reasons.

Firstly, until very recently the vast majority of research into dentistry has been carried out by dentists themselves. As such, though their intentions and work produced are mainly methodologically sound, their understanding of the concepts underlying the techniques for measuring anxiety are necessarily limited. This may account for some of the discrepencies occurring in the dental literature, where measurement of the same variables by different research teams can produce diametrically opposed findings. Thus an overview of the historical perspective which has directed psychological thinking is essential to facilitate an understanding of the current trends in anxiety research to be utilised by this project.

Secondly, the last ten years has seen a shift in psychological thinking about how people learn and why they maintain certain behaviours despite their obviously detrimental effect to the person involved. This has been encapsulated in a theory of behaviour which has become known as Cognitive Theory (Beck et al., 1985). This theory has superceded and integrated the theories previously accepted, especially with relation to anxiety. Cognitive theory allows a broader analysis of behaviour and has encouraged research into the role of thought as a determinant of behaviour. This in turn has meant that many psychologists now feel that on whatever theory a therapeutic model of anxiety is based as long as it benefits an individual, it is "the right" theory to use with that person. As such, it is beginning to appear that anxiety is not the simple concept it was once believed to be, but a complex construct of learned behaviour, and that an historical understanding of the development of this construct is necessary to make sense of current trends in psychological thinking about anxiety.

Consequently, the Freudian theory of anxiety, the behavioural paradigm and the cognitive model of anxiety will now be considered in turn.

3.2.1 THE FREUDIAN THEORY OF ANXIETY

The concept of anxiety and its effect upon human behaviour was first studied by Freud, who described anxiety as a painful emotional experience produced by excitations of the internal organs of the body (Hall, 1954), these excitations occurring through internal or external stimulation of the body and governed by the autonomic nervous system. Freudians have identified three types of anxiety.

3.2.1.1. Reality Anxiety: whose source is in the external world, e.g. fear of snakes, physical threat etc. This perception of threat from the external world could be innate or acquired. For example, fear of darkness could be innate as darkness has always been more dangerous to mankind than daylight, thus humans could have become evolutionarily predisposed to fear darkness, or fear of darkness could be learnt, as humans are more likely to have fear arousing experiences in the dark. However it could be both as heredity may produce a susceptibility to fear darkness and experience may transform this susceptibility into reality.

3.2.1.2. Neurotic Anxiety: whose source is the instinctual object choice of the Id, e.g. a person becomes afraid of some uncontrollable urge that will result in harm to the self. This may be through an act or a thought.

This form of anxiety can be seen in three manifestations of anxiety:

(a) Free floating apprehensiveness which attaches to any more-or-less suitable environmental circumstances and is a characteristic of "nervous"

people, who always expect the worst of any situation.

(b) Phobias: where the intensity of fear manifested is obviously out of proportion to the threat presented.

(c) Panic reactions: where impulse reactions need to be carried out to stop a person "exploding" (i.e. where the Id is exerting power over the ego and super-ego). These impulse reactions have the effect of reducing anxiety by relieving the pressure the Id is exerting upon the ego.

3.2.1.3. Modal Anxiety: whose source is the conscience or superego, thus a person is afraid of being punished for doing or thinking something contrary to the ego ideal. These feelings are manifested as feelings of guilt or shame in the ego. As the super-ego is derived from identification with parental values, it can be see that the original fear from which moral anxiety is derived is objective, i.e. the fear of punitive parents.

All fears, from this Freudian perspective, are more easily acquired during infancy and childhood, when the helplessness of the immature organism prevents it from being able to cope with danger. The young organism is often overwhelmed by fear as the ego has not developed to the stage where it can master excessive stimulation or trauma. Such situations reduce the organism to infantile helplessness, where the prototype for all trauma can be seen in the birth trauma. The birth trauma being a situation where the organism is bombarded with excessive

stimulation on entering a world that the protected foetal environment has not prepared her/him for. During their early years children face many traumatic situations which lay the groundwork for the development of individual networks of fears, such that any situation which, in later life, threatens to reduce a person to an infantile state of helplessness will touch off the anxiety signals.

This theory of anxiety is the starting point from which psychological theories of anxiety have developed. The major problem, as with all Freudian theories, is that such a theory is impossible to evaluate satisfactorily because the nature of the fears explained is primarily internal and as such only self-report can be used to measure the experience being described. Self-report is itself notoriously unreliable and where no other corroborating measures can be used is of little value. Where such experiments at evaluating have been attempted (e.g. Dixon et al., 1957) there have been severe methodological problems, particularly with the use of statistics on self-report data.

Therefore all fears are related to and derived from early experiences of helplessness, and where this fear is of external reality, i.e. objective, then the fear can be said to be real whereas where the fear is neurotic or moral, then the fear is of an internal nature and the person can be said to be afraid of feeling afraid. However, because of the problems with evaluation, psychologists began to explore only those aspects of anxiety which could be measured and consequently

evaluated. This led to the development of behavioural theories of anxiety.

3.2.2 THE BEHAVIOURAL PARADIGM

The behavioural model of fear acquisition is based upon the behavioural paradigm for the acquisition of all behaviour. As such, to understand the behavioural model of fear acquisition it is necessary to outline the mechanisms for promoting and inhibiting behaviour that have been put forward by behavioural scientists. The majority of this work is based upon work done by Pavlov (1927) and Skinner (1938), using animal experiments to attempt to understand the motivating forces that underly behaviour acquisition.

3.2.2.1 The Classical Conditioning Model:

This model of behaviour acquisition was outlined by Pavlov (1927) and can be summarised as follows: Through repeated exposure to associated discrete stimuli (e.g. a bell and food) a subject learns to anticipate the second stimulus from the appearance of the first stimulus. Thus the model relies upon there being two stimuli where the first stimulus precedes the second stimulus in time. The first stimulus being a not naturally exciting or inhibiting event (such as a bell ringing), and the second, a naturally exciting or inhibiting environmental event (such as the presentation of food). The two stimuli are then combined by repeatedly pairing them together until the first stimuli acquires the excitatory or inhibitory properties of the second stimulus. It is unlikely in a natural (i.e. non-laboratory) setting

that the first stimulus will always precede the second stimulus, thus the second stimulus has an independent probability of occurring when not preceded by the first stimulus. This means that there are three possible probabilities for the occurrence of the second stimulus: where the probability of the second stimulus being preceded by the first stimulus is greater than, less than or equal to the independent probability of the second stimulus occurring on its own.

Pavlov's experiments on animals have demonstrated that they are sensitive to all three of the above probabilities of occurence, and that responses to the first stimulus (the conditioned stimulus or CS) change accordingly (Dickinson, 1980) (See Table 3.4).

Table 3.4 CLASSICAL CONDITIONING RESPONSE PATTERNS

Where 1 is not naturally exciting

or inhibitory

2 is naturally exciting or inhibitory

Prob. of Stim. 1 occurring in relation to Stim. 2	Change in behaviour	Outcome
Greater than prob. of 2 occurring on own	Anticipates 2 occurring	Excitatory conditioned response
Equal to prob. of 2 occurring on own	No change in behaviour	Irrelevant to animal
Less than prob. of 2 occurring on own	Anticipates 2 <u>not</u> occurring	Inhibitory conditioned inhibition

From Table 3.4, it can be seen that if the probability of the first stimulus (CS) preceding the second stimulus (unconditioned stimulus or UCS) is greater than the independent probability of the second stimulus occurring without the first stimulus, then the animal will anticipate the occurrence of the second stimulus on presention of the first stimulus. Showing the unconditional stimulus to be excitatory and capable of producing a conditional response (CR). If the probability of the CS preceding the UCS is less than the probability of the UCS occurring independently then the animal responds to the CS in a manner that shows an anticipation of the UCS not occurring. This results in an inhibition of behaviour and the animals behaviour shows a conditioned inhibition. If the probability of the CS preceding the UCS is equal to the independent probability of the UCS then the occurrence of the CS neither inhibits nor elicits behaviour which shows anticipation of the UCS and in subsequent tests animals learn that the occurrence of the CS is irrelevant with respect to the occurrence of UCS.

From this brief review of classical conditioning it is evident that the model of behaviour provided is inadequate to explain the variety of human responses. There appear to be two major reasons for this, firstly, the vast majority of experiments have been carried out on animals in a laboratory setting thus controlling for all non-essential variables and encountering the problems of extrapolating to human behaviour. Secondly, there may well be a classical conditioning

component in dental anxiety but the range of variables that have been associated with development of such anxiety would make the task of deciding how the classical conditioning took place virtually impossible.

3.2.2.2 The Instrumental Conditioning Model

The classical conditioning model of behaviour acquisition has been extended by Skinners work to account for behaviours which are learnt but cannot be accounted for by classical conditioning. Skinner (1938) developed a theory of "instrumental conditioning" which accounts for the acquisition of new behaviour patterns that then affect exposure to future stimulus events. Thus, a subject uses a learnt response to mediate reactions to future similar stimuli, which indicates response-stimulus learning whereas classical conditioning only accounts for stimulus-stimulus learning. Therefore, in instrumental conditioning you have a response (R) which an animal emits with some probability and a stimulus (S) which occurs with an independent probability, when not preceded by R. As with Classical conditioning there are 3 possible relationships between the independent probability of S occurring and the probability of S occurring when preceded by R, i.e. the probability of S occurring when preceded by R could be greater than, equal to or less than the probability of S occurring independently. In instrumental conditioning learning is manifest as a change in the probability of R occurring. It is also necessary to describe the type of stimuli used, as the change in the probability of R occurring may take opposite

directions depending on what the animal is being asked to learn. (See Table 3.5).

Table 3.5 TYPE OF STIMULI AND RESPONSE EFFECT

P(R) ↑ = Increased probability of recurrence of R
P(R) ↓ = Decreased probability of recurrence of R

Type of Stimuli	P(R)↑	P(R)↓
Presentation	Reward (Approach)	Punishment (Passive Avoidance)
Termination	Punishment (Escape)	Reward (Time Out)
Omission	Reduction or Cessation of Punishment (Active Avoidance)	Reduction or Cessation of Reward (Extinction)

With stimulus presentation there is a situation where the likelihood of the response preceding the stimulus is greater than the likelihood of the stimulus without a response. Here there are two possible reactions, one where the presentation is of a rewarding stimulus following a response, thus leading to an increased probability of the response occurring again, e.g. bar pressing and food with a hungry rat. The other where the presentation is of a punishing stimulus following a response, leading to a decreased probability of that respsonse occurring again, e.g. bar pressing and electric shock for rats.

In order to understand the effects of termination and omission of

stimuli it is necessary to consider the possiblity of an integration between classical and instrumental conditioning. Suppose that for a given animal species there exist stimuli which act, without prior learning, as rewards or punishments. These stimuli may also act as Unconditioned Stimuli (UCS) in the classical conditioning paradigm; responses elicited by these UCS's are termed Unconditioned Responses (UCRS). Thus the result of classical conditioning in this case is that the CS comes to acquire the property of eliciting some portion of the total pattern of UCRS elicited by the UCS. Therefore when a UCS is provided by a rewarding or punishing stimuli, classical conditioning can confer on CSS', not themselves initially rewarding or punishing, secondary or conditioned properties.

These secondary properties fall into two general classes:

i) Reinforcers, which correspond to the reinforcing property of the UCS with which the CS has been paired

ii) Motivators, which are observed when relevant stimuli are presented to an animal independently of an animals responses. These correspond to some degree with the elevating properties of UCSS' with which they have been paired.

These secondary reinforcing and punishing stimuli have played a key role in the theory of emotions. As such, Mowrer (1960) treats 'hope' as the state elicited by secondary appetitive stimuli linked to the anticipation of reward, and 'fear' to the anticipation of punishment.

It is these states of anticipation that form the necessary background to the behavioural effects of omission stimuli in Table 3.5, as it is only when an animal anticipates reward that the omission of reward affects behaviour. This can be seen in a situation where an animal has been rewarded for a particular response over a period of time and then ceases to be rewarded for that response. The usual effect of this change of response is to decrease the conditioned response to extinction. On the other hand, omission of previously conditioned punishment increases the probability of the occurrence of the conditioned response. However, nearly all the experiments on the omission of reward use a procedure whereby the reward is discontinued (an 'extinction' procedure). The critical ingredient in this procedure, almost certainly, is a reduction in the rewarding stimulus following a response from the value it had before omission to zero. Another procedure which is in line with this reasoning, that of keeping the reward stimulus following a response at various values less than the independent probability of the stimulus occurring without a response, thus reducing the probability of the response occurring ('omission training') has been rarely studied.

The responses to termination of a stimuli are similar to those for omission, except that an animal's response to the stimulus is followed, not by omission of the reward/punishment, but by termination of the reward/punishment, i.e. the reward/punishment happens but the animal has the ability to leave the situation. This form of learning has been

widely used with evasive stimuli, e.g. a rat given a shock learns to 'escape' from the evasive stimulus, this has been rarely used with excitatory stimuli. Similarly, procedures involving the termination of reward, often called 'time out' studies, where the probability of a reward stimulus following a particular response is less than the independent probability of the stimulus occurring, have received little attention.

To summarise the above, Skinner has extended Pavlov's work to account for a greater range of behaviours within the behavioural model. By using a combination of classical and instrumental models an integrated formula of the occurrence of such emotions as 'hope' and 'fear' can be outlined. However, most of the experimentation has still again been confined to animals in a laboratory setting and the necessary integration of the classical and instrumental behavioural models relies upon the assumption that innate fear stimuli exist.

3.2.2.3 Behaviourism and Fear Acquisition

To understand those points of the above behavioural paradigm that are associated with inducing fear in subjects, it is first necessary to define the types of stimulus that are not associated with fear induction. Obviously reward stimuli, whether conditioned or unconditioned, are not associated with fear. Neither are the responses elicited by unconditioned punishment or non-reward, these can be seen as the precursors to fear responses as it is necessary to condition a subject to

expect punishment or non-reward before fear reactions become evident. Finally, secondary appetitive/excitatory stimuli (i.e. those paired with either reward or non-punishment), do not induce fear, but rather the emotion state of 'hope' mentioned above.

Thus, the stimuli remaining, which can induce fear, are those that deal with secondary punishing and secondary frustrative stimuli. These reactions can be summarised under 3 postulated emotional systems (See Table 3.6).

Table 3.6 EMOTIONAL SYSTEM OF SECONDARY PUNISHING AND FRUSTRATIVE STIMULI

EMOTIONAL	REINFORCING STIMULI	BEHAVIOUR
APPROACH	CONDITIONED STIMULI FOR REWARD AND NON-PUNISHMENT	APPROACH LEARNING; ACTIVE AVOIDANCE; SKILLED ESCAPE; PREDATORY AGGRESSION
STOP (OR BEHAVIOURAL INHIBITION SYSTEM)	CONDITIONED STIMULI FOR PUNISHMENT AND NON-REWARD	PASSIVE AVOIDANCE; EXTINCTION
FIGHT/FLIGHT	UNCONDITIONED PUNISHMENT AND NON-REWARD	UNCONDITIONED ESCAPE; DEFENSIVE AGGRESSION

It is the emotional system of 'stop' that is relevant to the experience of anxiety. Gray (1982) has postulated a physiological system which mediates reactions to this emotional system that differs

from physiological mediation to the other 2 emotional systems. For the 'approach' system curiosity and a feeling of safety could be expected to mediate responses, whereas for the 'fight/flight' system wariness and awareness of danger would be presumed to mediate responses. Neither of these can account for the doubt and uncertain expectation which characterise the 'stop system'. Through a series of well constructed tests, Gray has shown that mediation of responses to the 'stop' system are located in the hippocampus, the hippocampus acting as a 'centre of doubt' in the brain, monitoring behaviour as it occurs.

In order to explain the function of the hippocampus or as Gray called it the 'Behavioural Inhibition System' (BIS) it is necessary to detail the behaviours upon which the BIS acts. Firstly, the system mediates responses to secondary punishing and secondary frustrative stimuli. These two types of stimuli have been said to be functionally equivalent (Wagner, 1966; Gray, 1967, 1975). This appears to be so, as the simple operation of reward and punishment may combine with the classical conditioning component of the total learning process to produce secondary rewarding and punishing stimuli. In the same way the process of frustrative non-reward would occur, for instance, by pairing an initially neutral stimulus in a stimulus-stimulus sequence with non-reward (e.g. a tone made to sound just before non-rewarded entry to a goal box). Here the tone will acquire, by classical conditioning, some of the properties of non-reward itself, becoming aversive to the animal

in just the same way as if it were paired with a punishment (e.g. electric shock).

Though secondary punishing and frustrative stimuli derive their properties from classical conditioning with the corresponding unconditioned event, there is good reason to believe that responses to the conditioned and unconditioned stimuli are mediated by different systems, providing more evidence for the difference between responses to the 'Stop' or BIS system and the fight/flight system. It is generally true of classical conditioning responses that they conform to a modified version of Pavlov's (1927) symptom substitution hypothesis. That is, properties acquired by a CS as a result of classical conditioning are properties also possessed by the UCS employed to establish a particular CR.

However, when the UCS is an aversive stimulus there is an exception to this rule. For example, if a rat is given an electric shock as a UCS the response generated is lots of activity (running, jumping etc.), lots of noise (squealing). Whereas if a rat is conditioned to expect a shock following a tone etc., the reaction is the reverse, immobility and silence (Myer, 1971). Similarly, an unconditioned shock can elicit aggresive behaviour, if a suitable object is available, whereas a conditioned stimulus followed by a shock inhibits aggression (Baenninger, 1967; Myer, 1971).

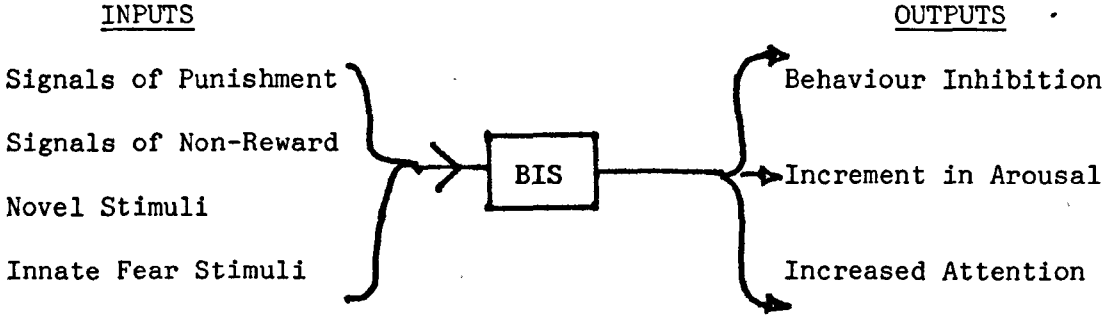
A similar effect has been seen to occur in humans, with heart rate

and respiration. The unconditioned heart rate and respiration response to shock is acceleration, whereas a conditioned stimulus followed by a shock produces deceleration (Notterman et al., 1952; Obrist et al., 1965). Therefore a conditioned stimulus signalling punishment appears to activate a different behavioural system from one which mediates responses to punishment itself.

Secondly, the Behavioural Inhibition System is specialised to respond to two further types of stimuli: novel stimuli, which ties in the phenomenon described by Sokolov (1963) as the 'orienting reflex' and Pavlov (1927) as 'external' inhibition with the activities of the BIS, and Innate Fear Stimuli, Gray (Gray, 1971; Gray 1976; Seligiman, 1971) outlines essentially the same type of stimulus as 'prepared stimuli'. These are stimuli associated with special dangers for a species and stimuli that arise during social interaction with conspecifics (e.g. threatening looks or calls).

Now, the system has been outlined, it is necessary to look at its function and effect.

Table 3.7 THE FUNCTIONS OF THE BEHAVIOURAL INHIBITION SYSTEM (BIS)



From Table 3.7 the functions of the system can be seen to be:
(a) to inhibit all ongoing behaviour; whether instrumentally, classically conditioned or innate.
(b) to perform a maximum analysis of current environmental stimuli, especially the novel ones, hence 'orienting responses' can be seen as a consequence of this system.
(c) other major outputs, inhibition of all previously operative behaviour patterns, coupled with increase in arousal, this increase in arousal leading to an intensifying of whatever behaviour finally does occur.

It is interesting to note that behaviour inhibition and increased arousal probably co-exist. This is known as the 'partial reinforcement effect' (Goodrich, 1959; Haggard, 1959) where animals exposed to non-reward both hesitate more (behaviour inhibition in a narrow sense) and run-faster (higher arousal) than continuously rewarded controls (Amsel, 1962; Gray & Smith, 1969).

Although, from Table 3.7, it can be seen that two of the four kinds of stimuli to which the BIS responds are learned, the system itself does not play a part in learning. The formation of conditioned punishing and frustrative stimuli is thought to take place according to the same general processes that are involved in classical conditioning which is mediated by different brain systems. Also, the way in which the BIS responds to stimuli is not learned. Animals seem to know instinctively

how to respond to threat (of pain, failure or uncertainty) but they have to learn what is threatening, except in the case of innate fear stimuli where the BIS responds (as to novel stimuli) more or less automatically.

Therefore, the acquisition of fear within a behavioural model is seen to occur when an organism uses the emotional system 'stop'. This activates the BIS where responses to such stimuli are coordinated. The postulated functions of the BIS have, to some extent, been corroberated by animal experimentation and some experiments on humans can be fitted to this model (e.g. Notteman et al., 1952; Obrist et al., 1965).

However, much more analysis of this integrated system of classical and instrumental conditioning is needed to transform this theory from useful explanation of phenomena to causal predictor of phenomena.

In summary to the Behavioural Paradigm section of the review, it can be said that:

1. The combination of classical and instrumental conditioning provides a powerful model of behaviour which can be evaluated.
2. The development of the B.I.S. from this model provides a measurable model of anxious behaviour.
3. The major problems with this model are the reliance upon animal experimentation and the assumption that innate fear stimuli exist.

3.2.3 THE COGNITIVE MODEL OF ANXIETY

In Freudian terms anxiety was seen as a repression of ideas causing conflict to arise in certain situations, the repressed ideas themselves being unconscious memories of the past which, for various reasons, predispose a person to fear situations in which some elements of the original situation appear to recur. In behavioural terms anxiety is seen purely in terms of what an organism does in reaction to a situation of conditioned or unconditioned threat. Both these scenarios assume that anxiety itself is the expression of an emotion, which to cognitive theorists, indicates that other components of the anxiety response have been subsumed in the subjective feeling of anxiety. Thus measurement of anxiety has centred, in Freudian terms, on the expressed feeling of the individual and, in behavioural terms, as the measurement of bodily feelings such as sweaty palms, trembling hands and heart palpitations. The cognitive model represents a distinct departure from previous theories of anxiety.

3.2.3.1 Cognitive Theory an Outline:

When looking at anxiety Beck (1985), the cognitive theorist on whose explication of the theory this account is based, postulated that the central feature of anxiety disorders is the preoccupation with danger and responses to endangering situations. Thus, when a person is confronted with a dangerous situation their consciousness is saturated with threatening thoughts and images. Anxiety also has a necessarily

future orientation, in that a threatening situation may be about to happen or is happening but the dire consequences of the situation has not yet occurred, i.e. the threatening thoughts have not materialised but the body is prepared for their imminent occurrence. An anxiety response to a situation is activated as a person nears the feared/threatening situation. Such imagining of a threatening situation can activate anxiety as it brings a distant danger into the present through visual or verbal imagery. However, when actually faced with a dangerous situation a person's response is likely to be different from the response to anticipation of such an event.

When confronted with danger, certain bodily emergency patterns emerge, such as flight, inhibition or fainting. Confronting danger may provoke certain automatic behaviour which is not provoked by imagining a situation. For example, a dental phobic undergoing treatment imagines the drill is piercing his skull, the trauma of this leads him to faint. This shows a profound reaction of the parasympathetic nervous system which is repsonsible for sweating and fainting.

The above statements about anxiety seem to suggest that the disabling and disturbing symptoms of anxiety may represent survival mechanisms that were once useful, maybe in prehistoric times, to overcome the extreme consequences of attack. Using this reasoning, fainting in response to danger could be seen as the human equivalent of playing dead in the face of a powerful predator. These very responses, nowadays, merely serve to

accentuate the anxiety problem and may make a person even more fearful of returning to the danger situation, lest the primitive response be repeated.

Consequently, as with Freudian and Behavioural theory, anxiety can be seen as a response to threat, however, unlike these two theories cognitive theory does not regard the unpleasant experience of anxiety as the central, overriding element of anxiety responses, instead anxiety is seen as a director of the consciousness. The feeling of anxiety draws attention from other pre-occupations to the unpleasant subjective experience. This in turn motivates an organism to reduce the unpleasant feeling by acting to avoid, escape or defend against the threatening event. Thus, measures which are taken to reduce danger will generally reduce anxiety. Anxiety is not the cause of the psychological distress that is felt, but continuing generation of anxiety indicates an inability to find an acceptable action to reduce the danger of a situation. Further to this, if the danger felt by an individual is not actual but misperceived or exaggerated the experience of anxiety in these situations gives little scope for intiating remedial action.

Therefore the main problem in anxiety disorders is not the generation of anxiety but rather an individual's cognitive response to potentially dangerous situations. It is this cognitive element of anxiety that makes Beck's formulation of anxiety so different from previous theories, as it now appears quite possible that anxiety is not a cause but a symptom of

an organism's response to danger.

3.2.3.2 The Cognitive Model of Reactions to Threat:

From the above, it appears anxiety is merely one of a group of inter-related "strategies" for dealing with threat. As such anxiety should accordingly be analysed within the framework of an individual's response to danger. The framework must include hostile or anger responses to threat as well as the anxiety responses. Individuals are also equipped with a range of protective mechanisms to deal with specific threats, for example, protecting against entry of noxious substances or ejecting them, defending against external blow, inhibiting an action, fainting, reaching to others for help, a complete term for these survival strategies could be termed the "fight, flight, freeze, faint reaction". These reactions Beck has termed the "primal reactions", as they are primitive (i.e. occur in other primates), involuntary (i.e. occur as if by reflex) and they appear to provide a baseline of defence against danger.

Within anxiety disorders specific groups of symptoms correspond to the functions of the specific primal systems: cognitive, affective, behavioural and physiological, with these symptoms being controlled by a master system: the psychological or organismic totality. The operations of the primal systems are co-ordinated and integrated by the master system.

The master system is designed to carry out certain objectives, such

as self-preservation, feeding and breeding. With the primal systems co-ordinating to achieve the desired "master plan", the operation of both the master plan and the primal systems varying to meet the organisms immediate environmental needs. Therefore specific primal responses to life threatening situations (fight, flight, freeze, faint) will differ from each other as well as from responses involved in feeding and breeding. In addition, an emergency situation will involve total mobilisation of all systems whereas in feeding or breeding certain sub-systems are activated and others deactivated.

In every day living people generally experience a smooth co-ordination of the various systems as they switch flexibly from one function to another, with integrated responses making sense of specific situational requirements and appearing be controlled by a neatly oriented "programme". The operation of our apparatus proceeds according to a comprehensible design, under the control of the perceptual/cognitive sub-systems. Where the cognitive system integrates perceptual inputs, selects an appropriate response plan to a situation and activates the rest of the bodily apparatus. The cognitive system relies on the sensory organs (predominantly eyes and ears) for information to construct meaningful patterns at a perceptual level. The patterns (or relationships) most likely to be important to an organism are those relevant to the organisms vital interests, e.g. survival or sex. Therefore to understand anxiety disorders the symptoms of anxiety

should be seen not as foreign experiences but as expressions of basic (primal) psychological functioning.

3.2.3.3 The Experience of Anxiety within a Cognitive Theory Perspective.

Anxiety is seen as a response to threatening situations, in which the cognitive system makes selective appraisals of environmental configurations and available coping resources; then, determines whether there is a clear and present danger, and sets in motion the sequence of affective, behavioural and physiological systems. These systems all have specific functions in terms of anxiety responses. The affective system gives rise to experience of anxiety, which concentrates an organism on a present danger and, through the unpleasantness of the experience of anxiety, speeds up reactions to the situation by enhancing the sense of urgency; the behavioural system controls the action or inhibition of action the cognitive system deems necessary as a reaction to the present danger; the physiological system controls the autonomic components that "service" somatic mobilisation and inhibition.

In the past, much has been made of the lack of concordance between the various measures of anxiety (physiological, cognitive and behavioural), assuming that there is a single monolithic system for dealing with danger and thus the various systems should show an equivalent amount of activation. However, the above cognitive theory breakdown of responses to danger shows that people can draw on several systems and the composition of operations shifts as the danger sequence

progresses from sounding the alert, to defining danger, to assessing and selecting appropriate coping strategies, to mobilising the appropriate motor apparatus and finally to providing appropriate autonomic innervation to support the somatic mobilisation. Once feed-back from the ongoing situation is integrated the operation of the master and component systems continues to shift according to the demands of the situation. In addition to the direct response to danger, certain homeostatic mechanisms are necessary to provide temperature control, i.e. regulating vasomotor and cardiac functions to adjust energy output etc. Therefore, to understand the response to threat it is necessary to have a comprehensive view of the individualised actions and interactions of the cognitive, affective, physiological and behavioural sub-systems, with a recognition that operations in each system may shift from one moment to the next.

In addition to the understanding of individualised responses to a threat there is the added complication of an individual having two or more competing responses or strategic operations (modes) being activated concurrently. For example, a patient in a dental situation may be choosing between two or more competing coping strategies such as (a) "Should I close my mouth and refuse further treatment ?" and (b) "Should I accept this treatment as it will be beneficial to my health ?" Here there is competition between the coping strategy concerned with self-preservation (a) which is the primal coping strategy whereas a more

conscious intention during treatment may be concerned with getting treatment done, pleasing parents, pleasing dentist etc. as in (b). In this situation the primal modes are very powerful and are operational as long as a person feels vulnerable to a present "danger", which means the patient in the above situation could be struggling to overcome the primal reaction to allow the conscious reaction to take place. This in turn leaves people in the paradoxical position of attempting to perform a task in the face of threat and having the performance of that task undermined by primal reactions. The most readily identifiable example of this phenomenon can be seen in situations where people have to confront an audience, the desire to perform well is undermined by the feeling that the performance will go badly. The phenomenon can be explained when the attempting of a task is broken down into the functions of the primal systems. The primal systems are geared to doubt the operator in a task (cognitive system), stiffness and watchfulness (behaviour inhibition), anxiety generation (affective), wish to escape (motivational) and rapid heart rate and breathing (physiological), these basal mechanisms being activated not to the person's particular wishes and goals but to the threat of negative evaluation, injury etc., which brings in the variable of the person's belief in and expectation of their effectiveness in a given situation (confidence). The level of confidence to do a task produces a reciprocal interaction with the degree of mobilisation of the primal self-protection mode.

Therefore, it appears that whereas the makings of the primal defence mode undermines a person's sense of efficacy, an increase in self-confidence tends to modify the sense of vulnerability and consequently the defensive systems. From this conclusion it can be argued that the symptoms of an anxiety disorder are an inappropriate anachronistic response based on an excessive estimate of the degree of danger in a given situation and an under-estimation of the person's abiity to perform adequately.

3.2.3.4 Normal and Abnormal Anxiety

As with all theories about anxiety the above reactions to threat occur either in situations where there is a threat great enough to warrant that reaction (normal anxiety response) or in situations which do not warrant such a response (abnormal anxiety reaction). Thus to complete the picture of what people do when they are threatened it is necessary to look at why some people have such an exaggerated response to threat. This exaggerated response is at the root of all anxiety disorders and within cognitive theory is seen as a hypersensitive alarm system. Anxious people are so sensitive to stimuli that may signal imminent disaster or injury that they are constantly warning themselves of potential threat. As most stimuli relevant to particular situations in a general environmental perception can be seen as dangerous, thus triggering the alarm system, these people experience many "false alarms"

which keep them in a state of stress and turmoil.

This pre-occupation with danger is manifest by persevering involuntary intrusions of automatic thoughts (either verbal or visual) whose content involves possible physical or mental harm. The person's ability to "reason" with these thoughts becomes impaired by the primal reaction stimulating the thoughts. People in this position tend to "catastrophise" (Ellis, 1962), that is to dwell on the worst possible outcome of any situation in which there is a possibly unpleasant outcome. This in turn leads to hypersensitivity, to potentially harmful aspects of a situation and the ignoring of, or refusing to submit to benign or positive aspects of a situation. Therefore people will appraise situations as unsafe unless they are irrefutably safe, which leaves no tolerance to uncertainty or ambiguity.

Thus it is this hypersensitivity to the possibly harmful effects of any situation that characterises abnormal anxiety. This anxiety may be specific to particular situations or generalised to broad categories of experience depending upon the persons reactions to environmental stimuli.

3.2.3 The Integration of the Behavioural and Cognitive Models of Anxiety

With regard to the theories outlined above, there appears to be a functional equivalence of the behavioural inhibition system and the inhibition component of the cognitive model of anxiety. In the behavioural inhibition system the major responses to threat are to inhibit behaviour, increase arousal and increase attention. Similarly, in the cognitive model behaviour is inhibited, the situation is evaluated in great detail to discover an apropriate way of behaving (which involved both increased arousal and increased attention) which may reach a level which becomes overpowering for the cognitive systems. This equivalence between the cognitive and behavioural models may extend further than stated here, but in terms of this research project it is not necessary to explore this area any further.

Thus, in terms of this project the model of anxiety being used, involves the behavioural conception of anxiety being integrated into a general cognitive framework. This allows the measurement of anxiety to be undertaken from a behavioural and a cognitive viewpoint without the expectation of a more than low positive correlation between the two, as, using the cognitive framework anxiety becomes a symptom rather than a cause of the perception of threatening situations.

In conclusion to the cognitive model of anxiety it can be stated that:

1. Becks theory marks a significant departure from previous theories of anxiety, with anxiety appearing as a symptom rather than a cause of an organism's response to danger.
2. Within cognitive theory it is evident that responses to threat, i.e. the symptoms of anxiety, are not foreign experiences but expressions of basic (primal) psychological functioning.
3. The primal defence mode can undermine a persons sense of efficacy (or self-confidence), consequently an increase in self-confidence can modify the undermining effects of the primal defence mode.
4. Symptoms of anxiety disorders can now be seen as innappropriate anachronistic responses based on excessive estimates of the degree of danger in a given situation and an under-estimation of the persons ability to perform adequately.
5. Hypersensitivity to the possible harmful effects of any situation is the major characteristic of abnormal anxiety responses.
6. By integrating the findings of behavioural and cognitive theorists within a cognitive framework it is possible to develop a model of anxiety which avoids the major problems inherent in the behavioural model of anxiety.

3.2.4 RELATED PSYCHOLOGICAL TOPICS

Throughout the main body of the review of the psychological literature it has been necessary to concentrate on the major issue within this project, namely the theories relating to anxiety. It is essential to put this concentration on anxiety into perspective with related psychological topics, in order to put the anxiety work within a framework of variables which will allow an analysis of dental anxiety in particular.

When a child visits the dentist he/she brings a host of preconceptions about dentistry. Some of these can be analysed in psychological terms, for instance, the work already done on the mother-child interaction and dental behaviour in children. However, most of the work carried out in this area concentrates on the effect of particular variables such as mother-child interaction and does not consider the wider implications of the total social/environmental influences that affect children's actions. Thus, one of the related areas of psychological enquiry is to look at the literature on the effect of social/environmental influences upon children's behaviour. For instance, it has been recognised for some time that children brought up in a family of smokers are more likely to smoke themselves and children whose friends smoke are more likely to develop a smoking habit.

In addition, one of the most common reasons given for fear of dentistry is expection of pain (Wardle, 1982, Woolgrove et al., 1980).

Pain itself is an area given a great deal of attention by psychologists in recent years and an understanding of the nature of pain is necessary to explain its importance in the development of anxiety.

Another much larger and more indirect area of psychological research that has affected some workers in dental anxiety (Williams et al., 1985) is temperament and personality. The rationale here, seems to be that some people are temperamentally more likely to be predisposed to develop anxiety problems in relation to threatening situations. In the light of this it is necessary to examine where the temperament and personality data arise from and how data can be linked with the dental situation.

Therefore, there are three areas of psychology which can be seen as directly affecting children's perceptions of dentistry, pain, social/environmental influences and temperament, which will be dealt with individually in this section of the psychological literature review.

3.2.4.1 Pain

The traditional view of pain has been described as an unpleasant sensation which is a symptom of disease or injury. Whilst this accords reasonably well with common sense, the clinical experience of pain has shown this argument to be fundamentally flawed, as disesase can often progress without the patient experiencing pain (e.g. cancer and heart

disease) and pain can be experienced in the absence of a demonstrable pathology (e.g. phantom limb pain).

In psychology the earliest attempt to study pain came from within psychophysics (Hardy et al., 1952), where psychologists attempted to relate a stimulus's magnitude and a subject's discrimminative ability. The results of these experiments indicated that consistent thresholds and scales of pain can only be obtained with highly practised subjects and constant prevailing conditions. The pain reaction was seen to be susceptible to mood, fatigue, anxiety and many other psychological factors.

The problems encountered by early researchers provided an alternative perspective for studying pain, by studying the relationships between pain and the variables that were seen to be susceptible to pain in the earlier studies. Much of this research has failed to provide unambiguous, reliable data on which to base a concept of pain. For instance, early workers in this area attempted to show a relationship between pain and personality, using the Introversion and Neuroticism scales from the EPI. They found that those with higher Introversion Neuroticism scores had significantly lower pain threshold ratings, (Lynn & Eysenck, 1961). However, this type of experimentation has not been replicable (Levine et al., 1966) and in the case of Introversion and Neuroticism, Bond and Pearson (1964) found that extrovert women cancer patients reported higher levels of pain and demanded more analgesics.

As a response to the problem of providing a simple sensory model of pain, which has proved very elusive except in physiological textbooks, Melzack and Wall (1982) developed a concecpt of pain based upon the cognitive functioning of the human brain. This theory states that pain is a multidimensional experience, involving a complex integration of peripheral sensory input and the central input. This process is governed by the action of the spinal transmission (T) cells, as it is at this point that fibres from the brainstem reticula formation and the cortex converge (both directly and via-inter-neurones). The exact physiology of the theory is not entirely agreed upon, however, the strength of this theory lies in the emphasis it places upon input from higher cortical processes, giving anatomical and conceptual reality to the psychological variables that are crucial in the determination of pain, such as the role of attention, expectation, salience, mood and past experiences. In addition, Melzack and Casey (1968) proposed that the sensory and affective aspects of pain are subserved by different parts of the CNS, both of which receive projections from the T cells. The existence of the separate subjective affective and sensory dimensions of pain is evident in the language that pain elicits, i.e. both sensory and affective descriptors, e.g. 'burning', 'torturing', 'pricking', 'distressing'. Another demonstration of this phenomenon explored by Johnson (1973) is that patients can make independent ratings of the intensity and aversiveness of pain.

There is a clear parallel between Melzack and Wall's work and the cognitive conceptualisation of pain from which cognitively-based pain treatments are derived (Meichenbaum and Turk, 1976). This model proposes that pain, may be described verbally or as a visual image. These thoughts are very subjective to the patient and subject to a variety of distortions, both positive and negative, which in turn affect the pain experienced and behaviour displayed.

Thus, as with anxiety, the rapid development of cognitive approaches to specific problems appears to be radically altering conceptions of the way in which people experience pain. This development will no doubt assume greater importance in the future and should therefore be explored in any project where pain plays a significant role.

In recent years, dental researchers have begun to look at the role of pain within the dental setting. An early study in this area by Wardle (1982) found that the most common reason for fear of dental treatment was anticipated pain, which was borne out by comparing anxiety and expected pain for a number of dental procedures which resulted in the highest levels of anxiety being associated with the highest expectations of pain and vice versa.

Lindsey, Wage & Yates (1984), have shown that patients tended to expect more discomfort than they were likely to experience over a range of dental treatments. Similarly, Kent (1984) showed that amount of pain expected and experienced by dental patients was related to the type of

dental procedure. Highly anxious patients expected more pain than they experienced when receiving such procedures as drilling and extractions but predicted more accurately the level of pain with such procedures as examinations. Low anxiety patients predicted the level of pain they would experience reasonably accurately for all procedures.

Therefore, it appears pain is a complicated concept which is very important in studying dental anxiety. With the recent advances into cognitive conceptions of pain it is necessary to integrate some form of cognitive pain conception into any study of dental anxiety.

3.2.4.2 Social/Environmental Influences

The whole area of family and peer group interactions has been studied in great depth by social and educational psychologists. However, much of this work does not relate to the present situation without much tortuous explanation and dubious generalisation from original settings to the dental situation. This section provides a brief overview of the research into this area and explains how this connects with the dental research into this field.

There has recently been an increasing recognition (Bronfenbrenner, 1973; Lamb, 1976; Lewis and Weinraub, 1976) that in order to understand the development of a child, that child must be studied as a member of his/her social system. This has led, in turn, to considerations of more complex models of socialisation. Within a child's social system there are many inter-related elements which combine to form a single system,

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i.e. the child's concept of his/her world (Monvane, 1967; Von Bertalanffy, 1967). The assumption is made that each element of this system (friend, father, sister etc.) influences and is influenced by each other element, for instance, within a 3 member family you have the Mother-Child, Father-Child and Mother-Father relationship as elements of a family system.

Thus, to understand the influences on a child in a particular area, it is necessary to try and encapsulate as much data as possible about all their relationships in an attempt to discover whether any particular patterns of attitudes can be seen. This is further complicated by the fact that systems infer the quality of non-additivity, i.e. knowing everything about the sub-systems (individual relationships) that comprise the system will not tell you everything about the system as it operates as a whole. This may be seen in most families as a child goes through adolescence, where outside influences begin to lead the child to challenge family attitudes, which often leads to conflict.

Therefore, to try and look at the parts of a child's system that could affect their perceptions of dentistry, it is necessary to get information about as many of the child's relationships as possible, though equally to be aware that in the context of a one-off visit research project using self-report data, very little can be concluded from such data unless general patterns of behavioural influence across a group of children is found.

This view of the influencing factors that affect children has taken

up a great deal of the dental research involved in childrens fear of dentistry. Unfortunately this research has tended to concentrate on specifi areas, such as mother-child relationships, peer group influences etc., which on their own are of very little use without the supporting information from other areas of the child's social contacts.

Therefore, this area of outside influences on behaviour is complicated and almost impossible to unravel within the context of the present project. It is hoped that by taking information from the whole spectrum of a child's social experience, some patterns of influence occurring between groups of children may lend support to particular influences, or combinations of influences, being of primary importance.

3.2.4.3 Temperament

A person's temperament may be described as "determined by physiological factors of the organism" (Strelau, 1983), i.e. the biological base upon which social influence and experience affect the development of the person's personality. Thus, temperament can be seen as the underlying factor of behaviour that may influence behaviour indirectly but does not determine behaviour. The major element in the construction of temperament has been succinctly outlined by Strelau (1983) as the "energy level of behaviour", i.e. the physiological mechanisms responsible for the accumulation and release of stored energy create a general energy level which each individual has to operate with. Within this there are two basic temperamental features, reactivity and

activity of behaviour. Reactivity is shown by a relatively stable and typical intensity of response to stimuli. This is measured by comparing reactions to different stimuli among different people, and can be seen to represent a dimension from extreme sensitivity to resistance or efficiency. This is derived from, and similar to, Pavlov's notion of strength of nervous system or the capability of responding adequately to high intensity, long-term or repetitive stimulation (Pavlov, 1952). Studies by Teplov and Nebylitsin (1963) have shown there is a relatively stable relationship between sensitivity and efficiency.

Thus, the weaker the stimulus that elicits a perceptible response, the higher the persons sensitivity is and the weaker the stimulus that starts to lower efficiency, the lower the persons resistance is, which consequently indicates a person of high reactivity. Conversely, a low reactive person is indicated by low sensitivity and high resistance. This provides a model in which highly reactive people are shown by the physiological mechanism of a high stimulation processing coefficient (SPC), whereas in low reactive people this mechanism suppresses stimulation.

The second feature of the energy level of behaviour, activity, states that individuals vary in the intensity or frequency of different kinds of task they undertake. This concept is similar to Hebb's (1955) idea of optimal activation, whereby a person seeks stimuli until an optimal level of arousal is reached. However, if a person becomes

overstimulated they will carry out activities aimed at reducing the arousal to an optimum level. Maintenance of this optimum level becomes a kind of "need" and disturbances of the equilibrium of activity elicit the motivation to act in a way that ensures the optimum level of activation is maintained.

Sources of stimulation that evoke arousal are extensive, e.g. situations, tasks, surroundings etc., and may arise from a persons own reactions and behaviour, via feedback. Thus, some activities can be carried out as they invoke a stimulating motivation through the emotional process accompanying the action, in other words, some activities can be a source of stimulation because they generate certain emotions, which in turn directly elicit a certain state of activation. For example activities that carry threats of various intensity evoke different reactions depending on the level of threat and the consequent emotional tension.

Therefore, to combine reactivity and activity, highly reactive people avoid situations and activities that have strong stimulation, whereas less reactive people undertake activities and look for situations that possess a high stimulating capacity. Consequently, low reactivity people are generally more active and highly reactive people show lowered activity.

In order to measure temperament it is impossible within a clinically-based study to assess the information necessary to judge a

person's temperament directly, therefore it is necessary to look at aspects of personality to judge the underlying temperament. Personality may be seen as the social-historical conditions that affect an individual, and it is necessary to outline the basic relations between temperament and personality to enable a measure of temperament to be useful. This area has not received much attention, however those who have worked in this field (Thomas & Chess, 1977; Thomas, Chess & Birch, 1968; Eliasz, 1974 & Strelau, 1978, 1983) have isolated four main interactions between temperament and personality:

1. Temperament induces change in the environment which in turn has consequences for the development of personality. For instance, from birth a child affects his/her environment by his/her temperament, this in turn leads the parents to respond to these temperamental demands and these responses have consequences for the child's emerging personality.
2. The environment may differ in its effect upon individuals, depending upon their temperamental traits, which in turn affects the formation of personality. For instance, Merlin (1955) found that low reactivity pupils when given poor marks for work reacted by improving their school-work, whereas high reactivity pupils withdrew and tended to give up further activity.
3. Temperamental traits determine acitvity aimed at modulating stimulation by choice of adequate activity or environment. These preferences of activity and environment affect personality development.

Thus, the activities you choose and the environment you choose reflect the level of activity your temperamental traits require for optimal performance.

4. Traits or mechanisms of personality independantly of their content, may become a source of stimulation and thus may indirectly affect the temperamental traits of a person. This expresses a situation where an aspect of a person's personality has become firmly established to the extent that it may override the temperamental predisposition. For instance, this may be true of some school over-achievers, where the desire to attain praise, good marks etc. can override the temperamental trait of the child in other areas to be less reactive to stimulation. However, this cannot be easily verified empirically, because personality traits are secondary to temperamental traits.

Therefore, to be able to provide a measure of temperament it is necessary to inquire into the first three of the four interactions listed above. In terms of dental research, very little has been done on the effect of temperament upon the genesis of dental anxiety. This may be due to the problem of separating temperament and personality in terms of the research situation. In the context of the present study it was seen as necessary to evaluate temperament, particularly as measures of personality (medical/dental history, social influence) were seen as essential to providing a picture of the dentally anxious child.

To conclude, temperament is the biological base upon which personality is built, as such the two interact closely together in particular ways. Thus, the importance of temperament in the genesis of anxiety cannot be left to the measurement of personality as other studies (except Williams et al., 1985) have done. However, measuring temperament as distinct from personality is difficult and that may account for many researchers reticence in tackling the problem.

In summarising the related psychological topics section of the review it can be concluded that:

1. Pain is a complicated concept which has received increasing attention in dental research in recent years. The cognitive model of pain has provided advances in the understanding of pain which have contributed to dental researchers ability to study the effect of pain expectation and tolerance on dental behaviour.
2. The social/environmental influences on behaviour are extremely complicated and within the present projects scope, impossible to explain to any depth.
3. Temperament can be defined as the biological base upon which personality is built. As such measures of temperament as opposed to personality are essential to explain the role of temperament/personality in the development of dental anxiety.

3.2.5 ANXIETY MEASUREMENT

The measurement of anxiety has inevitably reflected the prevailing historical perspective of the concept of anxiety. Those researchers following a Freudian paradigm favouring "projective" techniques, such as the relationship between the size of a drawing and anxiety used by Baldwin (1966), designed to measure the level of underlying or 'unconscious' anxiety reflected in the completion of an unrelated task. Similarly, behavioural researchers have favoured assessments of state and trait anxiety. Trait anxiety can be defined as a relatively stable level of anxiety proneness, that varies between individuals. When measuring trait anxiety the researcher is assessing differences between people in their tendency to experience anxiety states. State anxiety can be defined as transitory feelings of anxiety experienced in specific situations. Thus, measuring subjective, consciously perceived feelings of apprehension, tension and worry that vary in intensity and fluctuate over time, (Speilberger, 1966). Probably the most well known of these scales is Speilberger et al.'s (1973) State-Trait Anxiety Inventory (STAI). In addition, the focus of measurement on one of the three measurement channels, cognitive, physiological or behavioural, has tended to follow particular researchers biases about the relative importance of each of the three channels (Berkovec et al., 1977). This has led to the development of a plethora of anxiety measurement scales (Cattell & Scheier, 1961).

The most common form of anxiety measures are the anxiety scales, inventories and questionnaires, which are used to measure "signs" of anxiety. That is, they are used to indicate the degree of subjective anxiety through the score a person gets on the measure used. Unfortunately, using a cognitive perspective this means of measuring anxiety becomes unacceptable, as cognitive theory requires anxiety to be measured, not as a sign of anxiety, but as a sample of a person's reactions to a particular situation using at least two, if not all three, of the available channels of measurement (Cognitive, Physiological and Behavioural). The necessity for this "sampling" approach arises from the changing perspective of anxiety outlined above and can be summarised as "measuring what a person does rather than (infering) what he has or is" (Mischel, 1971).

Having outlined the underlying theory of anxiety measurement it is possible to examine the measurement of anxiety within each of the three possible channels:

3.2.5.1 Cognitive Measures: The only way to gain access to the cognitive component of anxiety is by asking the person how they are feeling. This method of gaining information by self report has been heavily criticised for lack of reliability and validity, problems with subjects faking responses and errors arising from a subject giving answers they feel an experimenter wants to hear (Bellack and Hersen, 1977; Mischel, 1968). However, when the self report measures are placed

within a cognitive context of alternative measures, with only a small positive correlation to other response channels required, there limitations can be seen as part of a persons response set rather than as misleading information.

Cognitive measures can be obtained either by questionnaire or by rating scales. Rating scales are used to measure a person's reactions to the immediate situation by placing a mark on a line at a relevant point to indicate the amount of anxiety felt, with the extremes of the line being defined (see figure 3.1).

Fig 1 Anxiety Rating Scale

This provides a quick and effective measure of a person's subjective experience within the experimental conditions.

3.2.5.2 Physiological Measures: To measure physiological reactions it is necessary to use equipment attached to the subject in order to assess electromyographic, cardiovascular or electrochemical changes. As this project deals with anxious children within a normal clinic routine it was decided on ethical and experimental grounds that to increase the stress of the visit, by the attachment of the necessary equipment, could be harmful to the child's perception of dentistry and could affect the results obtained. Consequently, physiological measurement of anxiety was considered unsuitable for this project.

3.2.5.3 Behavioural Measures: Anxious behaviour can be measured by observing the overt signs of anxiety (heavy breathing, tremors etc.) or by measuring the covert signs of anxiety (avoidance or escape behaviour) (Neitzel & Bernstein, 1981). In practice, most behaviour rating scales concerned with dentistry assess the most easily observed elements of both the overt and covert signs of anxiety (Melamed, 1983, Weinstein, 1982). Measuring a person's behavioural responses has become the predominant anxiety measurement technique, based upon the assumption that "seeing is believing". However, this confidence in the reliability and validity of behavioural data is difficult to reconcile with the data produced (e.g. Kent et al., 1974).

Therefore, it appears that both behavioural and cognitive assessments of anxiety can be reliable and valid measures when tested against other questionnaires, inventories or scales using the same channel of measurement. Problems arise when checking reliability and validity across channels of measurement. These problems arise partly from the concept of anxiety measurement as producing "signs" of the level of anxiety being perceived, rather than as "samples" of a person's experience within an anxiety inducing situation. The problems also arise from the concept of anxiety used when delineating lack of cross channel correlation as a problem. If a cognitive theory of anxiety is accepted, then only a low positive correlation across measurement channels is expected. Consequently, the low positive correlations

achieved are no longer a problem.

In short, it is necessary to take anxiety measures from as many channels of measurement as is feasible, to give as great a "sample" of a person's experience of anxiety as possible. When using a cognitive model of anxiety only low positive correlations across measurement channels are necessary, which circumvents many of the problems previously associated with such measurements.

3.3 SUMMARY: COMBINATION OF DENTAL AND PSYCHOLOGICAL LITERATURE

To provide a clear analysis of the information taken from dentistry and psychology it will be useful to provide a summary of the findings from the review of the literature. Using this framework it is possible to show what this project aims to investigate and how the models used in this project have been formulated.

3.3.1 SUMMARY OF FINDINGS

1. From the medical/dental factor the following conclusions were reached:

   (a) Routine dental experience is associated with increased anxiety during restorative treatment and initial examination and anxiety during these situations is greater than at a recall visit.

   (b) A patient's perception of the level of dental trauma asociated with dental procedures and the predictability of the trauma are the most important aspects of traumatic dental experiences from the viewpoint of developing dental anxiety.

   (c) Experiences of medical surgery may predispose children to dental anxiety.

   (d) The most effective patient management techniques are directing by command, reinforcing dental behaviour and questioning for feelings. However, dentists appear to use these techniques as part of their personal style rather than from any conscious patient management strategy.

(e) Dental procedures and the child's expectation of these procedures can influence the child's future reaction to dentistry. In addition, keeping all dental instruments out of sight in the surgery can help to reduce patient's anxiety.

2. From the individual factor the following conclusions were reached:

(a) The age effects within dental anxiety are extremely complicated. It may be possible to gain further insight into age effects by assessing anxiety and cooperation as separate variables.

(b) The role of gender in dental anxiety revealed a common finding in the psychological literature that girls report more fear than boys and an unusual finding that boys are more cooperative with their mothers present.

(c) Temperamentally, anxious children approach a wide variety of situations with more fear and have greater difficulty with moods, which leads to the conclusion that dentistry itself may not be the major cause of all dental anxiety.

(d) High expectation and low tolerance of pain are associated with dental anxiety.

3. From the environmental factor the following conclusions were reached:

(a) The role of the parental attitude to dentistry in engendering dental anxiety in children is very unclear.

(b) There appears to be a relationship between a parents attitude to the child's treatment and the child's perception of that treatment.

(c) No reliable conclusions, regarding any socio economic levels in dental anxiety, can be reached.

(d) There appears to be some peer group influence in dental anxiety, though how this influence is manifested is unknown.

(e) Dental researchers have concentrated on the mother-child relationship and very little evidence in the wider environmental context is available.

4. The relative analgesia section produced the following conclusions:

(a) Some patients will refuse treatment even with RA.

(b) Assessment of the effectiveness of RA is complicated by the unknown role of the dentist's behaviour management techniques in reducing anxiety.

(c) Even with planned patient management techniques some people still require RA.

5. The Freudian concept of anxiety produced the following conclusions:

(a) All fears are related to and derived from early experiences of helplessness.

(b) Where fear is of an external reality it can be said to be real, whereas if it is of an internal nature it can be said to be neurotic or moral and hence fear of being fearful.

(c) The major problems with the Freudian theory is that it cannot be evaluated.

6. The behavioural paradigm section produced the following conclusions:

(a) The combination of classical and instrumental conditioning provides a powerful model of behaviour that can be evaluated.

(b) The development of the B.I.S. from this model provides a measurable model of anxious behaviour.

(c) The major problems with this model are the reliance upon animal experimentation and the assumption that innate fear stimuli exist.

7. The cognitive model of anxiety section produced the following conclusions:

(a) Anxiety is seen as a symptom rather than a cause of an organisms response to threat.

(b) The symptoms of anxiety are expressions of basic (primal) psychological functioning.

(c) The primal defence mode can undermine a persons's self confidence, consequently an increase in self confidence can undermine the effects of the primal defence mode.

(d) Symptoms of anxiety disorders are innapropriate anachronistic responses based upon excessive estimates of threat and an underestimation of ability to cope.

(e) Hypersensitivity to threat is the major characteristic of an

abnormal anxiety response.

(f) By integrating the behavioural and cognitive models of anxiety within a cognitive framework it is possible to develop a model of anxiety which avoids the major problems inherent in the behavioural model.

8. The related psychological topics produced the following conclusions:

(a) The cognitive model of pain has allowed researchers to begin to measure the effect of pain expectation and tolerance on anxiety.

(b) The social/environmental influences on a child are extremely complex, and within this project, impossible to explain in any depth.

(c) Measures of temperament, as the biological base upon which personality is built, are necessary to explain the role of temperament/personality in the development of dental anxiety.

9. From the anxiety measurement section the following conclusions were reached:

(a) Both behavioural and cognitive measures of anxiety can be reliable and valid measures when tested against other measures using the same channel of assessment.

(b) When checking reliability and validity of behavioural and cognitive measures across channels of assessment only low positive correlations of these measures have been obtained.

(c) Using a cognitive model of anxiety only a low positive

correlation across channels is expected. Thus overcoming, what has until now, been a problem when measuring anxiety.

(d) Physiological measures were omitted from this project as they were felt to interfere too much with the subjects experience of the dental situation.

4 AIMS, OBJECTIVES AND HYPOTHESES

4.1 AIMS AND OBJECTIVES:

1. To carry out an experimental project which reflects the normal clinic routine, so that child and dentist behaviour can be assessed in as natural a setting as possible.
2. To use information from the literature review to provide data for a questionnaire/interview which will allow the variables most closely associated with dental anxiety to be isolated.
3. To assess the effects of type of treatment and whether the child has been treated by this dentist before on dental anxiety in children.
4. To construct a short checklist of questions/observations which may help a dentist detect possible treatment refusers at an initial visit.
5. To test the effectiveness of one dentists clinical judgement when administering RA to children, i.e. do those whom he considers suitable for RA form a unique homogeneous group within the dental refusing population ?
6. To investigate the role of dentist behaviour with regard to anxious children, by looking at any changes in dentist behaviour from anxious to non-anxious children.
7. To test the assumptions made about anxiety for this project, that anxiety and cooperation may be separate variables and that a cognitive conception of anxiety provides a clearer

impression of the experience of anxiety.

8. To assess the effectiveness of video tapes as a tool for research into dental anxiety and dental behaviour.

4.2 HYPOTHESES:

1. Dental refusers will be more anxious and/or less co-operative than non-dental refusers.
2. The major variables associated with dental anxiety (medical/dental , individual and environmental) will provide data to enable the distinguishing of high risk children with regard to dental refusal.
3. The variables type of treatment and whether treated before by this dentist will significantly affect a childs reaction to the dental situation.
4. The data will provide information which will allow the construction of a checklist of questions/observations to enable dentists to detect possible treatment refusers at initial examination.
5. The RA group of children will form a homogeneous group who differ with regard to some medical/dental, individual and environmental variables from the rest of the experimental group.
6. Dentist behaviour will not alter as a consequence of treating anxious children.
7. Anxiety and cooperation are two distinct facets of behaviour that need not correlate with each other.

8. Video tapes are an effective tool for assessing dental anxiety in a research setting.

5 METHOD

The methodology used in this study was designed to comply with the first Aim and Objective outlined above. As such the integration of clinical and experimental objectives had to be carefully worked out. An initial pilot study was undertaken on ten subjects to allow the formulation of an experimental design and to assess the original formulation of questionnaire/interview procedures. The data from the pilot study were not used in the final experimental project.

From the pilot study it became evident that to carry out the project with minimal clinical disruption it would be necessary to follow the steps outlined in the flow chart (see Table 5.1). This necessitated dividing the experimental procedure into three stages:

Stage 1: The main information gathering stage, where the subjects were asked to take part in the study and took part in an initial questionnaire/interview (outlined in section 5.2.1).

Stage 2: Where the treatment session was video recorded and a short assessment of the child's treatment anxiety was collected (outlined in section 5.2.2).

Stage 3: Where any final information necessary to the experimental project was gathered after treatment had been completed (outlined in section 5.2.3).

In addition to the above various technical considerations underlay the clinical and experimental procedures. From the literature review it

was apparent that all instruments should be kept out of sight to minimise the trauma of entering the dental surgery, the surgery used had already been designed to take account of this finding, (see plate 1). The dentist taking part in this study always allows parents to stay in the surgery and provides a set of comfortable chairs for parents, and if necessary will examine a child in this area of the surgery, (see plate 1). For an outline to this dentists philosophy of treatment of anxious children and an assessment of this philosophy by a professor of psychiatry (see Tables 5.2 and 5.3).

The video recording of the treatment sessions was facilitated by two ceiling mounted cameras and microphones. The main camera points at the dental chair with a microphone hanging down behind the dental chair (see camera plate 2, and microphone left hand top corner plate 1). The secondary camera points at the interview area with the comfortable chairs with a microphone hanging down above the chairs (see plate 1). The video monitoring room was situated next to the surgery (see plate 3) and facilitated easy access to the surgery for the researcher. As can be seen from plate 4, the main view of the surgery from the video monitoring room is of the dental chair and immediate surroundings, this was the only camera using during recording and no record of parents sitting in the surgery was taken. This was done primarily for the very practical consideration that it was not possible to set the secondary camera at such an angle that all parents could be observed.

Finally, the initial questionnaire/interview took place in the surgery with the researcher always taking the same position (see plate 5).

ORIGINAL THESIS CONTAINS PLATES WITH CLEAR OVER-LAYS.

Plate 1

VIEW OF THE DENTAL SURGERY FROM THE DOOR

Plate 2

DENTAL SURGERY FROM BEHIND THE DENTAL CHAIR, SHOWING POSITION OF MAIN CAMERA, MOUNTED FROM THE CEILING, DIRECTLY ABOVE THE ONE-WAY-MIRROR

Plate 3

PHOTOGRAPH TAKEN TO SHOW THE JUXTAPOSITION OF THE DENTAL SURGERY AND THE MONITORING ROOM, WHERE THE VIDEOTAPES WERE MADE

Plate 4

VIDEO EQUIPMENT IN THE MONITORING ROOM


SONY
JVC

Plate 5

INTERVIEWING SESSION IN THE CONSULTATION AREA
OF THE DENTAL SURGERY

Table 5.1 FLOW CHART OF EXPERIMENTAL PROCEDURE

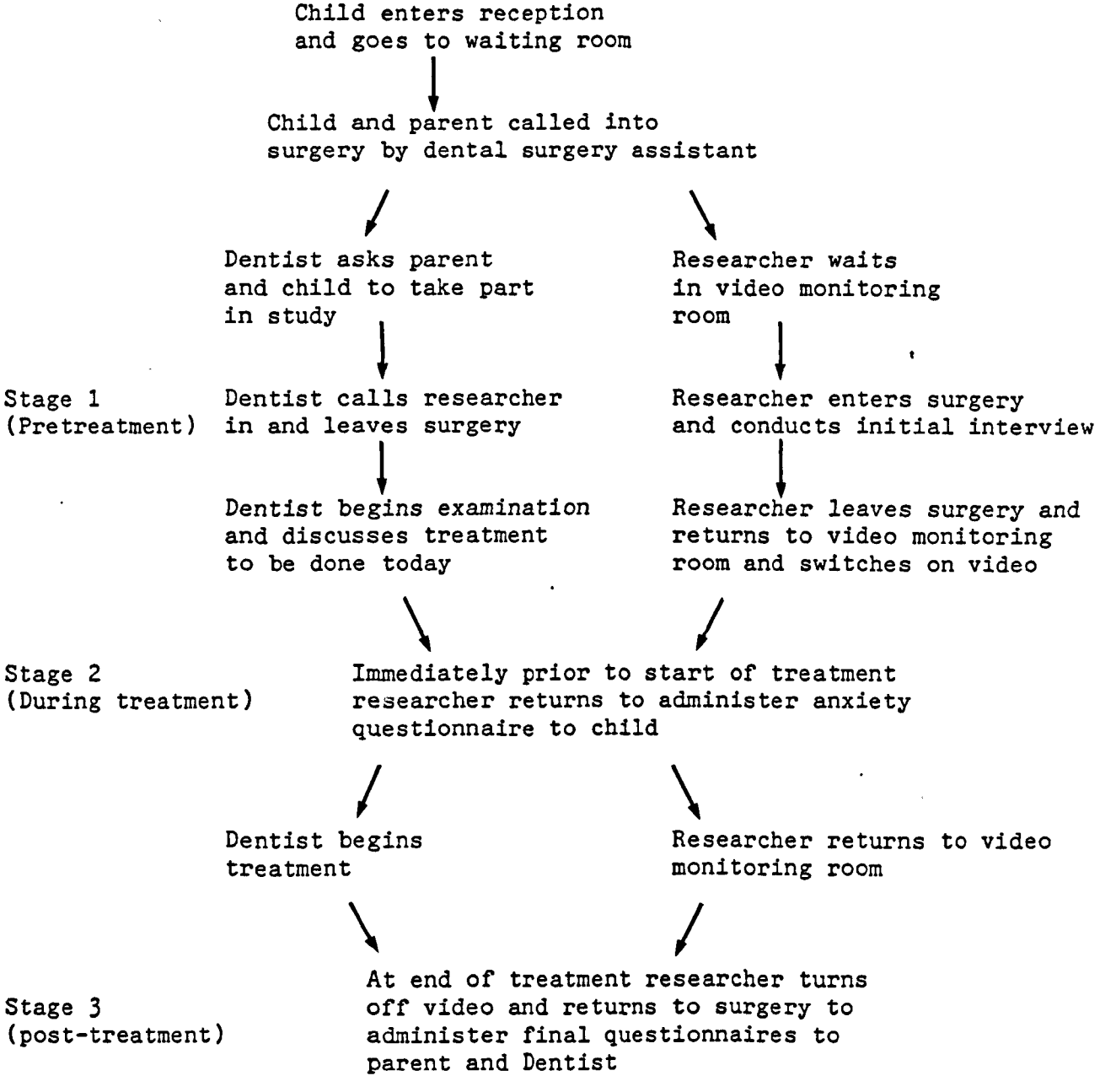


TABLE 5.2

STUDY DENTISTS PHILOSOPHY OF TREATMENT OF ANXIOUS CHILDREN

How I approach anxious children

It seemed worthwhile to write down one or two points governing my approach to the management of anxious children.

1 You can't get into someone's mouth if they don't want you to. Even a two-year old child can made it impossible.

2 If you give an anxious person the alternatives "Do you want some treatment ?" or "Do you want to delay it and think about it ? then the tendency is for the anxious parent to put it off until "another day".

3 The important thing, from a clinical point of view, is to recognize that a patient is anxious. The worst thing a dentist can do is to say "Relax - it's not going to hurt". Instead, in my view, the right thing to do is to say, "I appreciate you feel worried, I am going to try to help".

4 For every person there is a threshold beyond which they would be anxious. The vast majority of people accept a scale and polish. The majority accept a local anaesthetic for a restoration. By the same token the idea of extracting a tooth without any anaesthetic at all would cause most people to feel anxious and refuse treatment.

5 The threshold for anxious people is much lower than for non anxious people. For some, extreme anxiety occurs for a visual examination in the dental chair. The skill in managing these patients is to try to judge what their threshold will be and not to exceed it. If you are successful this may help the patient to feel one hurdle has been achieved and the dentist can build on this at future appointments.

6 Having made a decision about the threshold, the dentist has to try and achieve his objective using the "Tell, Show, Do" approach. Explain what you want to do (for example, a simple examination), show the patient the mouth mirror and then begin the examination confidently. Many patients will accept your confidence and allow the procedure to go ahead. If you have not judged the level of co-operation, re-asses, but try to end on a positive note with something achieved.

TABLE 5.2 CONTD.

7 Always remember than the patient has the last word. If they don't like you, or are past the threshold of anxiety, they will refuse treatment.

8 This approach is only acceptable, if there is no pathology, or the earliest signs of treatment need, which can be attended subsequently (for example, the need for a scaling to reduce periodontal disease, or a small cavity that does not require immediate restorative treatment). If an emergency arises, for instance severe toothache or an infection associated with an impacted wisdom tooth, or a suspect cancerous lesion that requires biopsy, then management of anxiety takes second place to treating the clinical problem. This may mean that a general anaesthetic is required.

9 General anaesthetics enable the necessary clinical treatment to be carried out. Rarely, if ever, do they do anything to reduce the underlying dental anxiety.

10 Never forget, you may fail to get anything done at all. Do not lose your temper as this only makes matters worse. Try to build up trust and increase gradually the level of co-operation. For some people, the "anxiety barrier" is so great that "tender loving care" is not enough. Sedation, for example relative analgesia, may be of value in these cases.

11 Never tell an untruth. Don't start a filling without a local anaesthetic and pretend "It won't hurt a bit". Never try and "slip in a local anaesthetic" without some explanation. Don't use emotive words like "needle" or "drill". Say "I want to use something to make your tooth go to sleep. You don't go to sleep, only your tooth goes to sleep", or "I want to take the badness out of your tooth and make it nice and clean".

12 Dentists are not psychiatrists, but their job is to recognize anxiety and by their actions turn a "dental refuser" into a person who will co-operate to some degree to enable a certain level of clinical dental treatment to be completed. Dentists are unlikely to eradicate completely all aspects of anxiety (it is unreasonable to expect them to be able to), but their aim is to help their anxious patients to manage and control their level of anxiety so they can co-operate with reasonable demands that a dentist makes in order to succeed with treatment.

TABLE 5.2 CONTD.

13 In summary, a behavioural approach is adopted towards dentally anxious children involving desensitiztion by interviewing initially away from the dental chair, followed by an introduction to the potentially fearful situation of a dental surgery without anything fearful happening, coupled with positive reinforcement.

LE 5.3 PSYCHIATRISTS ASSESSMENT OF STUDY DENTISTS PHILOSOPHY

22nd June 1988

r Professor Murray,

I enclose for your interest a recent chapter on Anxiety in Child and lescent Psychiatry.

In your clinic you provide a framework for:

Combating the anticipated anxiety by neutralising it with positive experiences and, if necessary, desensitization.

The child is also helped to reduce anxiety by relaxation and distraction. I do not remember the details of your relaxation method.

You also combat the anxiety by ensuring the environs are non-clinical.

The framework of your approach is essentially behavioural - however you describe it.

Yours sincerely,

Professor I. Kolvin

essor J.J. Murray,
of Dental School,
University
ASTLE UPON TYNE

5.1 SUBJECTS:

A pilot study of 10 patients was carried out between January and March 1986. This allowed the researcher to become familiar with the television equipment and to finalize the questionnaire. These results were discarded. Interviews with regard to the main study began in April 1986 and continued until July 1987.

All subjects were selected from referrals by dental practitioners to Newcastle University Dental School, Department of Child Dental Health. Those in the experimental group were selected from the incoming referrals, by using the criteria that children were being referred in for either anxiety or non-cooperation. Reasons for referral had to be explicitly stated in the referral form for a child to be considered as a candidate for inclusion. Further criteria relating to a child's suitability for the project were exercised when selecting subjects for both the experimental and control groups. Children with special needs (such as learning difficulties and spasticity) were excluded from the project as their reaction to dentistry may well be affected by their special needs. Children with severe physical problems, (e.g. heart problems, respiratory problems etc.) were also excluded as their reactions to dentistry may well be affected by medical experiences or extra difficulties with dental treatment, for instance, a heart patient undergoing a filling using local anaesthetic and possibly requiring antibiotic cover. Selection to the control group was affected by the

criteria that age and sex in both experimental and control groups should correspond closely enough for valid comparisons across groups to be made. *

In addition to the above criteria for inclusion in the project two wider qualifications were seen as necessary. Firstly, from the review of the dental literature on children's anxiety it was apparent that before the age of 6 years children's reaction to dentistry was affected by factors outside of the control of the dental situation. That is, a child under 6 does not have the experiences of medical/dental situations or the cognitive complexity required to assess and react to dental situations accurately. As such, children under 6 were excluded from the project as their results may well unduly bias the findings. Secondly, as this was a practically focused project looking at one dentist's patient group all the experimental and control group subjects came from that dentists case list.

The original objective was to aim for approximately 50 children in the study and control groups. Towards the end of July, 65 children had been seen in the apprehensive group compared with 42 controls. It would have been possible to increase the number of controls by taking normal children referred to Registrars and House Officers or to take patients off the student clinic. However, this may have biased the sample and it was decided not to increase the numbers in the control group in this way.

* The control group children were selected from the study dentists case lists having been referred for routine treatment including traumatised teeth, orthodontic treatment or general decay.

5.2 MATERIALS:

5.2.1 Pre-Treatment:

This section involves the questionnaire devised to be given to children and their presenting parent (See Appendix 1), in the form of a semi-structured interview. The information used in this questionnaire was based on a project carried out at Newcastle University dental school (Williams et al., 1985).

Various alterations to Williams et al.'s questionnaire were undertaken for this project. Firstly, in Williams et al.'s study it was found that the temperamental measure used (Thomas et al., 1968), in which children were rated on nine temperamental factors (see Appendix 1), only three of the scales were found to be significantly related to refusal of treatment. These were: approach/withdrawal, adaptability and quality of mood. In the present study it was decided to use these three factors and two of the remaining nine: activity, to assess the prevalence of the "frozen" response mentioned in the anxiety literature and attention span/persistance to assess the watchful and vigilant behaviour associated with a "frozen" response in cognitive theory. Secondly, some measure of the accompanying parents level of dental anxiety was seen to be necessary, to assess the effect upon the child of the parents feelings about dentistry. For this, a short, quick to administer, reliable and valid scale was necessary. The only scale available, meeting all these criteria, was the Corah Dental Anxiety

Scale (DAS) (See Appendix 1). (Corah, 1969; Corah et al., 1978). This scale was added to the initial interview. Thirdly, Williams et al. had included a measure of trait anxiety in their study, an updated or revised version of which was sought for this project. There was no other instrument among the anxiety scales which was as concise and robust. Consequently the Childrens Manifest Anxiety Scale (CMAS) (Castenada and McCandless, 1956) was used (See Appendix 1). Finally, Williams et al had incorporated a rating scale assessing the level of pain a child could tolerate. With the benefit of recent work on pain expectation (Wardle, 1982; Kent, 1984, Lindsay et al., 1984) it was decided to add a rating scale measuring the child's pain expectation as well as pain tolerance (See Appendix 1).

In addition to the above it was seen as necessary to extend the scope of the questionnaire in two areas, the medical/dental factor and the environmental factor. With regard to the medical/dental factor it was felt that some assessment of medical contact which reflects trauma but not surgical trauma was needed. Thus a question relating to the number of outpatient visits was added to the questionnaire. Also, the question of unexpected dental treatment was not covered by Williams et al. (1985) as such a question concerning this was included. The environmental factor proved the most problematic section of the questionnaire with very little in the literature review to refer to. Therefore, a collection of questions were included in the questionnaire

to attempt to isolate some of the possible variables from this complicated area of the anxiety literature. The questions selected referred to the child's general level of worry about change, any problems changing schools, whether the child made their own friends or relied on relatives or brothers and sisters, whether these friends were generally younger or older and how many specific fears (such as snakes, heights, open spaces etc.) the child had.

5.2 During Treatment:

Whilst the child was undergoing treatment a video recording of the situation was made for future behavioural analysis. This video encompassed the whole of the child's body (to enable assessment of any movements made) and the dentist (to enable assessment of the dentist's behaviour towards the child). The video data were seen as a central component of this project as they allowed comparison between self report/cognitive data given retrospectively and ongoing behavioural data from the situation being assessed.

The video data were tested for both Intra and Inter observer reliability. The Intra observer reliability required the candidate to rate a specified video after every ten videos scored, in order to check the consistency of the rating. Inter observer reliability was tested by training two dentists and two psychologists to rate the videos and then comparing their results on ten randomly selected videos with the researcher's ratings.

In addition, those children in the study who underwent RA, were videod when they were undergoing RA and when they were being treated without RA to enable a comparison between behaviour with and without RA.

Analysis of the data collected was undertaken using the following scales (see Appendix 2): Weinstein Dentist's Behaviour Profile (Weinstein et al., 1982); Melamed Children's Behaviour Profile (Melamed et al., 1985) and the Venham Anxiety Rating Scale (Venham et al., 1980) giving an overall picture of dentist's behaviour, child's behaviour and child's behavioural anxiety. The Weinstein and Melamed et al. scales were chosen as they are the only behaviour rating scales yet developed to assess dentist behaviour and children's cooperation. Weinstein has developed a scale to measure a child's reaction to dentists behaviour (Weinstein, 1982) which includes a child's cooperative behaviour, but a more direct and less complicated scale benefitted the researcher by not complicating the rating unnecessarily, which could lead to problems of inter and intra observer reliability, and facilitated the teaching of other raters with greater ease.

The Venham Anxiety Rating Scale was chosen as it is the only scale which directly measures anxious behaviour, Frankl et al. and Johnson and Baldwin have developed rating scales of cooperation, which much of the dental literature accepts as equivalent to anxiety (Cf Winer, 1982). As this project is designed to assess anxiety and cooperation separately, the Venham Anxiety Rating Scale had to be used.

The videos were rated by the researcher using the rating schedules listed above. Each video was run through five times, allowing for ratings on each section of the Weinstein scale and the Melamed scale to be made individually. The Venham Anxiety Rating Scale was filled in at the end of the rating schedule. The length of the videos varied greatly, but an average rating time of about an hour for each subject was required.

The child was also asked to complete the Venham Picture Scale (Venham & Kremer, 1979) immediately prior to the start of treatment, whilst in the dental chair. Venham's picture scale was chosen for this task as it is very easy to administer, only taking about 1-2 minutes, and has been well tried and tested. This allowed the gathering of a self report measure of situational anxiety within the assessed dental situation, which gave greater scope for comparing self report retrospective data, self report situational data and behavioural data on the child's level of anxiety.*

5.3 Post Treatment

After the child had completed treatment extra data were gathered from the dentist and presenting parent (see Appendix 3). These data were collected to complete the picture of what was done to the child, with data collected on how anxious and cooperative the dentist and presenting parent felt the child had been . The information from the dentist was necessary to compare the dentist's self report, about the child, with the

* The scale was administered by asking the child to indicate which of each of the pairs of pictures most closely reflects the way they are feeling. The scale was then scored by giving a value of 1 to each negative affect picture and 0 to each positive affect picture selected, and adding up the score.

behavioural data acquired using the video. The information from the presenting parent was necessary to compare the parents reactions to treatment with their expectations of the child's reactions and their own anxiety ratings taken during the initial questionnaire.

In addition to this information certain factual data were included, such as whether the child had been treated by this dentist before and whether the child had had RA or a GA before. Each of the post-treatment questionnaires took 1-2 minutes to complete.

5.4 PROCEDURE:

Subjects were chosen as suitable candidates for the study by looking into the records of each child to visit the clinic on a particular day and isolating those meeting the criteria necessary for inclusion in either of the two groups. Once the number of eligible people on each day had been ascertained, and if this number exceeded 2 (the maximum number the clinic was able to cope with without serious disruption) then preference was given to anxious group children, owing to the greater number of subjects necessary in this group. In reality there were never more than 5 suitable subjects at any one session, and as the experimental period lasted for 16 months with most children having 4 or 6 monthly check-ups, those not seen in the first instance were assessed at subsequent visits.

Once the subjects had been selected and had arrived, the dentist, in the surgery, asked the children and their parents if they would take part

in a study looking at children's reactions to dentistry. There were no potential subjects who refused to take part in the study and non-attendance of potential subjects had little effect on the overall sample, as the experimental period was long enough for potential subjects to attend one of three or more possible appointments.

After being asked and having agreed to take part in the project the researcher was introduced to child and parent in the surgery where the intial questionnaire/interview took place after the dentist had left the surgery. The initial interview took 20 to 25 minutes to administer and there were no problems with people refusing to answer or being unwilling to answer any of the questions. The researcher followed the text of the questionnaire very closely, only asking further questions to clarify answers given or to explain the meaning of questions not understood by parent or child.

At the end of the interview the researcher thanked the child and parent for taking part and explained that he would come back into the surgery with the Venham Picture Scale and that the child just had to point to the pictures that "look most like the way you feel".
The dentist then re-entered the surgery and began examination of the patient. At this point the researcher, in an adjoining room, with video monitor and recorder, began to record the dental situation. Once the dentist had completed his examination, and had explained any treatment that was to be carried out, the researcher returned to the surgery to

administer the Venham Picture Scale immediately prior to the start of treatment. The researcher left the room immediately after administering this test and returned to the video monitoring/recording room.

When treatment had finished the video recorder was switched off and the researcher waited, while the dentist explained various points of treatment and hygiene with the patient and arranged further appointments etc., before returning to the surgery with the post-treatment questionnaires.

6: RESULTS

6.1 INTRODUCTION

The Results section is divided into nine parts. First, general information concerning the experimental and control groups will be given. Then the results for each type of assessment (questionnaire, video, picture scales, assessment by parent and dentist) will be presented for study and control groups. The third part of Results will consider the effect of the type of dental treatment received and whether the child had been treated by this dentist before. The fourth sub section concerns multiple regression analysis of the most frequent indications of dental anxiety. Fifthly the effect of dentists behaviour will be recorded, followed by data on fourteen children who had had RA in this study. The next section considers specific results in terms of factors germane to the Review of the Literature. Finally Results concerning the assessment of the psychological model used in this study will be presented and data on the reliability of video measurements.

6.2 GENERAL INFORMATION ON STUDY AND CONTROL GROUPS

Table 6.1 shows there are no major differences between the groups, with regard to age, sex and socio economic status. There are two minor deviations from the expected results in that the balance of males and females is different for the study and control group and the mean age of the first dental visit is marginally younger for the control than the study group.

However, there were no significant differences across the groups (see Table 6.1a).

6.1: DESCRIPTIVE STATISTICS OF GENERAL INFORMATION

VARIABLES		STUDY	CONTROL
NUMBER OF SUBJECTS		65	42
	MALE	28	22
	FEMALE	37	20
AGE RANGE (in years)		6-18 (n=65)	6-18 (n=42)
MEAN AGE (in years)		12.41 (n=65)	11.42 (n=42)
SOCIO ECONOMIC STATUS:			
	1	0	1
	2	13	9
	3	22	13
	4	21	14
	5	9	5
		MEDIAN=3 (n=65)	MEDIAN=3 (n=42)
MEAN AGE AT 1ST DENTAL VISIT		3.8 (n=65)	3.07 (n=42)

6.1a: TESTS OF SIGNIFICANCE ON GENERAL INFORMATION

i) Chi Squared test of gender by group data

$\chi^2 = 0.8$ 1 df

ii) T-Test for significant age differences across groups

$F = 1.18$ $P = 0.583$

iii) T-Test for significant differences in age of first dental visit across groups

$F = 1.75$ $P = 0.058$

6.3 DESCRIPTIVE STATISTICS FOR THE QUESTIONNAIRE/INTERVIEW, VIDEO, PICTURE SCALE, ASSESSMENT BY PARENT AND DENTIST

The initial questionnaire/interview involved 34 questions and included assessments of the presenting parents dental anxiety (using the Corah Dental Anxiety Scale (DAS) (Corah, 1969)) and the childs manifest anxiety (using the Child Manifest Anxiety Scale (CMAS) (Castenada and McCandless, 1957)). In addition it was decided that the questions on the dentist post-operative questionnaire pertaining to whether the child had had a general anaesthetic (GA) or relative analgesia (RA) should be included in this section as contributing to the childs dental experience.

The answers to these questions have been grouped into divisions according to factors thought to be important from the Review of the Literature. The results to questions on the medical/dental, individual and environmental factors are given in tables 6.2 - 6.6.

The data in these tables were selected variables chosen to give an insight into the data and show marked differences between experimental and control group subjects on most variables in the medical dental factor, with attention span, pain tolerance, pain expectation and number of specific fears showing a marked difference for the individual factor and no major differences for the environmental factor. This was confirmed using Mann Whitney tests on all the variables, which provided the following significant results. The experimental group were more

likely to react poorly at their first dental visit ($P<0.05$) and at subsequent visits ($P<0.001$), to have had a GA ($P<0.001$), or RA ($P<0.01$), to have a shorter attention span, ($P<0.01$), lower pain tolerance ($P<0.01$), higher pain expectation ($P<0.001$) and a higher number of specific fears ($P<0.01$). In addition, from the descriptive statistics (Table 6.2) it can be seen that the experimental subjects are more likely to have a reason for dental fear with fears of gas, dentists manner and any treatment being cited most frequently.

Of the variables not included in the descriptive statistics only two provided significant differences between the groups, these being the number of recent life events ($P<0.05$) and reaction to the dental chair ($P<0.01$). In these cases the experimental group had had more recent life events (mean rank experimental group 58.80, mean rank control group 46.57) and a poorer reaction to the dental chair (mean rank experimental group 59.54, mean rank control group 45.43).

TABLE 6.2 MEDICAL/DENTAL FACTOR: DENTAL EXPERIENCE

VARIABLES		STUDY	CONTROL
CHILDS REACTION TO 1ST VISIT:			
	PLEASANT	20%	33.3%
	NEUTRAL	56.9%	57.1%
	UNPLEASANT	23.1%	9.5%
		(n=65)	(n=42)
CHILDREN WHO HAVE HAD A GA	YES	78.5%	11.9%
	NO	21.5%	88.1%
		(n=65)	(n=42)
CHILDREN WHO HAVE HAD RA	YES	21.9%	0%
	NO	78.1%	100%
		(n=64)	(n-42)
CHILDRENS REACTION TO DENTISTRY AFTER THE 1ST VISIT:	PLEASANT	3.1%	28.6%
	NEUTRAL	44.6%	66.7%
	UNPLEASANT	52.3%	4.8%
		(n=65)	(n=42)
INCIDENTS WHICH PARENTS THINK MAY HAVE CONTRIBUTED TO DENTAL FEAR:			
NO REASON		24.6%	92.9%
FEAR OF NEEDLES		9.2%	2.4%
EXTRACTIONS		4.6%	2.4%
FILLING WITHOUT ANAESTHETIC		3.1%	2.4%
MULTIPLE FILLINGS		1.5%	0
DRILL		1.5%	0
GAS		13.8%	0
DENTISTS MANNER		24.6%	0
ANY TREATMENT		15.4%	0
MEDICAL EXPERIENCE		1.5%	0
		(n=65)	(n=42)

TABLE 6.3 MEDICAL/DENTAL FACTOR: MEDICAL EXPERIENCE

VARIABLES		STUDY	CONTROL
CHILD REACTION TO PAST MEDICAL PROCEDURES:			
	GOOD	29.2%	42.9%
	MOD. WELL	40%	54.8%
	POOR	21.5%	2.4%
	V. POOR	9.2%	0
		(n=65)	(n=42)
HOW CHILD ANTICIPATES MEDICAL CONTACTS:			
	NO FEAR	61.5%	85.7%
	LOW FEAR	30.8%	14.3%
	HIGH FEAR	7.7%	0
		(n=65)	(n=42)
NUMBER OF INPATIENT HOSPITALIZATIONS:		RANGE 0-3	0-3
		MEAN .554	.452
		SD .771	.633

TABLE 6.4 INDIVIDUAL FACTOR

VARIABLES		STUDY	CONTROL
TEMPERAMENT SCALES:			
ACTIVITY	MEAN	67.738	62.167
	SD	24.267	28.244
	n	65	42
APPROACH/WITHDRAWAL	MEAN	49.154	51.595
	SD	21.755	24.353
	n	65	42
ADAPTABILITY	MEAN	59.446	68.333
	SD	24.320	22.826
	n	65	42
GENERAL QUALITY OF MOOD	MEAN	57.277	64.786
	SD	21.633	21.142
	n	65	42
ATTENTION SPAN/PERSISTANCE	MEAN	53.646	67.000
	SD	23.649	27.164
	n	65	42
REACTION TO PAIN:			
PAIN TOLERANCE	MEAN	60.156	41.000
	SD	27.673	25.781
	n	64	42
PAIN EXPECTATION	MEAN	36.231	7.738
	SD	30.873	14.109
	n	65	42

TABLE 6.4 continued

GENERAL SUSCEPTIBILITY TO ANXIETY:			
GENERAL LEVEL OF WORRY	MEAN	30.600	18.833
	SD	32.560	24.662
	n	65	65
NUMBER OF SPECIFIC FEARS	MEAN	1.292	.882
	SD	.964	1.234
	n	65	42

TABLE 6.5 ENVIRONMENTAL FACTOR: PEER GROUP INFLUENCES

VARIABLES		STUDY	CONTROL
NUMBER OF BROTHERS AND SISTERS			
	0	4.6%	7.1%
	1	60%	52.4%
	2	21.5%	31%
	3	9.2%	9.5%
	3+	3.1%	0
		(n-65)	(n=42)
CHILDS REACTION TO SCHOOL:	LIKES	24.6%	40.5%
	NEUTRAL	64.6%	54.8%
	DISLIKES	10.8%	4.8%
		(n=65)	(n=42)
CHILDS REACTION TO STRANGE CHILDREN:			
	REACTS WELL	41.5%	52.4%
	NEUTRAL	41.5%	38.1%
	REACTS BADLY	16.9%	9.5%
		(n=65)	(n=42)
WHO CHILD GENERALLY ASSOCIATES WITH:			
	BRO. & SIS.	10.8%	7.1%
	BRO. & SIS. FRIENDS	1.5%	0
	RELATIONS	1.5%	0
	OWN FRIENDS	86.2%	92.9%
		(n=65)	(n=42)

TABLE 6.6 ENVIRONMENTAL FACTOR: FAMILY INFLUENCES

VARIABLES		STUDY	CONTROL
PARENTS ANXIETY SCORE (CORAH DAS)	MEAN	10.049	10.833
	SD	4.295	3.629
	n	(n=61)	(n=42)
MOTHERS DENTAL ATTENDANCE			
	REGULAR	67.2%	76.2%
	SOMETIMES	18.8%	7.1%
	NEVER	14.1%	16.7%
		(n=64)	(n=42)
FATHERS DENTAL ATTENDANCE			
	REGULAR	45%	53.8%
	SOMETIMES	25%	7.7%
	NEVER	30%	38.5%
		(n=60)	(n=39)

Table 6.7 provides data on the childs self report anxiety and is made up of results to two questionnaires, the Child Manifest Anxiety Scale, administered at the end of the initial questionnaire/interview and the Venham Picture Scale given in the surgery immediately prior to the start of treatment.

The Child Manifest Anxiety Scale shows there is no difference between the groups, which indicates there is no difference between refusers and non-refusers for the level of general anxiety about everyday events.

The picture scale, however, shows there is a marked difference in anxiety felt immediately prior to treatment, with experimental group children more fearful than controls. This proved a significant effect when analysed using the Mann Whitney test ($P < 0.05$).

TABLE 6.7 ANXIETY AND COOPERATION MEASURES:

CHILD

VARIABLES		STUDY	CONTROL
CHILD MANIFEST ANXIETY SCALE			
	MEAN	16.766	15.952
	SD	7.702	5.975
	n	64	42
VENHAM PICTURE SCALE	MEAN	2.219	0.833
	SD	2.184	1.010
	n	62	42

Following the initial questionnaire/interview the interaction between dentist and patient was studied by means of a video. The video was started as the patient entered the surgery, with the Venham Picture Scale being administered after initial examination and before any treatment. The video was assessed using the Venham Anxiety Scale, Melamed Child Behaviour Profile and Weinstein Dentist Behaviour Profile.

Scores obtained from the videos are given in Table 6.8. In this section a small selection of variables from the Weinstein scale have been used to see if there are any changes in dentist behaviour for each major section of the scale. A more in depth analysis of dentist behaviour is given in section 6.6.

From the results in Table 6.8, it appears that the experimental group displayed more fear and were more disruptive than control subjects. This proved to be a significant difference with Mann Whitney significance levels of $P<0.01$ and $P<0.05$ respectively. The dentist behaviour indicates that the dentist spends more time talking, directing, empathising and touching with the experimental group. However, only the amount of time spent empathising and touching proved significant using the Mann Whitney test, with significance levels of $P<0.01$ and $P<0.05$ respectively.

TABLE 6.8 ANALYSES OF DENTAL SITUATION USING VIDEO RECORDINGS

VARIABLES			STUDY	CONTROL
VENHAM ANXIETY SCALE:	NO FEAR		36.9%	88.1%
	LOW FEAR		44.6%	11.9%
	MOD. FEAR		15.4%	0
	HIGH FEAR		1.5%	0
	V. HIGH FEAR		1.5%	0
			(n=65)	(n=42)
MELAMED CHILD BEHAVIOUR PROFILE		MEAN	1.172	0.635
		SD	1.416	1.142
		n	65	42
WEINSTEIN DENTIST BEHAVIOUR PROFILE:				
i) PROPORTION OF NON-VOCALISATION		MEAN	0.266	0.302
		SD	0.152	0.193
		n	65	42
ii) PROPORTION OF NON-DIRECTION		MEAN	0.331	0.395
		SD	0.194	0.223
		n	65	42
iii) PROPORTION OF NON-EMPATHY		MEAN	0.862	0.940
		SD	0.108	0.080
		n	65	42
iv) PROPORTION OF NON-CONTACT		MEAN	0.414	0.485
		SD	0.182	0.172
		n	65	42

During the questionnaire/interview the presenting parent assessed, on a scale 0-100, how anxious they felt their child was in anticipation of the dental examination. When the dentist had finished his examination and/or treatment each parent was asked to complete a further assessment, again using a scale of 0-100, of how anxious and cooperative they felt their child had been. The dentist filled in a similar post-treatment assessment. The results for these assessments are given in Tables 6.9 to 6.13.

The results in the Tables 6.9 and 6.10 show that both the dentist and parent consistently rated the experimental group children as being more anxious and less cooperative than control subjects. These results proved highly significant when analysed using the Mann Whitney test, where the following significance levels were obtained: parents pretreatment anxiety rating $P < 0.001$; parents post treatment anxiety rating $P < 0.001$; parents cooperation rating $P < 0.001$; dentists treatment anxiety rating $P < 0.001$; dentists rating of childs general dental anxiety $P < 0.001$; dentist rating of childs cooperation $P < 0.001$.

In addition Tables 6.11 to 6.13 make it clear that the dentist and parent ratings correlated highly together. This indicates that the parent and dentist were both sensitive to changing levels of anxiety. Though from the scatterplots in Table 6.12 it is clear that the dentist was more likely to rate dental refusers as more anxious and less cooperative than the presenting parent.

TABLE 6.9 ANXIETY AND COOPERATION MEASURES:

DENTIST RATING OF CHILD

VARIABLES		STUDY	CONTROL
DENTIST RATING CHILDS COOPERATION	MEAN	35.538	4.405
	SD	31.895	9.513
	n	65	42
DENTIST RATING CHILDS TREATMENT ANXIETY	MEAN	71.015	11.071
	SD	26.339	18.726
	n	65	42
DENTIST RATING CHILDS GENERAL DENTAL ANXIETY	MEAN	85.887	13.333
	SD	14.613	16.845
	n	62	42

The scales relevant to the above results can be seen in appendix 3.

TABLE 6.10 ANXIETY AND COOPERATION MEASURES

PARENT RATING OF CHILD

VARIABLES		STUDY	CONTROL
PARENT RATING CHILDS ANXIETY PRE-TREATMENT			
	MEAN	43.215	16.048
	SD	27.903	16.924
	n	65	42
PARENT RATING CHILDS ANXIETY POST-TREATMENT			
	MEAN	44.517	15.738
	SD	32.075	18.045
	n	58	42
PARENT RATING CHILDS COOPERATION POST-TREATMENT			
	MEAN	17.793	4.238
	SD	23.953	9.212
	n	58	42

The scales relevant to the above results can be seen in appendix 1, for parents pre treatment rating and appendix 3, for the post treatment ratings.

TABLE 6.11 DESCRIPTIVE STATISITCS OF DENTIST AND PARENT ANXIETY AND COOPERATION SCORES FOR EXPERIMENTAL AND CONTROL

i) CHILDS ANXIETY, EXPERIMENTAL GROUP SUBJECTS

No.	Parents Score	Dentists Score
1	25	30
2	60	30
3	70	90
4	60	40
5	35	40
6	27	10
7	21	90
8	100	70
9	75	80
10	25	40
11	45	80
12	35	90
13	60	70
14	20	40
15	70	70
16	20	40
17	12	100
18	60	70
19	50	80
20	30	10
21	90	80
22	30	20
23	20	80
24	55	70
25	20	70
26	20	100
27	50	90
28	15	40
29	50	100
30	45	60
31	90	80
32	10	10
33	80	100
34	70	75
35	10	55
36	85	85
37	100	90

No.	Parents Score	Dentists Score
38	30	100
39	40	50
40	10	80
41	37	90
42	50	100
43	10	85
44	20	85
45	0	100
46	30	80
47	65	100
48	100	100
49	20	40
50	30	60
51	70	100
52	40	50
53	65	100
54	50	80
55	30	70
56	0	90
57	10	100
58	10	70
59	50	90
60	90	70
61	30	65
62	100	85
63	40	90
64	30	75

ii) CHILDS ANXIETY CONTROL GROUP SUBJECTS

No.	Parents Score	Dentists Score
1	20	70
2	30	0
3	11	10
4	10	10
5	10	0
6	30	0
7	20	10
8	10	0
9	0	0
10	10	0
11	10	10
12	0	0
13	10	0
14	35	0
15	20	10
16	10	40
17	10	10
18	40	0
19	50	10
20	30	20
21	20	0
22	10	10
23	30	0
24	10	10
25	0	10
26	20	0
27	0	0
28	10	0
29	0	0
30	0	10
31	30	30
32	30	30
33	0	15
34	60	20
35	20	20
36	40	70
37	35	10
38	0	0
39	10	0
40	20	10
41	50	0
42	25	0

iii) CHILDS COOPERATION - EXPERIMENTAL GROUP SUBJECTS

No.	Parents Score	Dentists Score
1	10	80
2	*	10
3	40	60
4	90	90
5	15	0
6	0	0
7	0	20
8	15	60
9	35	0
10	0	0
11	*	0
12	0	60
13	5	10
14	*	0
15	*	70
16	0	10
17	60	80
18	0	20
19	*	10
20	0	80
21	20	40
22	0	0
23	40	30
24	0	10
25	0	10
26	*	80
27	50	90
28	0	20
29	35	60
30	0	10
31	0	10
32	0	0
33	25	50
34	50	100
35	0	10
36	0	20
37	0	30
38	20	100
39	*	0
40	25	30
41	0	60
42	20	60

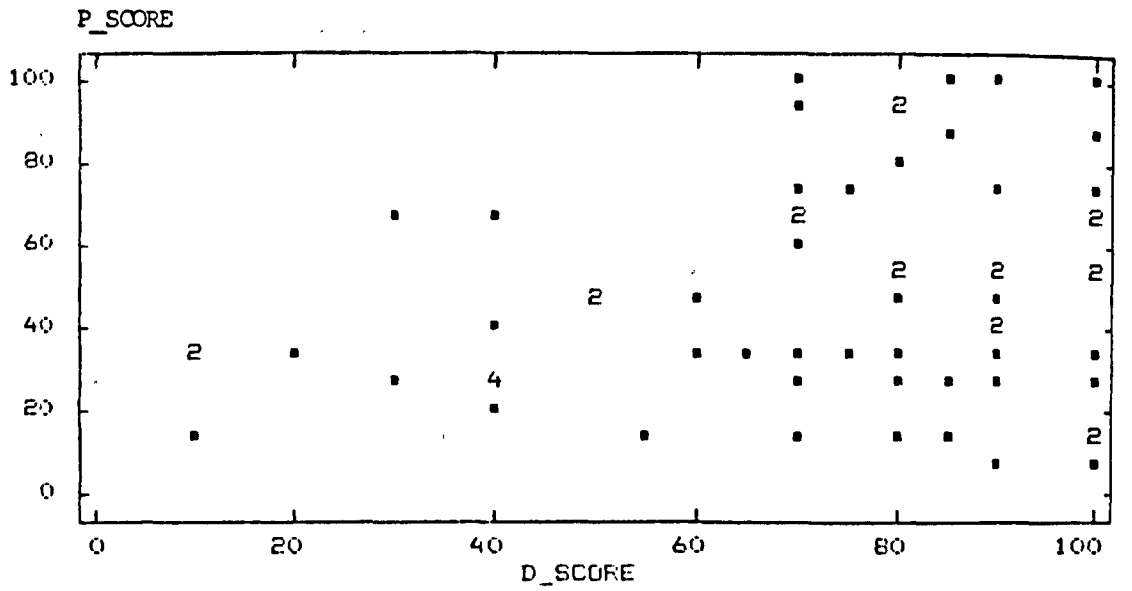
43	0	50
44	50	70
45	20	75
46	5	30
47	50	70
48	100	100
49	0	10
50	0	10
51	10	30
52	0	10
53	30	70
54	20	40
55	0	0
56	70	100
57	20	10
58	0	0
59	50	40
60	10	20
61	30	10
62	0	70
63	20	35
64	0	35

iv) CHILD COOPERATION CONTROL GROUP SUBJECTS

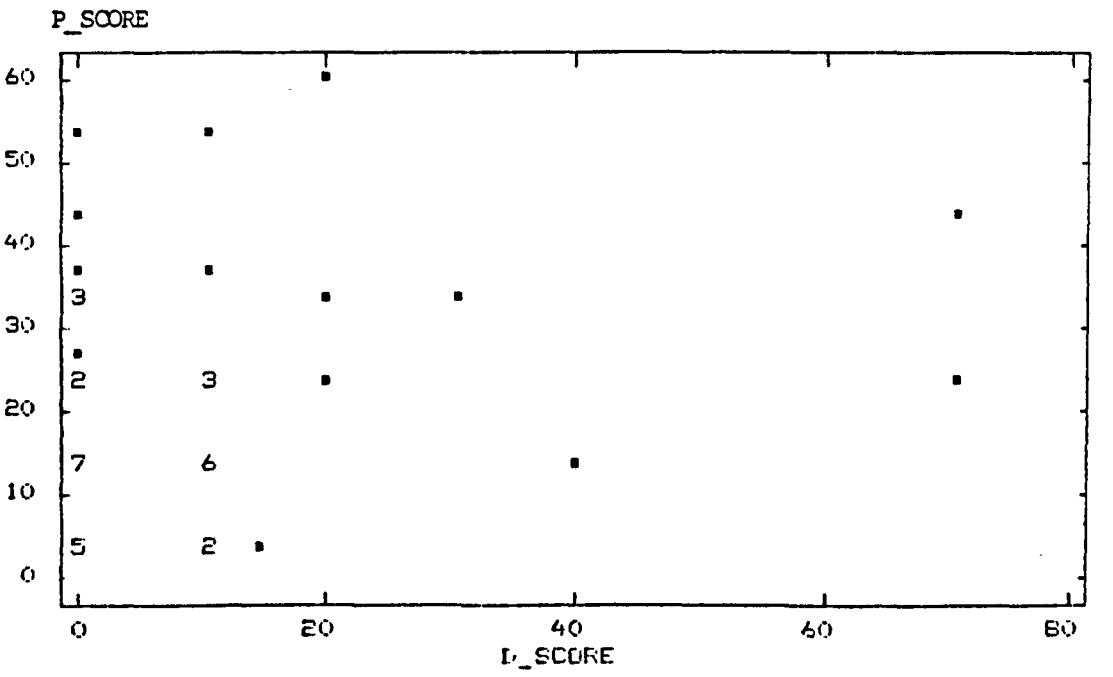
No.	Parents Score	Dentists Score
1	10	0
2	0	0
3	0	10
4	0	10
5	0	0
6	0	0
7	10	0
8	0	0
9	0	0
10	0	0
11	0	20
12	0	0
13	0	0
14	0	0
15	20	0
16	0	10
17	0	0
18	0	0
19	0	0
20	0	20
21	0	0
22	20	50
23	*	0
24	50	0
25	0	0
26	0	0
27	0	0
28	0	0
29	10	0
30	15	0
31	0	0
32	0	10
33	5	15
34	0	10
35	0	0
36	0	20
37	10	0
38	0	0
39	0	0
40	10	10
41	0	10
42	0	10

TABLE 6.12 SCATTERPLOTS OF DENTIST AND PARENT RATINGS

A) ANXIETY RATINGS



Experimental



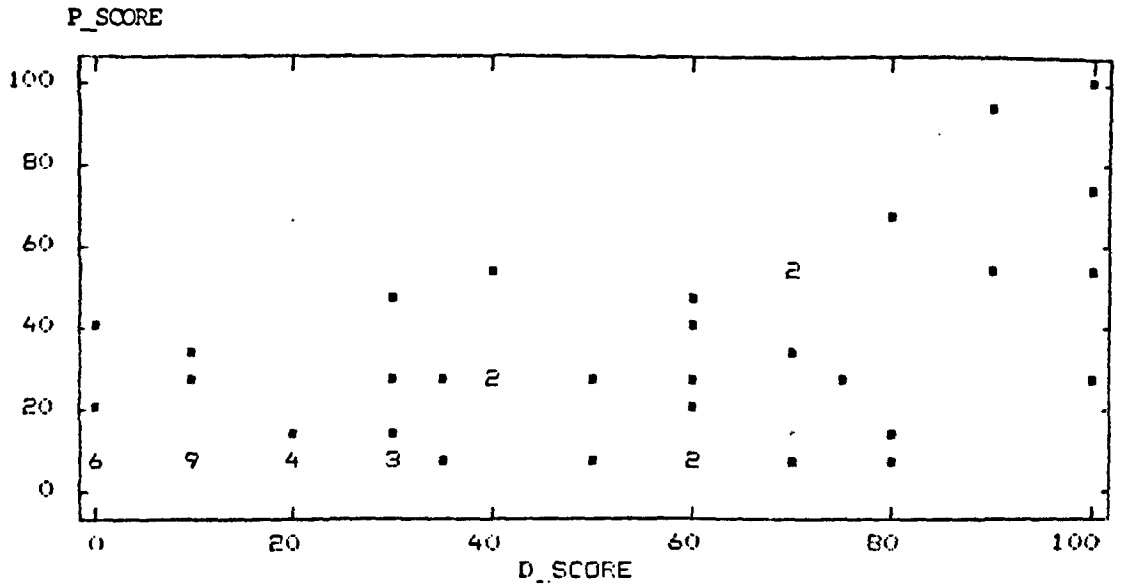
Control

P SCORE = parents rating

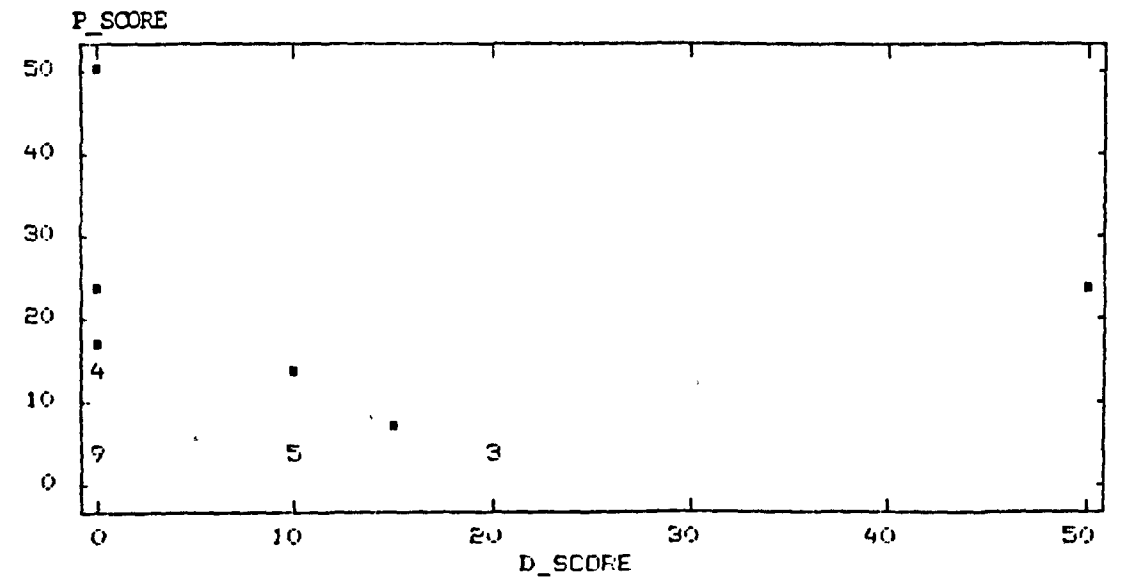
D SCORE = dentists rating

TABLE 6.12 CONTD.

B) CO-OPERATION RATINGS



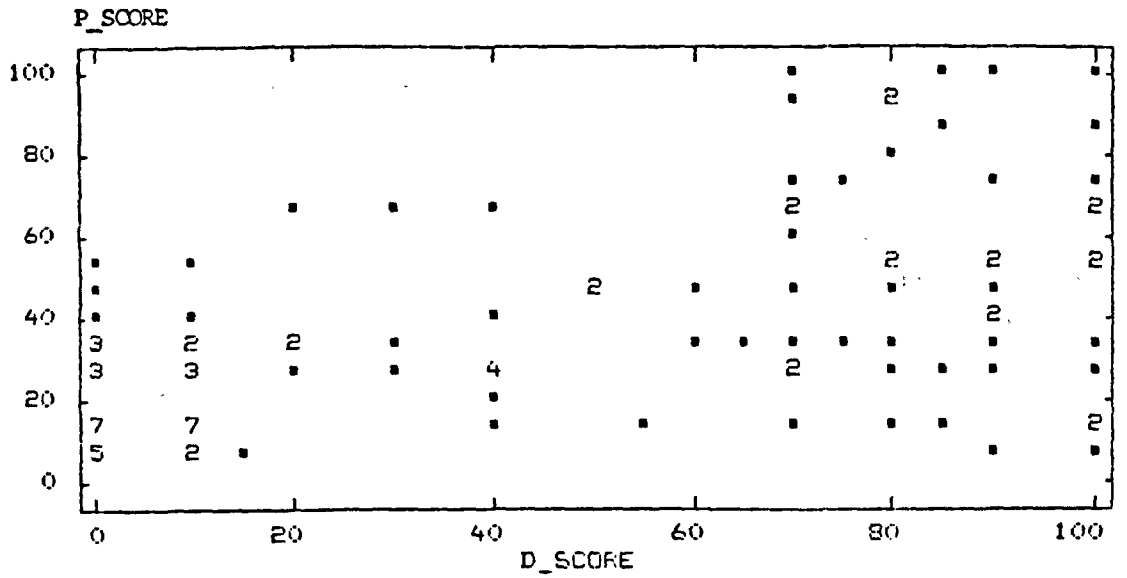
Experimental



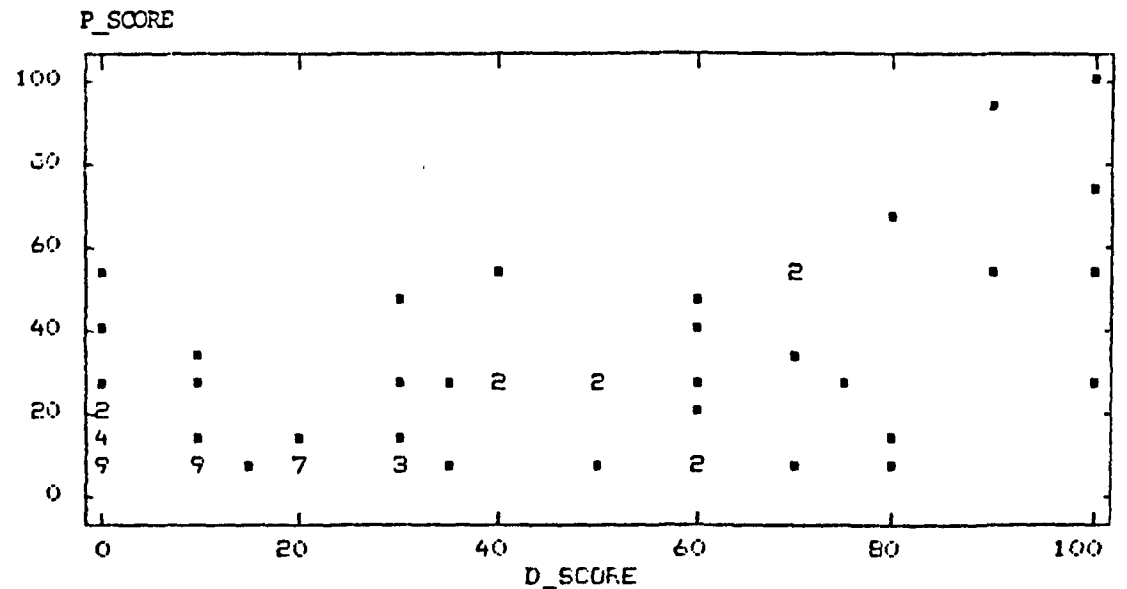
Control

TABLE 6.12 CONTD.

C) COMBINED RATINGS



Anxiety



Co-operation

TABLE 6.13 CORRELATION OF PARENTAL AND DENTIST RATINGS OF CHILDS ANXIETY AND COOPERATION

		DENTIST CHILDS TREATMENT ANXIETY	DENTIST CHILDS GENERAL DENTAL ANXIETY	DENTIST CHILDS COOPERATION
PARENT CHILDS PRE-TREATMENT ANXIETY	CORR.	0.4634 n=107	0.6600 n=100	0.4712 n=100
	SIG.	0.000*	0.000*	0.000*
PARENT CHILDS POST TREATMENT ANXIETY	CORR.	0.4937 n=104	0.6317 n=98	0.4849 n=98
	SIG.	0.000*	0.000*	0.000*
PARENT CHILDS COOPERATION	CORR.	0.4181 n=107	0.5671 n=100	0.5190 n=100
	SIG.	0.000*	0.000*	0.000*

NB: In all the Tables in the results an * is used to show the significant results, with a minimum significance of P 0.05 necessary.

6.4: EFFECT OF TYPE OF DENTAL TREATMENT AND WHETHER THE SUBJECT HAD BEEN TREATED BY THE DENTIST PREVIOUSLY

Obviously the type of treatment given, whether examination or scale and polish only (non-invasive) or fissure sealing, injection and filling or extraction (invasive) could have an effect on anxiety and cooperation. Whether a dental treatment session was invasive or non-invasive was assessed from the dentists post treatment questionnaire and the effect measured by means of the video, Child Manifest Anxiety Scale, Venham Picture Scale and the pre- and post-treatment questionnaires. An assessment of the effect of pain expectation and type of treatment was seen to be necessary as this aspect of dental anxiety has received such attention in the dental literature in recent years.

The results are given in tables 6.14 - 6.20. These results show there appears to be a marked difference between experimental and control group subjects on all the anxiety variables in relation to type of treatment with the experimental group scoring higher on anxiety than the control group. The cooperation measures show a similar effect, with the exception of the Melamed Child Behaviour Profile, where little difference can be perceived. The dentist behaviour measures show that he talks and empathises more with experimental group subjects. These results are borne out by the Kruskal Wallis tests of significance on the data in table 6.19. The variable used in the Kruskal Wallis test was a combination of whether the type of treatment was invasive or non-

invasive and whether the child was in the experimental or control group. Thus the variable varied from control/non-invasive to experimental/invasive.

These results also indicate there is very little difference in the scores obtained for invasive vs non-invasive procedures, with only pain expectation , the parents pre-treatment anxiety rating and the dentists time spent talking seeming to show a marked difference between experimental and control invasive vs non-invasive procedures. This is confirmed by the Mann Whitney tests of direction of effect for the Kruskall Wallis data, where only pain expectation and parents pre-treatment anxiety rating showing an increase in anxiety for experimental non-invasive subjects as compared to experimental invasive. This fits well with the other significant effect that the dentist talks more to the experimental non-invasive subjects as compared to experimental invasive subjects. This effect may well be related to whether the dentist has treated the child before, as those not treated before would be given an initial examination rather than invasive treatment. This is covered in the next part of this section.

TABLE 6.14 DESCRIPTIVE STATISTICS OF ANXIETY AND COOPERATION MEASURES: CHILDS RATING COMPARED WITH TYPE OF TREATMENT

VARIABLES		Non Invasive EXP.	Non Invasive CONT.	Invasive EXP.	Invasive CONT.
CHILD MANIFEST ANXIETY SCALE		n=37	n=30	n=26	n=12
	0-10	(9) 24.3%	(24) 80.0%	(6) 23.1%	(9) 75.0%
	11-20	(17) 45.9%	(6) 20.0%	(12) 46.2%	(3) 25.0%
	21-30	(8) 21.6%		(6) 23.1%	
	30+	(3) 8.1%		(2) 7.7%	
VENHAM PICTURE SCALE		n=35	n=30	n=26	n=42
	0-2	(22) 62.9%	(28) 93.3%	(15) 58.0%	(12) 100.0%
	3-5	(10) 28.6%	(2) 6.7%	(7) 26.9%	
	6-8	(3) 8.6%		(4) 15.4%	

TABLE 6.15 DESCRIPTIVE STATISTICS OF ANXIETY AND COOPERATION MEASURES

DENTIST RATING COMPARED WITH TYPE OF TREATMENT

VARIABLES		Non Invasive EXP.	Non Invasive CONT.	Invasive EXP.	Invasive CONT.
DENTIST RATING CHILDS TREATMENT ANXIETY		n=37	n=30	n=27	n=12
	0-20	(4) 10.8%	(28) 93.3%	(1) 3.7%	(9) 75.0%
	21-40	(5) 13.5%		(4) 14.8%	(2) 16.7%
	41-60	(4) 10.8%		(1) 3.7%	
	61+	(24) 64.9%	(2) 6.7%	(21) 77.8%	(1) 8.3%
DENTIST RATING CHILDS GENERAL DENTAL ANXIETY		n=37	n=30	n=24	n=12
	0-20		(27) 90.0%		(10) 83.3%
	21-40	(2) 5.4%	(1) 3.3%		(1) 8.3%
	41-60	(1) 2.7%			(1) 8.3%
	61+	(34) 91.9%	(2) 6.7%	(24) 100.0%	
DENTIST RATING CHILDS COOPERATION		n=37	n=30	n=27	n=12
	0-20	(17) 45.9%	(30) 100.0%	(14) 51.9%	(11) 91.7%
	21-40	(5) 13.5%		(5) 18.5%	
	41-60	(5) 13.5%		(3) 11.1%	(1) 8.3%
	61+	(10) 27.0%		(5) 18.5%	

TABLE 6.16 DESCRIPTIVE STATISTICS OF ANXIETY AND COOPERATION MEASURES:

PARENTAL RATING COMPARED WITH TYPE OF TREATMENT

VARIABLES		Non Invasive EXP.	Non Invasive CONT.	Invasive EXP.	Invasive CONT.
PARENT RATING CHILDS ANXIETY PRE-TREATMENT		n=37	n=30	n=27	n=12
	0-20	(7) 18.9%	(20) 66.7%	(10) 37.0%	(9) 75.0%
	21-40	(10) 27.0%	(8) 26.7%	(9) 33.3%	(2) 16.7%
	41-60	(9) 24.3%	(2) 6.7%	(4) 14.8%	(1) 8.3%
	61+	(11) 29.7%		(4) 14.8%	
PARENT RATING CHILDS ANXIETY POST TREATMENT		n=32	n=30	n=25	n=12
	0-20	(16) 50.0%	(22) 73.3%	(5) 20.0%	(10) 83.3%
	21-40	(7) 21.9%	(5) 16.7%	(10) 40.0%	(1) 8.3%
	41-60	(3) 9.4%	(3) 10.0%	(3) 12.0%	(1) 8.3%
	61+	(10) 31.3%		(7) 28.0%	
PARENTS RATING CHILDS COOPERATION		n=32	n=30	n=25	n=12
	0-20	(22) 68.8%	(29) 96.7%	(18) 72.0%	(12) 100.0%
	21-40	(4) 12.5%		(4) 16.0%	
	41-60	(4) 12.5%	(1) 3.3%	(2) 8.0%	
	61+	(2) 6.3%		(1) 4.0%	

TABLE 6.17 DESCRIPTIVE STATISTICS OF VIDEO DATA

COMPARED WITH TYPE OF TREATMENT

VARIABLES		Non Invasive EXP.	Non Invasive CONT.	Invasive EXP.	Invasive CONT.
VENHAM ANXIETY SCALE SCORE		n=37	n=30	n=27	n=12
	0	(14) 37.8%	(20) 66.7%	(10) 37.0%	(6) 50%
	1	(13) 35.1%	(10) 33.3%	(16) 60.2%	(6) 50%
	2	(8) 21.6%		(1) 3.7%	
	3+	(2) 5.4%			
MELAMED CHILD BEHAVIOUR PROFILE		n=37	n=30	n=27	n=12
	0-1.9	(24) 64.9%	(25) 83.3%	(17) 63.0%	(9) 75.0%
	2-3.9	(10) 27.0%	(4) 13.3%	(8) 29.6%	(3) 25.0%
	4-6.9	(3) 8.1%	(1) 3.3%	(2) 7.4%	
WEINSTEIN DENTIST BEHAVIOUR PROFILE		n=37	n=30	n=27	n=12
i) % TIME NOT TALKING	0-20	(20) 54.1%	(10) 33.3%	(5) 18.5%	(1) 8.3%
	21-40	(12) 32.4%	(14) 46.7%	(14) 51.9%	(7) 58.3%
	41-60	(4) 10.8%	(4) 13.3%	(7) 25.9%	(3) 25.0%
	61+	(1) 2.7%	(2) 6.7%	(1) 3.7%	(1) 8.3%

TABLE 6.17 CONTD.

VARIABLES	Non Invasive		Invasive	
	EXP.	CONT.	EXP.	CONT.
ii) % OF TIME NOT DIRECTING	n=37	n=30	n=27	n=12
0-20	(15)	(9)	(7)	(1)
	40.5%	30.0%	25.9%	8.3%
21-40	(11)	(9)	(6)	(4)
	29.7%	30.0%	22.2%	33.3%
41-60	(7)	(8)	(13)	(4)
	18.9%	26.7%	48.1%	33.3%
61+	(4)	(4)	(1)	(3)
	10.8%	13.3%	3.7%	25.0%
iii) % TIME NOT EMPATHISING	n=37	n=30	n=27	n=12
50-70	(3)	(1)	(1)	(0)
	8.1%	3.3%	3.7%	
70-90	(18)	(7)	(17)	(3)
	48.6%	23.3%	63.0%	25.0%
91+	(16)	(22)	(9)	(9)
	43.2%	73.3%	33.3%	75.0%
iv) % TIME NOT IN CONTACT	n=37	n=30	n=27	n=12
0-20	(1)	(1)	(3)	(2)
	2.7%	3.3%	11.1%	16.7%
21-40	(13)	(3)	(18)	(6)
	35.1%	10.0%	66.7%	50.0%
41-60	(12)	(19)	(6)	(3)
	32.4%	63.3%	22.2%	25.0%
61+	(11)	(7)		(1)
	29.7%	23.3%		8.3%

TABLE 6.18 PAIN EXPECTATION COMPARED WITH TYPE OF TREATMENT

		Non-Invasive		Invasive	
		EXP.	CONT.	EXP.	CONTD.
PAIN EXPECTATION		n=37	n=30	n=27	n=12
	0-20	(12)	(26)	(14)	(10)
		32.4%	86.7%	51.9%	83.3%
	21-40	(10)	(2)	(7)	(2)
		27.0%	6.7%	25.9%	16.7%
	41-60	(4)	(2)	(3)	
		10.8%	6.7%	11.1%	
	61+	(11)		(3)	
		29.7%		11.1%	

TABLE 6.19 KRUSKAL WALLIS TEST TO ASSESS SIGNIFICANCE OF DIFFERENCES ACROSS GROUPS WHEN CONTROLLING FOR TYPE OF TREATMENT

VARIABLES	TYPE OF TREATMENT/GROUP
VENHAM PICTURE SCALE SCORE	0.0161*
DENTIST CHILDS TREATMENT ANXIETY	0.000*
DENTIST CHILDS GENERAL DENTAL ANXIETY	0.000*
DENTIST CHILDS COOPERATION	0.000*
PARENT RATING CHILDS ANXIETY PRE TREATMENT	0.000*
PARENT RATING CHILDS ANXIETY POST TREATMENT	0.0001*
PARENT RATING CHILDS COOPERATION	0.0139*
PAIN EXPECTATION	0.000*
VENHAM VIDEO ANXIETY SCALE	0.0162*
MELAMED CHILD BEHAVIOUR PROFILE	0.1016
WEINSTEIN DENTIST BEHAVIOUR PROFILE	
i) DENTIST SILENCE	0.0086*
ii) DENTIST NON-DIRECTION	0.0524*
iii) DENTIST NON-EMPATHY	0.0005*

TABLE 6.20 MANN WHITNEY TESTS OF SIGNIFICANT EFFECTS WITHIN KRUSKAL WALLIS TEST ON TYPE OF TREATMENT BY GROUP

VENHAM PICTURE SCALE SCORE		2 NON INVASIVE/ EXPERIMENTAL n=35	3 INVASIVE/ CONTROL n=12	4 INVASIVE/ EXPERIMENTAL n=26
1 NON INVASIVE/ CONTROL	MEAN RANK	1: 27.92 2: 37.36	1: 22.17 3: 19.83	1: 23.65 4: 34.10
n=30	SIG.	0.0369*	0.5464	0.0132*
2 NON INVASIVE/ EXPERIMENTAL	MEAN RANK		2: 26.29 3: 17.33	2: 30.16 4: 32.13
n=35	SIG.		0.0431*	0.6604
3 INVASIVE/ CONTROL	MEAN RANK			3: 13.50 4: 22.27
n=12	SIG.			0.0195*

Numbers above each group refer to the numbers used for that group when giving mean ranks. The same notation is followed for each Mann Whitney test.

TABLE 6.20 CONTD.

DENTIST: CHILDS TREATMENT ANXIETY		2 NON INVASIVE/ EXPERIMENTAL n=37	3 INVASIVE/ CONTROL n=12	4 INVASIVE/ EXPERIMENTAL n=27
1 NON INVASIVE/ CONTROL	MEAN RANK	1: 17.40 2: 47.46	1: 21.17 3: 22.33	1: 16.30 4: 43.11
n=30	SIG.	0.000*	0.7620	0.000*
2 NON INVASIVE/ EXPERIMENTAL	MEAN RANK		2: 30.16 3: 9.08	2: 31.47 4: 33.91
n=37	SIG.		0.000*	0.6205
3 INVASIVE/ CONTROL	MEAN RANK			3: 7.79 4: 25.43
n=12	SIG.			0.000*

TABLE 6.20 CONTD.

DENTIST: CHILDS GENERAL DENTAL ANXIETY		2 NON INVASIVE/ EXPERIMENTAL n=37	3 INVASIVE/ CONTROL n=12	4 INVASIVE/ EXPERIMENTAL n=24
1 NON INVASIVE/ CONTROL	MEAN RANK	1: 15.93 2: 48.65	1: 20.98 3: 22.79	1: 15.57 4: 42.42
n=30	SIG.	0.000*	0.6546	0.000*
2 NON INVASIVE/ EXPERIMENTAL	MEAN RANK		2: 30.89 3: 6.83	2: 29.54 4: 33.25
n=37	SIG.		0.000*	0.4096
3 INVASIVE/ CONTROL	MEAN RANK			3: 6.50 4: 24.50
n=12	SIG.			0.000*

TABLE 6.20 CONTD.

DENTIST: CHILDS COOPERATION		2 NON INVASIVE/ EXPERIMENTAL n=37	3 INVASIVE/ CONTROL n=12	4 INVASIVE/ EXPERIMENTAL n=27
1 NON INVASIVE/ CONTROL	MEAN RANK	1: 22.00 2: 43.73	1: 20.37 3: 24.33	1: 18.78 4: 40.35
n=30	SIG.	0.000*	0.2197	0.000*
2 NON INVASIVE/ EXPERIMENTAL	MEAN RANK		2: 28,24 3: 15.00	2: 32.93 4: 31.91
n=37	SIG.		0.0043*	0.8261
3 INVASIVE/ CONTROL	MEAN RANK			3: 11.33 4: 23.85
n=12	SIG.			0.0012*

TABLE 6.20 CONTD.

PARENT: CHILDS PRE-TREATMENT ANXIETY RATING		2 NON INVASIVE/ EXPERIMENTAL n=37	3 INVASIVE/ CONTROL n=12	4 INVASIVE/ EXPERIMENTAL n=27
1 NON INVASIVE/ CONTROL	MEAN RANK	1: 21.45 2: 44.18	1: 22.18 3: 19.79	1: 23.57 4: 35.04
n=30	SIG.	0.000*	0.5533	0.0084*
2 NON INVASIVE/ EXPERIMENTAL	MEAN RANK		2: 29.36 3: 11.54	2: 36.38 4: 27.19
n=37	SIG.		0.0002*	0.0404*
3 INVASIVE/ CONTROL	MEAN RANK			3: 13.63 4: 22.83
n=12	SIG.			0.0186*

TABLE 6.20 CONTD.

PARENT: CHILDS PRE-TREATMENT ANXIETY RATING		2 NON INVASIVE/ EXPERIMENTAL n=32	3 INVASIVE/ CONTROL n=12	4 INVASIVE/ EXPERIMENTAL n=25
1 NON INVASIVE/ CONTROL	MEAN RANK	1: 24.20 2: 38.34	1: 21.60 3: 21.25	1: 20.55 4: 36.94
n=30	SIG.	0.0147*	0.9312	0.0001*
2 NON INVASIVE/ EXPERIMENTAL	MEAN RANK		2: 21.60 3: 14.58	2: 27.95 4: 30.34
n=37	SIG.		0.0112*	0.5883
3 INVASIVE/ CONTROL	MEAN RANK			3: 10.75 4: 22.96
n=12	SIG.			0.0012*

TABLE 6.20 CONTD.

PARENT RATING CHILDS COOPERATION		2 NON INVASIVE/ EXPERIMENTAL n=32	3 INVASIVE/ CONTROL n=12	4 INVASIVE/ EXPERIMENTAL n=25
1 NON INVASIVE/ CONTROL	MEAN RANK	1: 26.57 2: 36.13	1: 20.47 3: 24.08	1: 22.68 4: 34.38
n=30	SIG.	0.0147*	0.2773	0.0023*
2 NON INVASIVE/ EXPERIMENTAL	MEAN RANK		2: 23.81 3: 19.00	2: 28.42 4: 29.74
n=32	SIG.		0.2258	0.7527
3 INVASIVE/ CONTROL	MEAN RANK			3: 14.96 4: 20.94
n=12	SIG.			0.0971

TABLE 6.20 CONTD.

PAIN EXPECTATION		2 NON INVASIVE/ EXPERIMENTAL n=37	3 INVASIVE/ CONTROL n=12	4 INVASIVE/ EXPERIMENTAL n=27
1 NON INVASIVE/ CONTROL	MEAN RANK	1: 21.15 2: 44.42	1: 21.03 3: 22.67	1: 22.55 4: 36.17
n=30	SIG.	0.000*	0.6415	0.0010*
2 NON INVASIVE/ EXPERIMENTAL	MEAN RANK		2: 29.20 3: 12.04	2: 36.62 4: 26.85
n=37	SIG.		0.0003*	0.0372*
3 INVASIVE/ CONTROL	MEAN RANK			3: 13.96 4: 22.69
n=12	SIG.			0.0236*

TABLE 6.20 CONTD.

VENHAM ANXIETY SCALE		2 NON INVASIVE/ EXPERIMENTAL n=37	3 INVASIVE/ CONTROL n=12	4 INVASIVE/ EXPERIMENTAL n=27
1 NON INVASIVE/ CONTROL	MEAN RANK	1: 27.00 2: 39.68	1: 20.50 3: 24.00	1: 24.83 4: 33.63
n=30	SIG.	0.0036*	0.3208	0.0219*
2 NON INVASIVE/ EXPERIMENTAL	MEAN RANK		2: 22.54 3: 20.25	2: 34.41 4: 29.89
n=37	SIG.		0.1553	0.2990
3 INVASIVE/ CONTROL	MEAN RANK			3: 18.00 4: 20.89
n=12	SIG.			0.3997

TABLE 6.20 CONTD.

DENTIST SILENCE		2 NON INVASIVE/ EXPERIMENTAL n=37	3 INVASIVE/ CONTROL n=12	4 INVASIVE/ EXPERIMENTAL n=27
1 NON INVASIVE/ CONTROL	MEAN RANK	1: 37.43 2: 31.22	1: 20.05 3: 25.13	1: 26.25 4: 32.06
n=30	SIG.	0.1936	0.2254	0.1871
2 NON INVASIVE/ EXPERIMENTAL	MEAN RANK		2: 21.81 3: 34.83	2: 26.49 4: 40.74
n=37	SIG.		0.0060*	0.0025*
3 INVASIVE/ CONTROL	MEAN RANK			3: 20.88 4: 40.74
n=12	SIG.			0.7491

TABLE 6.20 CONTD.

DENTIST NON DIRECTION		2 NON INVASIVE/ EXPERIMENTAL n=37	3 INVASIVE/ CONTROL n=12	4 INVASIVE/ EXPERIMENTAL n=27
1 NON INVASIVE/ CONTROL	MEAN RANK	1: 37.42 2: 31.23	1: 19.68 3: 26.04	1: 27.75 4: 30.39
n=30	SIG.	0.1960	0.1290	0.5486
2 NON INVASIVE/ EXPERIMENTAL	MEAN RANK		2: 22.03 3: 34.17	2: 28.82 4: 37.54
n=37	SIG.		0.0105*	0.0643
3 INVASIVE/ CONTROL	MEAN RANK			3: 22.79 4: 18.76
n=12	SIG.			0.3074

TABLE 6.20 CONTD.

DENTIST NON EMPATHY		2 NON INVASIVE/ EXPERIMENTAL n=37	3 INVASIVE/ CONTROL n=12	4 INVASIVE/ EXPERIMENTAL n=27
1 NON INVASIVE/ CONTROL	MEAN RANK	1: 42.50 2: 27.11	1: 23.20 3: 17.25	1: 37.28 4: 19.80
n=30	SIG.	0.0009*	0.1325	0.0001*
2 NON INVASIVE/ EXPERIMENTAL	MEAN RANK		2: 23.73 3: 28.92	2: 32.77 4: 32.13
n=37	SIG.		0.2705	0.8915
3 INVASIVE/ CONTROL	MEAN RANK			3: 24.83 4: 17.85
n=12	SIG.			0.0768

Another potentially important variable is the effect of visiting a new dentist for the first time. The data were subdivided according to this variable and the results given in tables 6.21 - 6.27.

From tables 6.21 - 6.27 it appears there is a marked difference, not only between experimental and control group subjects, but also between whether the child has been treated before or not. This is confirmed by the Kruskal Wallis test (Table 6.26) and the Mann Whitney tests of direction of effect (Table 6.27). The variable used in the Kruskal Wallis test is a combination of whether the child has been treated before and which group he/she is in and varies from treated before/control to not treated before/experimental.

From these data it is apparent that when a dentist has not seen an anxious child before he rates them as being more anxious and less cooperative, the parent expects the child to be more anxious, though not after treatment, and rates them as less cooperative and the experimental children expect more pain at a first visit. In addition the children not treated before appear more anxious on the Venham Anxiety Scale.

There are effects upon dentist behaviour with the dentist directing and empathising more and being in contact less with new patients. Thus it appears that visiting a new dentist creates a particular stress on already anxious children.

TABLE 6.21 DESCRIPTIVE STATISTICS OF ANXIETY AND COOPERATION MEASURES: CHILD RATING COMPARED WITH WHETHER TREATED BEFORE

VARIABLES		NOT TREATED BEFORE EXP	NOT TREATED BEFORE CONT	TREATED BEFORE EXP	TREATED BEFORE CONT
CHILDS MANIFEST ANXIETY SCALE		n=14	n-17	n=50	n=22
	0-10	(3)	(3)	(13)	(4)
		21.4%	17.6%	26.%	18.2%
	11-20	(6)	(12)	(23)	(11)
		42.9%	70.6%	46.0%	50.0%
	21-30	(3)	(2)	(12)	(6)
		21.4%	11.8%	24.0%	27.3%
	30+	(2)		(2)	(1)
		14.3%		4.0%	4.5%
PICTURE SCALE SCORE		n=14	n=17	n=48	n=25
	0-2	(7)	(15)	(31)	(25)
		50.0%	88.2%	64.6%	100%
	3-5	(5)	(2)	(12)	
		35.7%	11.8%	25.0%	
	6-8	(2)		(5)	
		14.3%		10.4%	

TABLE 6.22 DESCRIPTIVE STATISTICS OF ANXIETY AND COOPERATION MEASURES: DENTIST RATING COMPARED WITH WHETHER TREATED BEFORE

VARIABLES		NOT TREATED BEFORE EXP	NOT TREATED BEFORE CONT	TREATED BEFORE EXP	TREATED BEFORE CONT
DENTIST RATING CHILDS PRESENT ANXIETY		n=14	n=17	n-51	n-25
	0-20	(1) 7.1%	(14) 82.4%	(4) 7.8%	(23) 92.0%
	21-40		(1) 5.9%	(9) 17.6%	(1) 4.0%
	41-60			(5) 9.8%	
	61+	(13) 92.9%	(2) 11.8%	(34) 66.7%	(1) 4.0%
DENTIST RATING CHILDS COOPERATION		n=14	n-17	n=51	n=25
	0-20	(1) 7.1%	(17) 100%	(30) 58.8%	(24) 96.0%
	21-40	(4) 28.6%		(7) 13.7%	
	41-60	(4) 28.6%		(4) 7.8%	(1) 4.0%
	61+	(5) 35.7%		(10) 19.6%	
DENTIST RATING CHILDS GENERAL DENTAL ANXIETY		n=14	n=17	n=48	n=25
	0-20		(14) 42.0%		(23) 92.0%
	21-40		(1) 5.9%	(2) 4.2%	(1) 4.0%
	41-60			(1) 2.1%	(1) 4.0%
	61+	(14) 100%	(2) 11.8%	(45) 93.8%	

TABLE 6.23 DESCRIPTIVE STATISTICS OF ANXIETY AND COOPERATION MEASURES: PARENTAL RATINGS COMPARED WITH WHETHER TREATED BEFORE

VARIABLES		NOT TREATED BEFORE EXP	NOT TREATED BEFORE CONT	TREATED BEFORE EXP	TREATED BEFORE CONT
PARENT RATING CHILDS ANXIETY PRE-TREATMENT		n=14	n=17	n=51	n=25
	0-20		(9) 52.9%	(17) 33.3%	(20) 80.0%
	21-40	(2) 14.3%	(6) 35.3%	(17) 33.3%	(4) 16.0%
	41-60	(5) 35.7%	(2) 11.8%	(8) 15.7%	(1) 4.0%
	61+	(7) 50.0%		(9) 17.6%	
PARENT RATING CHILDS ANXIETY POST TREATMENT		n=14	n=17	n=44	n=25
	0-20	(3) 21.4%	(11) 64.7%	(14) 31.8%	(21) 84.0%
		(3) 21.4%	(4) 23.5%	(14) 31.8%	(2) 8.0%
	41-60	(1) 7.1%	(2) 11.8%	(5) 11.4%	(2) 8.0%
	61+	50.0%		25.0%	
PARENT RATING CHILDS COOPERATION POST TREATMENT		n=14	n=17	n=44	n=25
	0-20	(8) 57.1%	(16) 94.1%	(33) 75.0%	(25) 100%
	21-40	(3) 21.4%		(5) 11.4%	
	41-60	(3) 21.4%	(1) 5.9%	(3) 6.8%	
	61+			(3) 6.8%	

TABLE 6.24 DESCRIPTIVE STATISTICS OF VIDEO DATA COMPARED WITH WHETHER TREATED BEFORE

		NOT TREATED BEFORE		TREATED BEFORE	
VARIABLES		EXP	CONT	EXP	CONT
VENHAM ANXIETY SCALE		n=14	n=17	n=51	n=25
	0	(2) 14.3%	(11) 64.7%	(22) 43.1%	(15) 60.0%
	1	(5) 35.7%	(6) 35.3%	(24) 47.1%	(10) 40.0%
	2	(6) 42.9%		(4) 7.8%	
	3+	(1) 7.1%		(1) 2.0%	
		n=14	n=17	n=51	n=25
MELAMED CHILD BEHAVIOUR PROFILE	0-1.9	(8) 57.1%	(16) 94.1%	(34) 66.7%	(18) 72.0%
	2-3.9	(5) 35.7%		(13) 25.5%	(7) 28.0%
	4-6.9	(1) 7.1%	(1) 5.9%	(4) 7.8%	
WEINSTEIN DENTIST BEHAVIOUR PROFILE		n=14	n=17	n=51	n=25
i) % of TIME NOT VOCALISING	0-20	(7) 50.0%	(5) 29.4%	(19) 37.3%	(6) 24.0%
	21-40	(7) 50.0%	(8) 47.1%	(19) 37.3%	(13) 52.0%
	41-60		(2) 11.8%	(11) 21.6%	(5) 20.0%
	61+		(2) 11.8%	(2) 3.9%	(1) 4.0%

TABLE 6.24 CONTD.

VARIABLES		NOT TREATED BEFORE EXP	NOT TREATED BEFORE CONT	TREATED BEFORE EXP	TREATED BEFORE CONT
		n=14	n=17	n=51	n=25
ii) % of TIME NOT DIRECTING	0-20	(8) 57.1%	(6) 35.3%	(14) 27.5%	(4) 16.0%
	21-40	(3) 21.4%	(5) 29.4%	(15) 29.4%	(8) 32.0%
	41-60	(3) 21.4%	(3) 17.6%	(17) 33.3%	(9) 36.0%
	61+		(3)	(5)	(4)
iii) % OF TIME NOT EMPATHISING		n=14	n=17	n=51	n=25
	50-70		(1) 5.9%	(5) 9.8%	
	71-90	(13) 92.9%	(2) 11.8%	(22) 43.1%	(8) 32.0%
	91+	(1) 7.1%	(14) 82.4%	(24) 47.1%	(17) 68.0%
iv) % OF TIME NOT IN PHYSICAL CONTACT		n=14	n=17	n=51	n=25
	0-20			(4) 7.8%	(3) 12.0%
	21-40	(2) 14.3%	(2) 11.8%	(29) 56.9%	(7) 28.0%
	41-60	(4) 28.6%	(11) 64.7%	(14) 27.5%	(11) 44.0%
	61+	(8) 57.1%	(4) 23.5%	(4) 7.8%	(4) 16.0%

TABLE 6.25 DESCRIPTIVE STATISTICS OF PAIN EXPECTATION COMPARED WITH WHETHER TREATED BEFORE:

VARIABLES		NOT TREATED BEFORE EXP	NOT TREATED BEFORE CONT	TREATED BEFORE EXP	TREATED BEFORE CONT
PAIN EXPECTATION		n=14	n=17	n=51	n=25
	0-20	(2) 14.3%	(15) 88.2%	(24) 47.1%	(21) 84.0%
	21-40	(3) 21.4%	(1) 5.9%	(14) 27.5%	(3) 12.0%
	41-60	(3) 21.4%	(1) 5.9%	(4) 7.8%	(1) 4.0%
	61+	(6) 42.9%		(8) 15.7%	

TABLE 6.26 KRUSKAL-WALLIS TEST TO ASSESS SIGNIFICANCE OF DIFFERENCES BETWEEN GROUPS ALLOWING FOR WHETHER TREATED BEFORE

VARIABLES	WHETHER TREATED BEFORE/GROUP
CHILDS MANIFEST ANXIETY SCORE	0.7849
VENHAM PICTURE SCALE SCORE	0.0055*
DENTIST CHILDS TREATMENT ANXIETY	0.000*
DENTIST CHILDS GENERAL DENTAL ANXIETY	0.000*
DENTIST CHILDS COOPERATION	0.000*
PARENT RATING CHILDS PRE-TREATMENT ANXIETY	0.000*
PARENT RATING CHILDS POST TREATMENT ANXIETY	0.000*
PARENT RATING CHILDS COOPERATION	0.0004*
VENHAM ANXIETY SCALE	0.004*
WEINSTEIN DENTIST BEHAVIOUR PROFILE:	
i) DENTIST SILENCE	0.2557
ii) DENTIST NON-DIRECTION	0.0403*
iii) DENTIST NON-EMPATHY	0.000*
iv) DENTIST NON-CONTACT	0.000*
MELAMED CHILD BEHAVIOUR PROFILE	0.0030*
PAIN EXPECTATION	0.000*

TABLE 6.27 MANN WHITNEY TESTS OF SIGNIFICANT EFFECTS WITHIN KRUSKAL WALLIS TEST ON WHETHER TREATED BEFORE BY GROUP

VENHAM PICTURE SCALE		2 TREATED BEFORE/ EXPERIMENTAL n=48	3 NOT TREATED BEFORE/CONTROL n=17	4 NOT TREATED BEFORE/EXPERIMENTAL n=14
1				
TREATED BEFORE/ CONTROL n=25	MEAN	1 29.10	1 19.96	1 15.60
	RANK	2 41.11	3 23.76	4 27.86
	SIG.	0.0163*	0.2852	0.0008*
2				
TREATED BEFORE/ EXPERIMENTAL n=48	MEAN		2 34.57	2 29.66
	RANK		3 28.56	4 37.82
	SIG.		0.2429	0.1276
3				
NOT TREATED BEFORE/ CONTROL n=17	MEAN			3 12.68
	RANK			4 20.04
	SIG.			0.0214*

TABLE 6.27 CONTD.

DENTIST CHILDS TREATMENT ANXIETY		2 TREATED BEFORE/ EXPERIMENTAL n=51	3 NOT TREATED BEFORE/CONTROL n=17	4 NOT TREATED BEFORE/EXPERIMENTAL n=14
1				
TREATED BEFORE/ CONTROL n=25	MEAN	1 14.88	1 19.72	1 13.30
	RANK	2 50.08	3 24.12	4 31.96
	SIG.	0.000*	0.2149	0.000*
2				
TREATED BEFORE/ EXPERIMENTAL n=51	MEAN		2 41.74	2 30.48
	RANK		3 12.79	4 42.18
	SIG.		0.000*	0.0386*
3				
NOT TREATED BEFORE/ CONTROL n=17	MEAN			3 9.50
	RANK			4 23.89
	SIG.			0.000*

TABLE 6.27 CONTD.

DENTIST CHILDS GENERAL DENTAL ANXIETY		2 TREATED BEFORE/ EXPERIMENTAL n=48	3 NOT TREATED BEFORE/CONTROL n=17	4 NOT TREATED BEFORE/EXPERIMENTAL n=14
1				
TREATED BEFORE/ CONTROL	MEAN	1 13.12	1 19.38	1 13.00
	RANK	2 49.44	3 24.62	4 32.50
n=25	SIG.	0.000*	0.1592	0.000*
2				
TREATED BEFORE/ EXPERIMENTAL	MEAN		2 41.17	2 29.52
	RANK		3 9.94	4 38.29
n=48	SIG.		0.000*	0.0980
3				
NOT TREATED BEFORE/ CONTROL	MEAN			3 9.00
	RANK			4 24.50
n=17	SIG.			0.000*

TABLE 6.27 CONTD.

DENTIST CHILDS COOPERATION		2 TREATED BEFORE/ EXPERIMENTAL n=48	3 NOT TREATED BEFORE/CONTROL n=17	4 NOT TREATED BEFORE/EXPERIMENTAL n=14
1				
TREATED BEFORE/ CONTROL	MEAN	1 23.14	1 20.88	1 13.22
	RANK	2 46.03	3 22.41	4 32.11
n=25	SIG.	0.000*	0.6066	0.000*
2				
TREATED BEFORE/ EXPERIMENTAL	MEAN		2 39.20	2 28.94
	RANK		3 20.41	4 47.79
n=51	SIG.		0.0005*	0.0009*
3				
NOT TREATED BEFORE/ CONTROL	MEAN			3 9.09
	RANK			4 24.39
n=17	SIG.			0.000*

TABLE 6.27 CONTD.

PARENT CHILDS PRE TREATMENT ANXIETY RATING		2 TREATED BEFORE/ EXPERIMENTAL n=51	3 NOT TREATED BEFORE/CONTROL n=17	4 NOT TREATED BEFORE/EXPERIMENTAL n=14
1				
TREATED BEFORE/ CONTROL	MEAN	1 21.92	1 17.16	1 13.42
	RANK	2 46.63	3 27.88	4 31.75
n=25	SIG.	0.000*	0.0039*	0.000*
2				
TREATED BEFORE/ EXPERIMENTAL	MEAN		2 36.83	2 28.97
	RANK		3 27.50	4 47.68
n=51	SIG.		0.0902	0.0010*
3				
NOT TREATED BEFORE/ CONTROL	MEAN			3 10.09
	RANK			4 23.18
n=17	SIG.			0.0001*

TABLE 6.27 CONTD.

PARENT POST-TREATMENT ANXIETY RATING		2 TREATED BEFORE/ EXPERIMENTAL n=44	3 NOT TREATED BEFORE/CONTROL n=17	4 NOT TREATED BEFORE/EXPERIMENTAL n=14
1				
TREATED BEFORE/ CONTROL n=25	MEAN	1 23.28	1 19.48	1 14.16
	RANK	2 41.66	3 24.47	4 30.43
	SIG.	0.0002*	0.1813	0.000*
2				
TREATED BEFORE/ EXPERIMENTAL n=44	MEAN		2 33.98	2 27.44
	RANK		3 23.29	4 35.96
	SIG.		0.0339*	0.0986
3				
NOT TREATED BEFORE/ CONTROL n=17	MEAN			3 10.85
	RANK			4 22.25
	SIG.			0.0005*

TABLE 6.27 CONTD.

PARENT RATING CHILDS CO-OPERATION		2 TREATED BEFORE/ EXPERIMENTAL n=44	3 NOT TREATED BEFORE/CONTROL n=17	4 NOT TREATED BEFORE/EXPERIMENTAL n=14
1				
TREATED BEFORE/ CONTROL	MEAN	1 30.68	1 21.96	1 14.64
	RANK	2 37.45	3 20.82	4 29.57
n=25	SIG.	0.0002*	0.7107	0.000*
2				
TREATED BEFORE/ EXPERIMENTAL	MEAN		2 32.90	2 26.67
	RANK		3 26.09	4 38.39
n=44	SIG.		0.1229	0.0169*
3				
NOT TREATED BEFORE/ CONTROL	MEAN			3 11.15
	RANK			4 28.89
n=17	SIG.			0.0005*

TABLE 6.27 CONTD.

VENHAM ANXIETY SCORE		2 TREATED BEFORE/ EXPERIMENTAL n=51	3 NOT TREATED BEFORE/CONTROL n=17	4 NOT TREATED BEFORE/EXPERIMENTAL n=14
1				
TREATED BEFORE/ CONTROL n=25	MEAN	1 33.20	1 21.90	1 15.40
	RANK	2 41.10	3 20.91	4 28.21
	SIG.	0.1004	0.7607	0.0003*
2				
TREATED BEFORE/ EXPERIMENTAL n=51	MEAN		2 36.63	2 29.61
	RANK		3 28.12	4 45.36
	SIG.		0.0857	0.0029*
3				
NOT TREATED BEFORE/ CONTROL n=17	MEAN			3 11.24
	RANK			4 21.79
	SIG.			0.0006*

TABLE 6.27 CONTD.

DENTIST NON-DIRECTION		2 TREATED BEFORE/ EXPERIMENTAL n=51	3 NOT TREATED BEFORE/CONTROL n=17	4 NOT TREATED BEFORE/EXPERIMENTAL n=14
1				
TREATED BEFORE/ CONTROL	MEAN	1 43.24	1 23.72	1 23.92
	RANK	2 36.18	3 18.24	4 13.00
n=25	SIG.	0.1899	0.1548	0.0041*
2				
TREATED BEFORE/ EXPERIMENTAL	MEAN		2 35.20	2 35.53
	RANK		3 32.41	4 23.79
n=51	SIG.		0.6149	0.0394*
3				
NOT TREATED BEFORE/ CONTROL	MEAN			3 17.85
	RANK			4 13.75
n=17	SIG.			0.2105

TABLE 6.27 CONTD.

DENTIST NON-EMPATHY		2 TREATED BEFORE/ EXPERIMENTAL n=51	3 NOT TREATED BEFORE/CONTROL n=17	4 NOT TREATED BEFORE/EXPERIMENTAL n=14
1				
TREATED BEFORE/ CONTROL	MEAN	1 45.50	1 18.78	1 24.90
	RANK	2 35.07	3 25.50	4 11.43
n=25	SIG.	0.0507	0.0649	0.0004*
2				
TREATED BEFORE/ EXPERIMENTAL	MEAN		2 29.91	2 35.95
	RANK		3 48.26	4 22.25
n=51	SIG.		0.0007*	0.0160*
3				
NOT TREATED BEFORE/ CONTROL	MEAN			3 21.91
	RANK			4 8.82
n=17	SIG.			0.000*

TABLE 6.27 CONTD.

DENTIST NON-CONTACT	2 TREATED BEFORE/ EXPERIMENTAL n=51	3 NOT TREATED BEFORE/CONTROL n=17	4 NOT TREATED BEFORE/EXPERIMENTAL n=14
1			
TREATED BEFORE/ CONTROL	MEAN 1 44.70	1 19.40	1 16.82
	RANK 2 35.46	3 24.59	4 25.68
n=25	SIG. 0.0864	0.1782	0.0198*
2			
TREATED BEFORE/ EXPERIMENTAL	MEAN	2 29.25	2 28.23
	RANK	3 50.24	4 50.39
n=51	SIG.	0.0002*	0.0001*
3			
NOT TREATED BEFORE/ CONTROL	MEAN		3 14.12
	RANK		4 18.29
n=17	SIG.		0.2035

TABLE 6.27 CONTD.

PAIN EXPECTATION	2 TREATED BEFORE/ EXPERIMENTAL n=51	3 NOT TREATED BEFORE/CONTROL n=17	4 NOT TREATED BEFORE/EXPERIMENTAL n=14
1			
TREATED BEFORE/ CONTROL	MEAN 1 25.08	1 21.22	1 13.58
n=25	RANK 2 45.08	3 21.91	4 31.46
	SIG. 0.0001*	0.8303	0.000*
2			
TREATED BEFORE/ EXPERIMENTAL	MEAN	2 38.87	2 29.17
n=51	RANK	3 21.28	4 46.96
	SIG.	0.0013*	0.0017*
3			
NOT TREATED BEFORE/ CONTROL	MEAN		3 9.59
n=17	RANK		4 23.79
	SIG.		0.000*

6.5 MULTIPLE REGRESSION ANALYSIS ON MOST FREQUENT INDICATORS OF DENTAL ANXIETY:

From the summary of significant results given in Table 6.28 it is evident that the following variables are the most potentially predictive of changes in anxiety. The parents rating of the childs anxiey pre-treatment and pain expectation are the only variables sensitive to changes in anxiety for experimental vs control subjects, type of treatment and whether the dentist has treated the child before. The majority of significant variables in the three major factors of dental anxiety (medical/dental, individual and environmental) occur in the medical/dental factor. Of these variables the most significant and generally applicable is the reaction to subsequent dental visits. Finally, the effect of visiting a new dentist has such a marked effect on anxiety levels and dentist behaviour that it must be considered as a possible predictive variable in its own right.

Using the variables outlined above a simple regression analysis was carried out to test the predictive value of the outlined variables, see Table 6.29.

In order to assess the ability of these variables to predict anxiety levels, it was necessary to carry out regression analyses on a range of anxiety measures, dentist rating of childs treatment anxiety, Venham Picture Scale Score, Venham Anxiety Scale and parents post-treatment anxiety rating. The results show that the only predictive

variable is the parents pre-treatment anxiety rating, which proved significant for all the chosen measures of anxiety. Thus it appears that the parents assessment of how anxious a child will be in the dental situation is a good indicator of how the child will react to dental treatment.

TABLE 6.28 COMPARISON OF SIGNIFICANT DIFFERENCES BETWEEN SUBJECTS FOR EXPERIMENTAL VS CONTROL, TYPE OF TREATMENT AND WHETHER TREATED BEFORE.

MAJOR FACTORS	VARIABLES	DIFFERENCES BETWEEN EXPERIMENTAL AND CONTROL GROUPS	VARIABLES SENSITIVE TO TYPE OF TREATMENT	VARIABLES SENSITIVE TO WHETHER TREATED BEFORE
		SIG	SIG	SIG
ANXIETY AND COOPERATION MEASURES	VENHAM PICTURE SCALE	0.025		
	DENTIST: CHILDS TREATMENT ANXIETY	0.000		0.0386
	DENTIST: CHILDS GENERAL DENTAL ANXIETY	0.000		
	DENTIST: CHILDS CO-OPERATION	0.000		0.0009
	PARENT: CHILDS PRE-TREATMENT ANXIETY	0.000	0.0404	0.0010
	PARENT: CHILDS POST-TREATMENT ANXIETY	0.000		
	PARENT: CHILDS CO-OPERATION	0.0016		0.0169
	VENHAM ANXIETY SCALE	0.0021		0.0029
	CHILD BEHAVIOUR PROFILE	0.0174		
DENTIST BEHAVIOUR	DENTIST EMPATHY	0.000		0.0160
	DENTIST CONTACT	0.0472		0.0001
	DENTIST DIRECTION			0.0394
	DENTIST TALKING		0.0025	

6.28 CONTD.

		SIG	SIG	SIG
MEDICAL/ DENTAL	AGE AT FIRST DENTAL VISIT	0.0227		
	REACTION TO DENTAL CHAIR	0.0085		
	REACTION TO FIRST DENTAL VISIT	0.0391		
	REACTION TO SUBSEQUENT VISITS	0.000		
	WHETHER CHILD HAS HAD A GA	0.000		
	WHETHER CHILD HAS HAD RA	0.0012		
	REACTION TO PAST MEDICAL VISITS	0.0052		
	ANTICIPATION OF MEDICAL CONTACTS	0.0051		
INDIVIDUAL	ATTENTION SPAN	0.0036		
	PAIN TOLERANCE	0.0012		
	PAIN EXPECTATION	0.000	0.0372	0.0017
	NUMBER OF SPECIFIC FEARS	0.0077		
ENVIRONMENTAL	NUMBER OF RECENT LIFE EVENTS	0.0143		

TABLE 6.29 MULTIPLE REGRESSION ANALYSIS OF MOST FREQUENT PREDICTORS OF ANXIETY COMPARED WITH ANXIETY MEASURES

i) USING VENHAM PICTURE SCALE AS DEPENDANT VARIABLE

VARIABLE	COEFFICIENT	STANDARD ERROR	P VALUE
REACTION TO SUB-SEQUENT VISITS	0.363988	0.320299	0.2587
WHETHER TREATED BEFORE	-0.026597	0.403287	0.9476
PAIN EXPECTATION	0.010806	0.008310	0.1967
PARENT: CHILDS PRE-TREATMENT ANXIETY RATING	0.018292	0.008847	0.0415*
CONSTANT	0.340080	0.474629	0.4755

ii) USING DENTIST RATING OF CHILDS TREATMENT ANXIETY AS DEPENDANT VARIABLE

VARIABLE	COEFFICIENT	STANDARD ERROR	P VALUE
REACTION TO SUB-SEQUENT VISITS	10.529089	5.966580	0.0809
WHETHER TREATED BEFORE	9.636742	7.512680	0.2028
PAIN EXPECTATION	0.210869	0.154797	0.1765
PARENT: CHILDS PRE-TREATMENT ANXIETY RATING	0.455098	0.164806	0.0069*
CONSTANT	7.707522	8.841461	0.3856

TABLE 6.29 CONTD.

iii) USING VENHAM ANXIETY SCALE AS DEPENDANT VARIABLE

VARIABLE	COEFFICIENT	STANDARD ERROR	P VALUE
REACTION TO SUB-SEQUENT VISITS	0.026018	0.128256	0.8397
WHETHER TREATED BEFORE	-0.022880	-0.013713	0.8876
PAIN EXPECTATION	0.004030	0.003327	0.2289
PARENT: CHILDS PRE-TREATMENT ANXIETY RATING	0.009568	0.003543	0.0082*
CONSTANT	0.274275	0.190054	0.1524

iv) USING PARENTS POST TREATMENT RATING OF CHILDS ANXIETY AS DEPENDANT VARIABLE

VARIABLE	COEFFICIENT	STANDARD ERROR	P VALUE
REACTION TO SUB-SEQUENT VISITS	8.666531	4.733464	0.0704
WHETHER TREATED BEFORE	0.308067	5.960031	0.9589
PAIN EXPECTATION	0.188800	0.122805	0.1276
PARENTS: CHILDS PRE-TREATMENT ANXIETY RATING	0.332940	0.130745	0.0125*
CONSTANT	6.851270	7.014192	0.3312

EFFECTS OF DENTIST BEHAVIOUR

The dentist behaviour was assessed using the Weinstein Behaviour
le, scored from the video tapes. An assessment of the reliability
is scale is given in section 6.10.

From the descriptive statistics on this scale in table 6.30 it
rs that the dentist talks more to anxious children and less to other
e in the surgery when treating anxious children, gives more specific
eneral feedback and tries to persuade fearful children more, spends
time empathising with anxious children using questioning for feeling
eassurance more often and is in contact less with anxious children.
This is borne out by Mann Whitney tests, the results of which are
ble 6.31.

As a consequence of the obvious effect of visiting a new dentist on
ty levels in the children studied, it was necessary to see how this
ble affected the dentists behaviour. From Table 6.32 it can be
that when treating a child for the first time the study dentist,
more time explaining/demonstrating procedures, gave less specific
ack about behaviour, spent more time directing in general, touched
hildren less during treatment but patted or stroked the children
and spent less time in contact with the children in general.
Thus it appears that anxious children and new patients have a
d effect on a dentists behaviour.

TABLE 6.30 DESCRIPTIVE STATISTICS OF DENTIST BEHAVIOUR FROM THE WEINSTEIN BEHAVIOUR PROFILE FOR EXPERIMENTAL AND CONTROL GROUPS

VARIABLES		EXP.	CONT.
VOCALISATION		n=65	n=42
DENTAL TALK TO CHILD	0-20%	(9)	(15)
		13.8%	35.7%
	21-40%	(21)	(18)
		32.3%	42.9%
	41-60%	(15)	(6)
		23.1%	14.3%
	61%+	(20)	(2)
		30.8%	4.8%
NON DENTAL TALK TO CHILD		n=65	n=42
	0-20%	(64)	(41)
		98.5%	97.6%
	21-40%		(1)
			2.4%
	41-60%		
	61%+	(1)	
		1.5%	
DENTAL TALK TO OTHER THAN CHILD		n=65	n=42
	0-20%	(40)	(11)
		61.5%	26.2%
	21-40%	(16)	(16)
		24.6%	38.1%
	41-60%	(6)	(9)
		9.2%	21.4%
	61%	(3)	(6)
		4.6%	14.3%
NON DENTAL TALK TO OTHER THAN CHILD		n=65	n=42
	0-20%	(63)	(39)
		96.9%	92.9%
	21-40%	(1)	(2)
		1.5%	4.8%
	41-60%	(1)	(1)
		1.5%	2.4%
	61%+		

TABLE 6.30 CONTD.

VARIABLES		EXP.	CONT.
DENTIST SILENCE		n=65	n=42
	0-20%	(26)	(11)
		40%	26.2%
	21-40%	(26)	(21)
		40%	50%
	41-60%	(11)	(7)
		16.9%	16.7%
	61+%	(2)	(3)
		3.1%	7.1%
DIRECTION		n=65	n=42
DIRECTION BY COMMAND	0-20%	(60)	(39)
		92.3%	92.9%
	21-40%	(4)	(3)
		6.2%	7.1%
	41-60%	(1)	
		1.5%	
	61+%		
DIRECTION BY EXPLANATION/ DEMONSTRATION		n=65	n=42
	0-20%	(7)	(8)
		10.8%	19.0%
	21-40%	(24)	(15)
		36.9%	35.7%
	41-60%	(24)	(14)
		36.9%	33.3%
	61+%	(10)	(5)
		15.4%	11.9%
DIRECTION BY RULE SETTING		n=65	n=42
	0%	(63)	(39)
		96.9%	92.9%
	1-10%	(2)	(3)
		3.1%	7.1%

TABLE 6.30 CONTD.

VARIABLES		EXP.	CONT.
DIRECTION BY SPECIFIC FEEDBACK		n=65	n=42
	0%	(48)	(39)
		73.8%	92.9%
	1-10%	(17)	(3)
		26.2%	7.1%
DIRECTION BY GENERAL FEEDBACK		n=65	n=42
	0%	(17)	(22)
		26.2%	52.4%
	1-10%	(38)	(17)
		58.5%	40.5%
	11-20%	(10)	(2)
		15.4%	4.8%
	21-25%		(1)
			2.4%
DIRECTION BY PERSUASION		n-65	n=42
	0%	(51)	(40)
		78.5%	95.2%
	1-10%	(13)	(1)
		20.0%	2.4%
	11-15%	(1)	(1)
		1.5%	2.4%
DIRECTION USING RHETORICAL QUESTIONS		n=65	n=42
	0%	(13)	(13)
		20.0%	31.0%
	1-10%	(38)	(26)
		58.5%	61.9%
	11-20%	(14)	(3)
		21.5%	7.1%

TABLE 6.30 CONTD.

VARIABLES		EXP.	CONT.
NON DIRECTION		n=65	n=42
	0-20%	(22)	(10)
		33.8%	23.3%
	21-40%	(18)	(13)
		27.7%	31.0%
	41-60%	(20)	(12)
		30.8%	28.6%
	61+%	(5)	(7)
		7.7%	16.7%
EMPATHY:			
EMPATHISES BY QUESTIONING FOR FEELINGS		n=65	n=42
	0%	(17)	(22)
		26.2%	52.4%
	1-10%	(29)	(14)
		44.6%	33.3%
	11-20%	(16)	(5)
		24.6%	11.9%
	21-30%	(3)	(1)
		4.6%	2.4%
EMPATHISES BY REASSURING		n=65	n=42
	0%	(23)	(30)
		35.4%	71.4%
	1-10%	(31)	(10)
		47.7%	23.8%
	11-20%	(10)	(1)
		15.4%	2.4%
	21-30%		(1)
			2.4%
	31-40%	(1)	
		1.5%	

TABLE 6.30 CONTD.

VARIABLES		EXP.	CONT.
EMPATHISES BY IGNORING EXPRESSION OF PAIN etc.		n=65	n=42
	0%	(65)	(42)
		100%	100%
EMPATHISES BY BELITTLING SUBJECT		n=65	n=42
	0%	(64)	(41)
		98.5%	97.6%
	1-10%	(1)	(1)
		1.5%	2.4%
EMPATHISES USING STOP MECHANISM		n=65	n=42
	0%	(63)	(42)
		97.0%	100%
	0-10%	(2)	
		3.0%	
NOT EMPATHISING		n=65	n=42
	50-60%	(2)	
		3.1%	
	61-70%	(3)	(1)
		4.6%	2.4%
	71-80%	(11)	(3)
		16.9%	7.1%
	80+%	(49)	(38)
		75.4%	90.5%

TABLE 6.30 CONTD.

VARIABLES		EXP.	CONT.
PHYSICAL CONTACT:		n=65	n=42
TOUCHES DURING TREATMENT	0-20%	(5)	(2)
		7.7%	4.8%
	21-40%	(14)	(14)
		21.5%	33.3%
	41-60%	(16)	(14)
		24.6%	33.3%
	61+%	(30)	(12)
		46.2%	28.6%
PATS OR STROKES CHILDS		n=65	n=42
	0%	(31)	(25)
		47.7%	59.5%
	1-20%	(30)	(16)
		46.2%	38.1%
	21-40%	(4)	(1)
		6.2%	2.4%
HOLDS CHILD: CHILD NOT INTERFERING WITH TREATMENT		n=65	n=42
	0%	(62)	(42)
		95.4%	100%
	1-10%	(3)	
		4.6%	
RESTRAINS CHILD		n=65	n=42
	0%	(62)	(42)
		98.5%	100%
	1%	(1)	
		1.5%	

TABLE 6.30 CONTD.

VARIABLES		EXP.	CONT.
ASSISTS CHILD IN POSITIONING		n=65	n=42
	0%	(57)	(36)
		87.7%	85.7%
	1-10%	(8)	(6)
		12.3%	14.3%
NOT IN CONTACT		n=65	n=42
	0-20%	(4)	(3)
		6.2%	7.1%
	21-40%	(31)	(9)
		47.7%	21.4%
	41-60%	(18)	(22)
		27.7%	52.4%
	61+%	(12)	(8)
		18.5%	19.1%

TABLE 6.31 MANN WHITNEY TESTS FOR SIGNIFICANT DIFFERENCES IN DENTIST BEHAVIOUR ACROSS GROUPS

VARIABLE	MEAN RANK	SIGNIFICANCE
VOCALISATION:		
DENTIST: DENTAL TALK TO CHILD	EXP: 63.68 CONT: 39.02	0.001*
DENTIST: NON DENTAL TALK TO CHILD	EXP: 55.44 CONT: 51.77	0.5060
DENTIST: DENTAL TALK TO OTHERS	EXP: 45.36 CONT: 67.36	0.0003*
DENTIST: NON DENTAL TALK TO OTHERS	EXP: 52.40 CONT: 56.48	0.3966
DENTIST: SILENCE	EXP: 51.47 CONT: 57.92	0.2937
DIRECTION:		
DENTIST DIRECTS BY COMMAND	EXP: 50.43 CONT: 59.52	0.1383
DENTIST DIRECTS BY EXPLAINING/SHOWING	EXP: 55.42 CONT: 51.82	0.5571
DENTIST DIRECTS BY SETTING RULES	EXP: 53.15 CONT: 55.35	0.3242
DENTIST DIRECTS BY SPECIFIC FEEDBACK	EXP: 57.94 CONT: 47.90	0.0163*
DENTIST DIRECTS BY GENERAL FEEDBACK	EXP: 60.70 CONT: 43.63	0.0043*
DENTIST DIRECTS BY FAULTING	EXP: 54.10 CONT: 53.85	0.9275

TABLE 6.31 CONTD.

VARIABLE	MEAN RANK	SIGNIFICANCE
DENTIST DIRECTS BY PERSUASION	EXP: 57.45 CONT: 48.65	0.0209*
DENTIST DIRECTS BY ASKING RHETORICAL QUESTIONS	EXP: 58.59 CONT: 46.89	0.0546
DENTIST NOT DIRECTING	EXP: 50.73 CONT: 59.06	0.1750
EMPATHY:		
DENTIST EMPATHISES BY QUESTIONING FOR FEELINGS	EXP: 61.48 CONT: 42.42	0.0014*
DENTIST EMPATHISES BY REASSURING	EXP: 63.02 CONT: 40.05	0.001*
DENTIST EMPATHISES BY IGNORING EXPRESSION OF PAIN ETC.	EXP: 54.00 CONT: 54.00	1.000
DENTIST EMPATHISES BY DENYING EXPRESSION OF PAIN ETC.	EXP: 53.94 CONT: 54.10	0.9444
DENTIST EMPATHISES BY BELITTLING SUBJECT	EXP: 53.83 CONT: 54.26	0.7648
DENTIST EMPATHISES BY USE OF STOP SIGNAL	EXP: 54.65 CONT: 53.00	0.2534
DENTIST NOT EMPATHISING	EXP: 44.32 CONT: 68.99	0.000*

TABLE 6.31 CONTD.

VARIABLE	MEAN RANK	SIGNIFICANCE
PHYSICAL CONTACT:		
DENTIST TOUCHES CHILD DURING TREATMENT	EXP: 57.82 CONT: 48.08	0.1127
DENTIST PATS OR STROKES CHILDS	EXP: 56.52 CONT: 50.11	0.2595
DENTIST HOLDS CHILD: CHILD NOT INTERFERING WITH TREATMENT	EXP: 54.97 CONT: 52.50	0.1599
DENTIST RESTRAINS CHILD	EXP: 54.32 CONT: 53.20	0.4215
DENTIST HELPS CHILD WITH CHAIR POSITIONING	EXP: 53.67 CONT: 54.51	0.8149
DENTIST NOT IN CONTACT	EXP: 49.22 CONT: 61.40	0.0472*

TABLE 6.32 MANN WHITNEY TESTS FOR SIGNIFICANT DIFFERENCES IN DENTIST BEHAVIOUR WITH REGARD TO WHETHER HE HAS TREATED THE CHILD BEFORE OR NOT

VARIABLE	MEAN RANK	SIGNIFICANCE
VOCALISATION:		
DENTIST: DENTAL TALK TO CHILD	NOT TB: 52.52 TB: 54.61	0.7520
DENTIST: NON DENTAL TALK TO CHILD	NOT TB: 49.92 TB: 55.66	0.3327
DENTIST: DENTAL TALK TO OTHERS	NOT TB: 56.42 TB: 53.01	0.6062
DENTIST: NON DENTAL TALK TO OTHERS	NOT TB: 51.97 TB: 54.83	0.5804
DENTIST: SILENCE	NOT TB: 47.78 TB: 56.66	0.1651
DIRECTION:		
DENTIST DIRECTS BY COMMAND	NOT TB: 53.90 TB: 54.04	0.9835
DENTIST DIRECTS BY EXPLAINING/ SHOWING	NOT TB: 64.00 TB: 49.92	0.0332*
DENTIST DIRECTS BY SETTING RULES	NOT TB: 55.00 TB: 53.59	0.5604
DENTIST DIRECTS BY SPECIFIC FEEDBACK	NOT TB: 47.15 TB: 56.80	0.0318*
DENTIST DIRECTS BY GENERAL FEEDBACK	NOT TB: 49.35 TB: 55.89	0.3100

NOT TB = NOT TREATED BEFORE

TB = TREATED BEFORE

TABLE 6.32 CONTD.

VARIABLE	MEAN RANK	SIGNIFICANCE
DENTIST DIRECTS BY FAULTING	NOT TB: 56.55 TB: 52.96	0.3818
DENTIST DIRECTS BY ASKING RHETORICAL QUESTIONS	NOT TB: 56.87 TB: 52.83	0.5373
DENTIST NOT DIRECTING	NOT TB: 43.74 TB: 58.18	0.0289*
EMPATHY:		
DENTIST EMPATHISES BY QUESTIONING FOR FEELINGS	NOT TB: 51.81 TB: 54.89	0.6318
DENTIST EMPATHISES BY REASSURING	NOT TB: 53.65 TB: 54.14	0.9357
DENTIST EMPATHISES BY IGNORING EXPRESSION OF PAIN ETC.	NOT TB: 54.00 TB: 54.00	1.000
DENTIST EMPATHISES BY DENYING EXPRESSION OF PAIN ETC.	NOT TB: 53.23 TB: 54.32	0.6522
DENTIST EMPATHISES BY BELITTLING SUBJECT	NOT TB: 54.71 TB: 53.71	0.5196
DENTIST EMPATHISES BY USE OF STOP SIGNAL	NOT TB: 53.00 TB: 54.41	0.3642
DENTIST NOT EMPATHISING	NOT TB: 55.02 TB: 53.59	0.8226

TABLE 6.32 CONTD.

VARIABLE	MEAN RANK	SIGNIFICANCE
PHYSICAL CONTACT:		
DENTIST TOUCHES CHILD DURING TREATMENT	NOT TB: 29.89 TB: 63.84	0.000*
DENTIST PATS OR STROKES CHILD	NOT TB: 66.27 TB: 48.29	0.0047*
DENTIST HOLDS CHILD: CHILD NOT INTERFERING WITH TREATMENT	NOT TB: 54.26 TB: 53.89	0.8477
DENTIST RESTRAINS CHILDS	NOT TB: 53.50 TB: 54.20	0.5230
DENTIST HELPS CHILD WITH CHAIR POSITIONING	NOT TB: 57.66 TB: 52.51	0.1834
DENTIST NOT IN CONTACT	NOT TB: 74.74 TB: 45.54	0.0000*

In addition to assessing changes in dentist behaviour it was thought necessary to look at how the measures of child anxiety correlated with particular dentist behaviours, thus giving a picture of which dentist behaviours are sensitive or precipitative to changes in anxiety levels of the children seen. From Table 6.33 it is evident that all the anxiety measures are correlated with the following dentist behaviours: the amount of time spent talking to the child and others (negatively); the level of general feedback given (except for the parents pre-treatment anxiety rating); the amount of persuasion used; how much time the dentist spends questioning for feelings, reassuring the child and empathising in general; the extent to which the dentist pats or strokes the child (except for the Venham Picture Scale).

In addition each section of the anxiety measures correlated with specific dentist behaviours. The childs anxiety, as per the Venham Picture Scale, correlated with the number of rhetorical questions asked and how often a stop mechanism was used.

The parents rating of anxiety pre-treatment correlated with the amount of demonstration/explanation given by the dentist, how much specific feedback, fault finding and time spent in contact by the dentist. The parents post-treatment anxiety rating correlated with how much the dentist talks, the number of rhetorical questions, how much the dentist denies the childs feelings and how much difficulty he had in maintaining the childs positioning. The parents cooperation rating

correlated with both the level of fault finding and playing down of childs feelings by the dentist.

The dentist ratings all correlated with how much he talked and how many rhetorical questions he asked. In addition the dentists rating of the childs treatment anxiety was connected with the use of stop mechanisms and level of difficulty in maintaining the childs positioning. The dentist cooperation rating also being associated with problems maintaining correct positioning.

Finally, the behavioural measures correlated with different behaviours. The Venham Anxiety Scale being associated with the number of rhetorical questions asked. The Melamed Child Behaviour Profile was connected with the number of commands given, the level of fault finding, underplaying feelings, not accepting the childs anxiety experience and difficulty in maintaining correct dental positioning.

Thus it is evident that dentist behaviour has a marked and varied effect on different anxiety measures.

TABLE 6.33(a) CORRELATIONS OF ANXIETY MEASURES AND DENTIST BEHAVIOUR

DENTIST BEHAVIOUR	CHILD SELF REPORT ANXIETY (VENHAM PICTURE SCALE)	BEHAVIOURAL MEASURES: VENHAM ANXIETY SCALE	MELAMED BEHAVIOUR PROFILE
VOCALISATION: DENTAL TO CHILD	.2110 (104) .015*	.3242 (107) .000*	.3684 (107) .000*
NON DENTAL TO CHILD	.0154 (104) .438	-.0884 (107) .183	-.0848 (107) .193
DENTAL TO OTHER THAN CHILD	-.2050 (104) .018*	-.3354 (107) .000*	-.2436 (107) .006*
NON DENTAL TO OTHER THAN CHILD	-.1602 (104) .052	-.0605 (107) .268	-.1173 (107) .114
DENTIST SILENCE	-.0954 (104) .168	-.0862 (107) .189	-.0941 (107) .168

N.B. All correlations in the results are Spearman correlations presented in the following order:

correlation

n

significance (P value)

TABLE 6.33(b) CORRELATIONS OF ANXIETY MEASURES AND DENTIST BEHAVIOUR

DENTIST BEHAVIOUR	PARENTS RATING OF CHILD: PRE-TREATMENT ANXIETY	PRE-TREATMENT ANXIETY	CHILDS COOPERATION
VOCALISATION: DENTAL TO CHILD	.2395 (107) .006 *	.4553 (100) .000 *	.4671 (100) .000 *
NON DENTAL TO CHILD	-.0778 (107) .213	.0598 (100) .277	.1104 (100) .137
DENTAL TO OTHER THAN CHILD	-.2245 (107) .010 *	-.3724 (100) .000 *	-.4474 (100) .000 *
NON DENTAL TO OTHER THAN CHILD	-.0681 (107) .243	-.1028 (100) .154	-.1484 (100) .070
DENTIST SILENCE	-.1176 (107) .114	.1787 (100) .038 *	-.0915 (100) .183

TABLE 6.33(c) CORRELATIONS OF ANXIETY MEASURES AND DENTIST BEHAVIOUR

DENTIST BEHAVIOUR	DENTISTS RATING OF CHILD: CHILDS TREATMENT ANXIETY	CHILDS GENERAL DENTAL ANXIETY	CHILDS COOPERATION
VOCALISATION: DENTAL TO CHILD	.4700 (107) .000*	.4781 (104) .000*	.4852 (107) .000*
NON DENTAL TO CHILD	.0618 (107) .264	-.0096 (104) .461	-.0601 (107) .269
DENTAL TO OTHER THAN CHILD	-.3444 (107) .010*	-.3566 (104) .000*	-.2876 (107) .001*
NON DENTAL TO OTHER THAN CHILD	-.0681 (107) .243	-.1028 (104) .154	-.1484 (107) .070
DENTIST SILENCE	-.1906 (107) .025*	.1722 (104) .040*	-.1800 (107) .032*

TABLE 6.33(d) CORRELATIONS OF ANXIETY MEASURES AND DENTIST BEHAVIOUR

DENTIST BEHAVIOUR	CHILD SELF REPORT ANXIETY (VENHAM PICTURE SCALE)	BEHAVIOURAL MEASURES: VENHAM ANXIETY SCALE	MELAMED BEHAVIOUR PROFILE
DIRECTION: COMMANDS	-.1541 (104) .059	.0458 (107) .320	.1916 (107) .024*
EXPLAINS/DEMONSTRATES	.0789 (104) .213	.0401 (107) .341	-.0382 (107) .348
SETS RULES	-.1201 (104) .112	-.1508 (107) .060	-.0321 (107) .371
GIVES SPECIFIC FEEDBACK	.0152 (104) .439	.0362 (107) .356	-.0277 (107) .389
GIVES GENERAL FEEDBACK	.3011 (104) .001*	.2462 (107) .005*	.2509 (107) .005*
FINDS FAULT	-.0272 (104) .392	-.0718 (107) .231	.3245 (107) .000*
PERSUADES	.2638 (104) .008*	.1608 (107) .049*	.3364 (107) .000*
ASKS RHETORICAL QUESTIONS	.2267 (104) .010*	.2526 (104) .004*	.0985 (104) .156*
NOT DIRECTING	-.1306 (104) .093	.1166 (107) .116	- .1314 (107) .089

TABLE 6.33(e) CORRELATIONS OF ANXIETY MEASURES AND DENTIST BEHAVIOUR

DENTIST BEHAVIOUR	PARENTS RATING OF CHILD PRE-TREATMENT ANXIETY	POST-TREATMENT ANXIETY	CHILDS COOPERATION
DIRECTION: COMMANDS	-.1509 (107) .060	-.0806 (100) .213	-.0030 (100) .488
EXPLAINS/DEMONSTRATES	.1784 (107) .033*	.1505 (100) .067	-.0097 (100) .462
SETS RULES	-.0605 (107) .268	-.1308 (100) .097	-.0708 (100) .242
GIVES SPECIFIC FEEDBACK	.1707 (107) .039	.0509 (100) .307	-.0816 (100) .210
GIVES GENERAL FEEDBACK	.1421 (107) .072	.3229 (100) .001*	.2864 (100) .002*
FINDS FAULT	-.2834 (107) .002*	.0865 (100) .196	.2994 (100) .001*
PERSUADES	.1701 (107) .040*	.2600 (100) .004*	.3445 (100) .000*
ASKS RHETORICAL QUESTIONS	.1194 (107) .110	.2058 (100) .020*	.1040 (100) .152
NOT DIRECTING	-.1508 (107) .060	-.2385 (100) .008*	-.1501 (100) .068

TABLE 6.33(f) CORRELATIONS OF ANXIETY MEASURES AND DENTIST BEHAVIOUR

DENTIST BEHAVIOUR	DENTIST RATINGS OF CHILD		
	CHILDS TREATMENT ANXIETY	CHILDS GENERAL DENTAL ANXIETY	CHILDS COOPERATION
DIRECTION: COMMANDS	-.0885 (107) .182	-.1106 (104) .132	.1099 (107) .130
EXPLAINS/DEMONSTRATES	.1029 (107) .146	.1046 (104) .145	.1364 (107) .081
SETS RULES	-.1038 (107) .144	-.1253 (104) .103	-.1231 (107) .103
GIVES SPECIFIC FEEDBACK	.0988 (107) .156	.1432 (104) .073	-.0528 (107) .295
GIVES GENERAL FEEDBACK	.3891 (107) .000 *	.3792 (104) .000 *	.3891 (107) .000 *
FINDS FAULT	.0490 (107) .308	.0417 (104) .337	.1742 (107) .036 *
PERSUADES	.3583 (107) .000 *	.3142 (104) .001 *	.4017 (107) .000 *
ASKS RHETORICAL QUESTIONS	.2896 (107) .001 *	.2481 (104) .006 *	.2621 (107) .003 *
NOT DIRECTING	-.2030 (107) .018 *	-.1752 (104) .038 *	-.3256 (107) .000 *

TABLE 6.33(g) CORRELATIONS OF ANXIETY MEASURES AND DENTIST BEHAVIOUR

DENTIST BEHAVIOUR	CHILD SELF REPORT ANXIETY (VENHAM PICTURE SCALE)	BEHAVIOURAL MEASURES: VENHAM ANXIETY SCALE	MELAMED BEHAVIOUR PROFILE
EMPATHY			
QUESTIONS FOR FEELINGS	.2378 (104) .003*	.2607 (107) .003*	.1751 (107) .036*
REASSURES	.2305 (104) .009*	.5111 (107) .000*	.4913 (107) .000*
IGNORES FEELINGS	no correlations possible		
DENIES FEELINGS	.1162 (104) .120	.1259 (107) .098	.2756 (107) .002
BELITTLES	-.1549 (104) .058	-.1404 (107) .075	.2403 (107) .006*
USES A STOP MECHANISM	.1704 (104) .042	-.0223 (107) .410	.0992 (107) .155
NOT EMPATHISING	-.3026 (104) .001*	-.3953 (107) .000*	-.4219 (107) .000*

TABLE 6.33(h) CORRELATIONS OF ANXIETY MEASURES AND DENTIST BEHAVIOUR

DENTIST BEHAVIOUR	PARENTS RATING OF CHILD PRE-TREATMENT ANXIETY	POST-TREATMENT ANXIETY	CHILDS COOPERATION
EMPATHY			
QUESTIONS FOR FEELINGS	.2711 (107) .002*	.3111 (100) .001*	.2385 (100) .008*
REASSURES	.3329 (107) .000	.5349 (100) .000	.4601 (100) .000
IGNORES FEELINGS		no correlation possible	
DENIES FEELINGS	-.1029 (100) .146	.1772 (100) .039*	.2154 (100) .016*
BELITTLES	-.1157 (107) .118	.1023 (100) .156	.2456 (100) .007*
USES A STOP MECHANISM	.0153 (107) .438	.0994 (100) .163	-.1180 (100) .121
NOT EMPATHISING	-.3263 (107) .000*	-.4934 (100) .000*	-.4291 (100) .000*

TABLE 6.33(i) CORRELATIONS OF ANXIETY MEASURES AND DENTIST BEHAVIOUR

DENTIST BEHAVIOUR	DENTIST RATINGS OF CHILD		
	CHILDS TREATMENT ANXIETY	CHILDS GENERAL DENTAL ANXIETY	CHILDS COOPERATION
EMPATHY			
QUESTIONS FOR FEELINGS	.3833 (107) .000*	.3794 (104) .000*	.2588 (107) .004*
REASSURES	.5522 (107) .000*	.4963 (104) .000*	.4951 (107) .000*
IGNORES FEELINGS	no correlation possible		
DENIES FEELINGS	.1165 (100) .116	.0744 (104) .227	.1571 (107) .053
BELITTLES	.0544 (107) .289	.0334 (104) .368	.0342 (107) .363
USES A STOP MECHANISM	.1622 (107) .048*	.1605 (104) .052	.1155 (107) .118
NOT EMPATHISING	-.5509 (107) .000*	-.5000 (104) .000*	-.4422 (107) .000*

TABLE 6.33(j) CORRELATIONS OF ANXIETY MEASURES AND DENTIST BEHAVIOUR

DENTIST BEHAVIOUR	CHILD SELF REPORT ANXIETY (VENHAM PICTURE SCALE)	BEHAVIOURAL MEASURES: VENHAM ANXIETY SCALE	MELAMED BEHAVIOUR PROFILE
PHYSICAL CONTACT	-.0448	-.0965	-.0046
TOUCHES DURING	(104)	(107)	(107)
TREATMENT	.326	.161	.481
	.1150	.1620	.2102
PATS OR STROKES	(104)	(107)	(107)
	.122	.048*	.015*
	.0112	.0737	.1894
HOLDS CHILD	(104)	(107)	(107)
	.455	.225	.025*
	-.0017	.0659	.0817
RESTRAINS CHILD	(104)	(107)	(107)
	.493	.250	.201
ASSISTS WITH	-.1590	.0305	.1145
POSITIONING	(104)	(107)	(107)
	.053	.377	.120
	-.0044	.0029	-.0898
NOT IN CONTACT	(104)	(107)	(107)
	.482	.488	.179

TABLE 6.33(k) CORRELATIONS OF ANXIETY MEASURES AND DENTIST BEHAVIOUR

DENTIST BEHAVIOUR	PARENTS RATINGS OF CHILD		
	PRE-TREATMENT ANXIETY	POST-TREATMENT ANXIETY	CHILDS COOPERATION
PHYSICAL CONTACT TOUCHES DURING TREATMENT	-.2031 (107) .018*	-.1417 (100) .080	-.1006 (100) .160
PATS OR STROKES	.1812 (107) .031*	.2798 (100) .002*	.3009 (100) .001*
HOLDS CHILD	-.0961 (107) .162	.1735 (100) .042*	.1092 (100) .140
RESTRAINS CHILD	-.0871 (107) .186	no correlation possible	
ASSISTS WITH POSITIONING	.0212 (107) .414	-.0158 (100) .438	-.0323 (100) .375
NOT IN CONTACT	.1719 (107) .038*	.0506 (100) .309	-.0114 (100) .455

TABLE 6.33(1) CORRELATIONS OF ANXIETY MEASURES AND DENTIST BEHAVIOUR

DENTIST BEHAVIOUR	DENTIST RATINGS OF CHILD		
	CHILDS TREATMENT ANXIETY	CHILDS GENERAL DENTAL ANXIETY	CHILDS COOPERATION
PHYSICAL CONTACT	-.0307	.0421	-.0732
TOUCHES DURING	(107)	(104)	(107)
TREATMENT	.377	.336	.227
	.3083	.2941	.3775
PATS OR STROKES	(107)	(104)	(107
	.001*	.001*	.000*
	.1726	.1544	.2096
HOLDS CHILD	(107)	(104)	(107)
	.038	.059	.015
	.0729	.0199	-.0016
RESTRAINS CHILD	(107)	(104)	(107)
	.228	.421	.493
ASSISTS WITH	.0427	.0039	.0373
POSITIONING	(107)	(104)	(107)
	.331	.484	.351
	-.0714	-.1575	-.0679
NOT IN CONTACT	(107)	(104)	(107)
	.232	.055	.244

6.7 THE EFFECT OF RELATIVE ANALGESIA:

One objective of this study was to measure the effects of RA. The dentist had used RA on 14 children in the experimental group, and of these 5 children had been video recorded having treatment with RA and without RA. The criterion used for giving RA was that it would only be used when, in the dentists opinion, it could be helpful to the child. The decision by the dentist reflected his philosophy in treating patients given in the Method section.

There are two major areas of contention with regard to RA, first, are there a group of children for whom RA is the most suitable treatment and secondly, how much of the effect of RA is due to the drug itself and how much to altered dentist behaviour in the situation.

Thus, this section will be divided into two parts, a consideration of the differences between those children given RA and those not given RA and an assessment of the changes in dentist behaviour between those given RA and those not given RA.

Tables 6.34 to 6.38 show the descriptive statistics for the three major factors of dental anxiety (medical/dental, individual and environmental). From these tables it appears that, once again, there are significant differences between experimental and control group subjects, but no differences between those who have had RA and those who have not. This is confirmed by the data in tables 6.39 and 6.40, where the Kruskal Wallis test shows variables to significantly distinguish between groups,

but the direction of effect noted by the Mann Whitney tests show no significant differences between those experimental group subjects who have had RA and those who have not.

TABLE 6.34 MEDICAL/DENTAL FACTOR

DENTAL EXPERIENCE COMPARED WITH RA

VARIABLES		NO RA EXP	HAD RA EXP
CHILDS REACTION TO 1ST VISIT		n=50	n=14
	PLEASANT	(11)	(2)
		22.0%	14.3%
	NEUTRAL	(31)	(6)
		62.0%	42.9%
	UNPLEASANT	(8)	(6)
		36.0%	42.9%
WHETHER HAD GA		n=50	n=14
	NO	(18)	(9)
		36.0%	64.3%
	YES	(32)	(5)
		64.0%	35.7%
REACTION TO SUBSEQUENT VISITS		n=50	n=14
	PLEASANT	(2)	(0)
		4.0%	
	NEUTRAL	(25)	(4)
		50.0%	28.6%
	UNPLEASANT	(23)	(10)
		46.0%	71.4%

TABLE 6.34 CONTD.

VARIABLES		NO RA EXP	HAD RA EXP
REASONS FOR DENTAL FEAR		n=49	n=14
	NO REASON	(10)	(6)
		20.4%	42.9%
	FEAR NEEDLES	(4)	(2)
		8.2%	14.3%
	EXTRACTIONS	(3)	(0)
		6.1%	
	GAS	(7)	(2)
		14.3%	14.3%
	DENT. MANNER	(12)	(3)
		24.5%	21.4%
	ANY TREATMENT	(10)	(0)
		20.4%	
		(3)	(1)
		6.1%	7.1%

TABLE 6.35 MEDICAL/DENTAL FACTOR

MEDICAL EXPERIENCE COMPARED WITH RA

VARIABLES		NO RA EXP	HAD RA EXP
REACTION TO PAST MEDICAL EXPERIENCES		n=50	n=14
	GOOD	(16) 32.0%	(3) 21.4%
	MOD. WELL	(19) 38.0%	(6) 42.9%
	POORLY	(12) 24.0%	(2) 14.3%
	V. POORLY	(3) 60%	(3) 21.0%
ANTICIPATION OF MEDICAL CONTACTS		n=50	n=14
	NO FEAR	(31) 62.0%	(9) 64.3%
	LOW FEAR	(17) 34.0%	(2) 14.3%
	HIGH FEAR	(2) 4.0%	(3) 21.4%
NUMBER OF INPATIENT HOSPITALIZATIONS		n=50	n=14
	0	(29) 58.0%	(8) 57.1%
	1	(14) 28.0%	(6) 42.9%
	2	(5) 10.0%	
	3	(2) 4.0%	

TABLE 6.36 INDIVIDUAL FACTOR COMPARED WITH RA

VARIABLES		NO RA EXP	HAD RA EXP
TEMPERAMENT SCALES		n=50	n=14
ACTIVITY	0-20	(1)	(2)
		2.0%	14.3%
	21-40	(5)	(2)
		10.0%	14.3%
	41-60	(11)	(5)
		22.0%	35.7%
	61+	(3)	(5)
		66.0%	35.7%
APPROACH/WITHDRAWAL		n=50	n=14
	0-20	(6)	(1)
		12.0%	7.1%
	21-40	(11)	(4)
		22.0%	28.7%
	41-60	(21)	(7)
		42.0%	50.0%
	61+	(12)	(2)
		24.0%	14.3%
ADAPTABILITY		n=48	n=14
	0-20	(4)	(1)
		8.3%	7.1%
	21-40	(6)	(3)
		12.5%	21.4%
	41-60	(15)	(4)
		31.3%	28.6%
	61+	(23)	(6)
		47.9%	42.9%

TABLE 6.36 CONTD.

VARIABLES		NO RA EXP	HAD RA EXP
QUALITY OF MOOD		n=50	n=14
	0-20	(2)	(2)
		4.0%	14.3%
	21-40	(8)	(1)
		16.0%	7.1%
	41-60	(20)	(6)
		40.0%	42.9%
	61+	(20)%	(5)%
		40.0%	35.7%
ATTENTION SPAN/PERSISTENCE		n=50	n=14
	0-20	(4)	(2)
		8.0%	14.3%
	21-40	(17)	(2)
		34.0%	14.3%
	41-60	(9)	(6)
		18.0%	42.9%
	61+	(20)	(4)
		40.0%	14.3%
REACTION TO PAIN: PAIN TOLERANCE		n=50	n-14
	0-20	(8)	(1)
		16.0%	7.1%
	21-40	(6)	(2)
		12.0%	14.3%
	41-60	(13)	(1)
		26.0%	7.1%
	61+	(23)	(10)
		46.0%	71.4%

TABLE 6.36 CONTD.

VARIABLES		NO RA EXP	HAD RA EXP
PAIN EXPECTATION		n=50	n=14
	0-20	(22)	(4)
		44.0%	28.6%
	21-40	(13)	(2)
		26.0%	14.3%
	41-60	(5)	(2)
		10.0%	14.3%
	61+	(10)	(5)
		20.0%	35.7%
GENERAL SUSCEPTIBILITY TO ANXIETY:		n=50	n=14
GENERAL LEVEL OF WORRY	0-20	(28)	(5)
		56.0%	35.7%
	21-40	(8)	(3)
		16.0%	21.4%
	41-60	(7)	
		14.0%	
	61+	(7)	(6)
		14.0%	42.9%
NUMBER OF SPECIFIC FEARS		n=50	n=14
	0	(11)	(4)
		22.0%	28.6%
	1	(17)	(6)
		34.0%	42.9%
	2	(16)	(4)
		32.0%	28.6%
	3+	(6)	
		12.0%	

TABLE 6.37 ENVIRONMENTAL FACTOR

PEER INFLUENCE COMPARED WITH RA

VARIABLES		NO RA EXP	HAD RA EXP
NUMBER OF BROTHERS AND SISTERS		n=50	n=14
	0	(1)	(2)
		2.0%	14.3%
	1	(30)	(8)
		60.0%	57.1%
	2	(11)	(3)
		22.0%	21.4%
	3+	(8)	(1)
		16.0%	7.1%
REACTION TO SCHOOL		n=50	n=14
	LIKES	(13)	(3)
		26.0%	21.4%
	NEUTRAL	(34)	(7)
		68.0%	50.0%
	DISLIKES	(3)	(4)
		6.0%	28.6%
REACTION TO STRANGE CHILDREN		n=50	n=14
	LIKES	(20)	(6)
		40.0%	42.9%
	NEUTRAL	(21)	(6)
		42.0%	42.9%
	DISLIKES	(9)	(2)
		18.0%	14.3%

TABLE 6.38 ENVIRONMENTAL FACTOR:

FAMILY INFLUENCES COMPARED WITH RA

VARIABLES		NO RA EXP	HAD RA EXP
PARENTS ANXIETY SCORE (DAS)		n=47	n=13
	5-10	(28)	(10)
		59.6%	76.9%
	11-15	(10)	(2)
		21.3%	15.4%
	16-20	(9)	(1)
		19.1%	7.7%
MOTHERS DENTAL ATTENDANCE		n=50	n=13
	REGULAR	(32)	(10)
		64.0%	76.9%
	SOMETIMES	(10)	(2)
		20.0%	15.4%
	NEVER	(8)	(1)
		16.0%	7.7%
FATHERS DENTAL ATTENDANCE		n=47	n=12
	REGULAR	(17)	(9)
		36.2%	75.0%
	SOMETIMES	(13)	(2)
		27.7%	16.7%
	NEVER	(17)	(1)
		36.2%	7.7%

TABLE 6.39

KRUSKAL WALLIS TEST TO ASSESS SIGNIFICANCE OF DIFFERENCES ACROSS GROUPS CONTROLLING FOR WHETHER CHILD HAS HAD RA

VARIABLES	RA/GROUP
FATHERS DENTAL HABITS	0.0645
ACTIVITY	0.0952
PAIN TOLERANCE	0.0013*
CHILDS GENERAL LEVEL OF WORRY	0.1189
REACTION TO 1st DENTAL VISIT	0.0349*
REACTION TO SUBSEQUENT DENTAL VISITS	0.000*
WHETHER CHILD HAD GA	0.000*
CHILDS REACTION TO SCHOOL	0.0781
PARENTS DENTAL ANXIETY SCORE	0.1805
MOTHERS USE OF DENTISTRY	0.4751
ATTENTION SPAN	0.0093*
PAIN EXPECTATION	0.0000*
ANTICIPATION OF MEDICAL CONTACT	0.0253*
NUMBER OF MEDICAL HOSPITALIZATIONS	0.8411
REACTION TO STRANGE CHILDREN	0.3840

TABLE 6.39 CONTD.

VARIABLES	RA/GROUP
ADAPTABILITY	0.1389
QUALITY OF MOOD	0.2563
REACTION TO PAST MEDICAL PROCEDURES	0.00143*
APPROACH WITHDRAWAL	0.8396
NUMBER OF SPECIFIC FEARS	0.0201*
NUMBER OF BROTHERS AND SISTERS	0.4728
POSITION OF TARGET CHILD	0.9998
PROBLEMS CHANGING SCHOOLS	0.1539
CHILDS REGULAR PLAYMATES	0.3727
RELATIVE AGE OF PLAYMATES	0.4898
NUMBER OF RECENT LIFE EVENTS	0.0437*
AGE AT 1st DENTAL VISIT	0.0930
WHAT DONE AT 1st VISIT	0.3972
AMOUNT OF PAIN IN MEDICAL CONTACTS	0.5124
UNEXPECTED DENTAL TREATMENT	0.9221
CONTACT WITH OTHERS WITH BAD DENTAL EXPERIENCE	0.9991
REACTION TO DENTAL CHAIR	0.0108*

TABLE 6.40 MANN WHITNEY TESTS OF SIGNIFICANT EFFECTS WITHIN KRUSKAL WALLIS TEST ON WHETHER A CHILD HAS HAD RA BY GROUP

PAIN TOLERANCE		2 NON RA/EXPERIMENTAL n=49	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1				
NON RA/CONTROL	MEAN	1 38.25	1	1 24.40
	RANK	2 52.64	3	4 40.79
n=42	SIG.	0.0092*		0.0011*
2				
NON RA/EXPERIMENTAL	MEAN		2	2 29.97
	RANK		3	4 39.11
n=49	SIG			0.0984
3				
RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.40 CONTD.

REACTION OF CHILD TO 1ST VISIT		2 NON RA/EXPERIMENTAL n=36	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1				
NON RA/CONTROL	MEAN	1 42.86	1	1 25.74
	RANK	2 49.56	3	4 36.79
n=42	SIG.	0.1701		0.0152*
2				
NON RA/EXPERIMENTAL	MEAN		2	2 30.58
	RANK		3	4 39.36
n=49	SIG			0.0791
3				
RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.40 CONTD.

REACTION TO SUBSEQUENT VISITS		2 NON RA/EXPERIMENTAL n=50	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1 NON RA/CONTROL	MEAN	1 33.29	1	1 23.26
	RANK	2 57.60	3	4 44.21
n=42	SIG.	0.1701		0.0152*
2 NON RA/EXPERIMENTAL	MEAN		2	2 30.64
	RANK		3	4 39.14
n=50	SIG			0.0852
3 RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.40 CONTD.

WHETHER CHILD HAD HAD A GA		2 NON RA/EXPERIMENTAL n=50	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1 NON RA/CONTROL	MEAN	1 33.48	1	1 26.83
	RANK	2 57.44	3	4 33.50
n=42	SIG.	0.000*		0.0459*
2 NON RA/EXPERIMENTAL	MEAN		2	2 34.48
	RANK		3	4 25.43
n=50	SIG			0.0602
3 RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.40 CONTD.

PAIN EXPECTATION		2 NON RA/EXPERIMENTAL n=50	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1 NON RA/CONTROL	MEAN	1 32.57	1	1 23.11
	RANK	2 58.20	3	4 48.60
n=42	SIG.	0.000*		0.000*
2 NON RA/EXPERIMENTAL	MEAN		2	2 30.74
	RANK		3	4 38.79
n=50	SIG			0.1511
3 RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.40 CONTD.

ANTICIPATION OF MEDICAL CONTACTS		2 NON RA/EXPERIMENTAL n=50	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1 NON RA/CONTROL	MEAN	1 40.36	1	1 26.79
	RANK	2 51.66	3	4 33.64
n=42	SIG.	0.0090*		0.0488*
2 NON RA/EXPERIMENTAL	MEAN		2	2 32.27
	RANK		3	4 33.32
n=50	SIG			0.8274
3 RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.40 CONTD.

REACTION TO PAST MEDICAL CONTACTS		2 NON RA/EXPERIMENTAL n=50	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1 NON RA/CONTROL	MEAN	1 39.87	1	1 25.67
	RANK	2 52.07	3	4 37.00
n=42	SIG.	0.0180*		0.0123*
2 NON RA/EXPERIMENTAL	MEAN		2	2 31.41
	RANK		3	4 36.39
n=50	SIG			0.3517
3 RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.40 CONTD.

NUMBER OF SPECIFIC FEARS	2 NON RA/EXPERIMENTAL n=50	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1			
NON RA/CONTROL	MEAN 1 38.58	1	1 27.29
	RANK 2 53.15	3	4 32.14
n=42	SIG. 0.0063		0.3018
2			
NON RA/EXPERIMENTAL	MEAN	2	2 33.84
	RANK	3	4 27.71
n=50	SIG		0.2540
3			
RA/CONTROL	MEAN		3
	RANK		4
n=0	SIG		

TABLE 6.40 CONTD.

NUMBER OF RECENT LIFE EVENTS		2 NON RA/EXPERIMENTAL n=50	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1 NON RA/CONTROL	MEAN	1 40.73	1	1 26.76
	RANK	2 51.35	3	4 33.71
n=42	SIG.	0.0175*		0.0609
2 NON RA/EXPERIMENTAL	MEAN		2	2 33.45
	RANK		3	4 32.68
n=50	SIG			0.9631
3 RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.40 CONTD.

REACTION TO DENTAL CHAIR	2 NON RA/EXPERIMENTAL n=50	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1			
NON RA/CONTROL	MEAN 1 38.79	1	1 28.00
	RANK 2 52.98	3	4 30.00
n=42	SIG. 0.0038*		0.6197
2			
NON RA/EXPERIMENTAL	MEAN	2	2 34.22
	RANK	3	4 26.36
n=50	SIG		0.1209
3			
RA/CONTROL	MEAN		3
	RANK		4
n=0	SIG		

Table 6.41 indicates that there were no children in the study who had received RA when not treated before. As the effect of visiting a new dentist is anxiety provoking in itself, it was necessary to remove those not treated before from the analysis of the anxiety and cooperation and dentist behaviour measures. Thus, allowing a more reasonable comparison of the effect of RA upon a childs anxiety level at subsequent treatment.

The data in tables 6.42 - 6.45 indicate that there are some changes in anxiety level, but again those primarily occur between experimental and control group subjects and not between those having RA and those not having RA. Tables 6.46 and 6.47 confirm this view with a number of variables proving signifiant in the Kruskal Wallis test, but only parents rating of the childs anxiety pre-treatment and the level of dentist direction (with dentist directing RA subjects less than non-RA subjects) showing a significant difference between experimental RA and non-RA subjects.

Finally, in this section, there is a comparison of child behaviour when having RA and when not having RA. This is taken from the five videos of children taken when undergoing treatment with and without RA. These data show (Table 6.48) that there was no difference in behaviour, as per the video recordings, whether the child is receiving RA or not.

As an addendum to this section it should be noted that the number of subjects involved, 14 who had had RA and 5 videoed when having RA and when not having RA, is too small to make any but the most cautious statements about the effect of RA.

TABLE 6.41 WHETHER TREATED BEFORE BY RA

VARIABLES		NO RA EXP	HAD RA EXP
TREATED BEFORE		n=50	n=14
	NO	(14)	(0)
		28.0	0
	YES	(36)	(14)
		72.0	100.0

TABLE 6.42 DESCRIPTIVE STATISTICS OF CHILD RATING COMPARED WITH WHETHER THEY HAVE HAD RA, WITH THOSE NOT TREATED BEFORE REMOVED

VARIABLES		NOT HAD RA EXP	HAD RA EXP	CONTROL
CHILD MANIFEST ANXIETY SCALE		n=35	n=14	n=25
	0 - 10	(10) 28.6%	(3) 21.4%	(4) 16.0%
	11 - 20	(16) 45.7%	(6) 42.9%	(14) 56.0%
	21 - 30	(8) 22.9%	(4) 28.6%	(6) 24.0%
	31+	(1) 2.9%	(1) 7.1%	(1) 4.0%
VENHAM PICTURE SCALE		n=35	n=12	n=25
	0 - 2	(23) 65.7%	(8) 66.7%	(25) 100%
	3 - 5	(8) 22.9%	(3) 25.0%	
	6 - 8	(4) 11.4%	(1) 8.3%	

TABLE 6.43 DESCRIPTIVE STATISTICS OF VIDEO DATA COMPARED WITH WHETHER CHILD HAD HAD RA WITH THOSE NOT TREATED BEFORE REMOVED

VARIABLES		NOT HAD RA EXP	HAD RA EXP	CONTROL
VENHAM ANXIETY SCALE		n=36	n=14	n=25
	0	(14)	(8)	(15)
		38.9%	57.1%	60.0%
	1	(17)	(6)	(10)
		47.2%	42.9%	40.0%
	2	(4)		
		11.1		
	3+	(1)		
		2.8%		
MELAMED CHILD BEHAVIOUR PROFILE		n=36	n=14	n=25
	0 - 19	(24)	(10)	(18)
		66.7%	71.4%	72.0%
	2 - 3.9	(8)	(4)	(7)
		22.2%	28.6%	28.0%
	4 - 6.9	(4)		
		11.1%		
WEINSTEIN DENTIST BEHAVIOUR		n=36	n=14	n=25
PROFILE:	0 - 20	(14)	(4)	(6)
i) % OF TIME SPENT		38.9%	28.6%	24.0%
VOCALISING	21 - 40	(13)	(6)	(13)
		36.1%	42.9%	52.0%
	41 - 60	(8)	(3)	(5)
		22.2%	21.4%	20.0%
	61+	(1)	(1)	(1)
		2.8%	7.1%	4.0%

TABLE 6.43 CONTD.

VARIABLES		NOT HAD RA EXP	HAD RA EXP	CONTROL
ii) % OF TIME NOT DIRECTING		n=36	n=14	n=25
	0 - 20	(12)	(2)	(4)
		33.3%	14.3%	16.0%
	21 - 40	(12)	(2)	(8)
		33.3%	14.3%	32.0%
	41 - 60	(12)	(5)	(9)
		33.3%	35.7%	36.0%
	61+		(5)	(4)
			35.7%	16.0%
iii) % TIME NOT EMPATHISING		n=36	n=14	n=25
	50 - 70	(5)		
		13.9%		
	71 - 90	(15)	(6)	(8)
		41.7%	42.9%	32.0%
	91+	(16)	(8)	(17)
		44.4%	57.1%	68.0%
iv) % TIME NOT IN PHYSICAL CONTACT		n=36	n=14	n=25
	0 - 20	(3)	(1)	(3)
		8.3%	7.1%	12.0%
	21 - 40	(26)	(6)	(7)
		72.2%	42.9%	28.0%
	41 - 60	(90)	(4)	(11)
		25.0%	28.6%	44.0%
	61+	(1)	(3)	(4)
		2.8%	21.4%	16.0%

TABLE 6.44 DESCRIPTIVE STATISTICS OF ANXIETY AND COOPERATION MEASURES DENTIST RATINGS COMPARED WITH WHETHER CHILD HAS HAD RA WITH THOSE NON TREATED BEFORE REMOVED

VARIABLES		NOT HAD RA EXP	HAD RA EXP	CONTROL
DENTIST RATING CHILDS TREATMENT ANXIETY		n=36	n=14	n=25
	0 - 20	(3) 8.3%	(1) 7.1%	(23) 92.0%
	21 - 40	(7) 19.4%	(2) 14.3%	(1) 4.0%
	41 - 60	(2) 5.6%	(3) 21.4%	
	61+	(24) 66.7%	(8) 57.1%	(1) 4.0%
DENTIST RATING CHILDS COOPERATION		n=36	n=14	n=25
	0 - 20	(22) 61.1%	(8) 57.1%	(24) 96.0%
	21 - 40	(4) 11.1%	(3) 21.4%	
	41 - 60	(2) 5.6%	(1) 7.1%	(1) 4.0%
	61+	(8) 22.2%	(2) 14.3%	
DENTIST RATING CHILDS GENERAL DENTAL ANXIETY		n=33	n=14	n=25
	0 - 20			(23) 92.0%
	21 - 40	(1) 3.0%	(1) 7.1%	(1) 4.0%
	41 - 60	(1) 3.0%		(1) 4.0%
	61+	(31) 93.9%	(13) 92.9%	

TABLE 6.45 ANXIETY AND COOPERATION MEASURES: PARENTAL RATING COMPARED WITH WHETHER CHILD HAS HAD RA, WITH THOSE NOT TREATED BEFORE REMOVED

VARIABLES		NOT HAD RA EXP	HAD RA EXP	CONTROL
PARENT RATING CHILDS ANXIETY		n=36	n=14	n=25
PRE-TREATMENT	0 - 20	(14)	(3)	(20)
		38.9 %	21.4%	80.0%
	21 - 40	(13)	(4)	(4)
		36.1%	28.6%	16.0%
	41 - 60	(3)	(5)	(1)
		8.3 %	35.7 %	4.0 %
	61+	(6)	(2)	
		16.7 %	14.3 %	
PARENT RATING CHILDS ANXIETY		n=33	n=10	n=25
POST TREATMENT	0 - 20	(12)	(2)	(21)
		36.4 %	20.0 %	84.0 %
	21 - 40	(8)	(6)	(2)
		24.2 %	60.0 %	8.0 %
	41 - 60	(3)	(1)	(2)
		9.1 %	10.0 %	8.0 %
	61+	(10)	(1)	
		30.3 %	10.0 %	
PARENT RATING CHILDS COOPERATION		n=33	n=10	n=25
POST TREATMENT	0 - 20	(25)	(8)	(25)
		75.8 %	80.0 %	100 %
	21 - 40	(3)	(1)	
		9.1 %	10.0 %	
	41 - 60	(3)		
		9.1 %		
	61+	(2)	(1)	
		6.1 %	10.0 %	

TABLE 6.46

KRUSKAL WALLIS TEST TO ASSESS SIGNIFICANCE OF DIFFERENCES ACROSS GROUPS CONTROLLING FOR RA AND WITH THOSE NOT TREATED BEFORE REMOVED

VARIABLES	RA/TREATED BEFORE
WEINSTEIN DENTIST BEHAVIOUR PROFILE:	
i) DENTIST NON-DIRECTION	0.0121*
ii) DENTIST NON-EMPATHY	0.1266
iii) DENTIST NON-CONTACT	0.0370*
iv) DENTIST SILENCE	0.5139
PARENT CHILDS PRE-TREATMENT ANXIETY	0.0000*
PARENT RATING CHILDS POST-TREATMENT ANXIETY	0.0014*
PARENT CHILDS COOPERATION	0.3098
VENHAM ANXIETY SCALE	0.0973
MELAMED CHILD BEHAVIOUR PROFILE	0.7547
VENHAM PICTURE SCALE	0.0715
DENTIST RATING CHILDS TREATMENT ANXIETY	0.000*
DENTIST CHILDS GENERAL DENTAL ANXIETY	0.000*
DENTIST CHILDS COOPERATION	0.0001*

TABLE 6.47 MANN WHITNEY TESTS OF SIGNIFICANT EFFECTS OF KRUSKAL WALLIS ON WHETHER CHILD HAS HAD RA FOR THOSE TREATED BEFORE BY GROUP

DENTIST NON DIRECTION		2 NON RA/EXPERIMENTAL n=36	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1 NON-RA/ CONTROL	MEAN	1 36.84	1	1 18.56
	RANK	2 26.94	3	4 22.57
n=25	SIG	0.0321*		0.2917*
2 NON RA/ EXPERIMENTAL	MEAN		2	2 22.17
	RANK		3	4 34.07
n=36	SIG			0.0095*
3 RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.47 CONTD.

DENTIST NOT IN CONTACT		2 NON RA/EXPERIMENTAL n=36	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1 NON-RA/ CONTROL	MEAN	1 37.14	1	1 20.04
	RANK	2 26.74	3	4 19.93
n=25	SIG	0.0243*		0.9766
2 NON RA/ EXPERIMENTAL	MEAN		2	2 23.04
	RANK		3	4 31.82
n=36	SIG			0.0556
3 RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.47 CONTD.

PARENT RATING CHILDS ANXIETY PRE-TREATMENT		2 NON RA/EXPERIMENTAL n=36	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1 NON-RA/ CONTROL	MEAN	1 20.76	1	1 14.16
	RANK	2 38.11	3	4 30.43
n=25	SIG	0.0001*		0.000*
2 NON RA/ EXPERIMENTAL	MEAN		2	2 22.96
	RANK		3	4 32.04
n=36	SIG			0.0472*
3 RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.47 CONTD.

PARENT RATING CHILDS ANXIETY POST TREATMENT		2 NON RA/EXPERIMENTAL n=36	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1				
NON-RA/	MEAN	1 21.44	1	1 14.82
CONTROL	RANK	2 35.61	3	4 25.95
n=25	SIG	0.0013*		0.0027*
2				
NON RA/	MEAN		2	2 22.09
EXPERIMENTAL	RANK		3	4 21.70
n=36	SIG			0.9308
3				
RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.47 CONTD.

DENTIST CHILDS TREATMENT ANXIETY		2 NON RA/EXPERIMENTAL n=36	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1 NON-RA/ CONTROL n=25	MEAN	1 14.30	1	1 13.58
	RANK	2 42.60	3	4 31.46
	SIG	0.000*		0.000*
2 NON RA/ EXPERIMENTAL n=36	MEAN		2	2 26.64
	RANK		3	4 22.57
	SIG			0.3720
3 RA/CONTROL n=0	MEAN			3
	RANK			4
	SIG			

TABLE 6.47 CONTD.

DENTIST CHILDS GENERAL DENTAL ANXIETY RATING		2 NON RA/EXPERIMENTAL n=36	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1 NON-RA/ CONTROL	MEAN	1 13.06	1	1 13.06
	RANK	2 41.95	3	4 32.39
n=25	SIG	0.000*		0.000*
2 NON RA/ EXPERIMENTAL	MEAN		2	2 25.50
	RANK		3	4 20.46
n=36	SIG			0.2362
3 RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.47 CONTD.

DENTIST CHILDS COOPERATION		2 NON RA/EXPERIMENTAL n=36	3 RA/CONTROL n=0	4 RA/EXPERIMENTAL n=14
1				
NON-RA/	MEAN	1 20.48	1	1 15.66
CONTROL	RANK	2 38.31	3	4 27.75
n=25	SIG	0.000*		0.0004*
2				
NON RA/	MEAN		2	2 25.43
EXPERIMENTAL	RANK		3	4 25.68
n=36	SIG			0.9561
3				
RA/CONTROL	MEAN			3
	RANK			4
n=0	SIG			

TABLE 6.48 MANN WHITNEY TESTS OF SIGNIFICANT DIFFERENCES IN CHILD BEHAVIOUR DEPENDANT ON WHETHER THEY ARE GIVEN RA OR NOT

VARIABLE	MEAN RANK		SIGNIFICANCE
VENHAM VIDEO ANXIETY SCALE	WITH RA:	6.00	
	WITHOUT RA:	5.00	0.5721
MELAMED CHILD BEHAVIOUR PROFILE	WITH RA:	5.10	
	WITHOUT RA:	5.90	0.6742

The dentist behaviour has been analysed in two ways. Using the Weinstein Dentist Behaviour Profile it was possible to assess changes in dentist behaviour for those children who had had RA in the past, compared with those who had not and for children when having RA and when not having RA.

The results in Table 6.49 show that the dentist alters his behaviour when treating children who have had RA in the past by talking less to others in the surgery, giving more specific but less general feedback and having to hold children in position during treatment more often.

Table 6.50 indicates that when using RA on a child the dentist is more likely to talk less to others in the surgery, give more general feedback and use a stop mechanism more often (this dentist used a system of counting to 5 when drilling, so that drilling would not go on for long and gave the child an opportunity to have some control over the treatment).

TABLE 6.49 MANN WHITNEY TESTS FOR SIGNIFICANT DIFFERENCES IN DENTIST BEHAVIOUR WITH REGARD TO WHETHER THE CHILD HAS HAD RA OR NOT

VARIABLE	MEAN RANK		SIGNIFICANCE
VOCALISATION:			
DENTIST: DENTAL TALK TO CHILD	NO RA:	53.33	
	RA:	54.64	0.8813
DENTIST: NON DENTAL TALK TO CHILD	NO RA:	52.46	
	RA:	60.36	0.3191
DENTIST: DENTAL TALK TO OTHERS	NO RA:	56.23	
	RA:	35.57	0.0191*
DENTIST: NON DENTAL TALK TO OTHERS	NO RA:	52.46	
	RA:	60.32	0.2564
DENTIST: SILENCE	NO RA:	52.39	
	RA:	60.82	0.3385
DIRECTION:			
DENTIST DIRECTS BY COMMAND	NO RA:	55.32	
	RA:	41.57	0.1186
DENTIST DIRECTS BY EXPLAINING/SHOWING	NO RA:	55.86	
	RA:	37.96	0.0423
DENTIST DIRECTS BY SETTING RULES	NO RA:	53.88	
	RA:	51.00	0.3739
DENTIST DIRECTS BY SPECIFIC FEEDBACK	NO RA:	51.46	
	RA:	66.89	0.0104*
DENTIST DIRECTS BY GENERAL FEEDBACK	NO RA:	55.99	
	RA:	37.11	0.0278*

TABLE 6.49 CONTD.

VARIABLE	MEAN RANK		SIGNIFICANCE
DENTIST DIRECTS BY FAULTING	NO RA:	53.57	
	RA:	53.07	0.9027
DENTIST DIRECTS BY PERSUASION	NO RA:	54.01	
	RA:	50.14	0.4692
DENTIST DIRECTS BY ASKING RHETORICAL QUESTIONS	NO RA:	54.86	
	RA:	44.54	0.2371
DENTIST NOT DIRECTING	NO RA:	50.72	
	RA:	71.75	0.0171
EMPATHY:			
DENTIST EMPATHISES BY QUESTIONING FOR FEELINGS	NO RA:	52.06	
	RA:	62.96	0.2051
DENTIST EMPATHISES BY REASSURING	NO RA:	55.49	
	RA:	40.39	0.0670
DENTIST EMPATHISES BY IGNORING EXPRESSION OF PAIN ETC.	NO RA:	53.50	
	RA:	53.50	1.000
DENTIST EMPATHISES BY DENYING EXPRESSION OF PAIN ETC.	NO RA:	53.88	
	RA:	51.00	0.3740
DENTIST EMPATHISES BY BELITTLING SUBJECT	NO RA:	53.65	
	RA:	52.50	0.5794
DENTIST EMPATHISES BY USE OF STOP SIGNAL	NO RA:	53.08	
	RA:	56.25	0.1274
DENTIST NOT EMPATHISING	NO RA:	53.44	
	RA:	53.89	0.9585

TABLE 6.49 CONTD.

VARIABLE	MEAN RANK		SIGNIFICANCE
PHYSICAL CONTACT:			
DENTIST TOUCHES CHILD DURING TREATMENT	NO RA:	52.84	
	RA:	57.82	0.5722
DENTIST PATS OR STROKES CHILD	NO RA:	55.15	
	RA:	42.68	0.1256
DENTIST HOLDS CHILD: CHILD NOT INTERFERING WITH TREATMENT	NO RA:	53.73	
	RA:	52.00	0.4952
DENTIST RESTRAINS CHILD	NO RA:	53.00	
	RA:	56.79	0.0104*
DENTIST HELPS CHILD WITH CHAIR POSITIONING	NO RA:	53.52	
	RA:	53.36	0.9747
DENTIST NOT IN CONTACT	NO RA:	53.43	
	RA:	53.93	0.9553

TABLE 6.50 MANN WHITNEY TESTS OF SIGNIFICANT DIFFERENCES IN BEHAVIOUR BY DENTIST WHEN TREATING CHILDREN WITH OR WITHOUT RA

VARIABLE	MEAN RANK	SIGNIFICANCE
VOCALISATIONS:		
DENTAL TO CHILD	WITH RA: 5.70	
	WITHOUT RA: 5.30	0.8335
NON DENTAL TO CHILD	WITH RA: 7.00	
	WITHOUT RA: 4.00	0.1127
DENTAL TO OTHERS	WITH RA: 3.00	
	WITHOUT RA: 8.00	0.0088*
NON DENTAL TO OTHERS	WITH RA: 5.80	
	WITHOUT RA: 5.20	0.6985
DENTIST SILENCE	WITH RA: 5.90	
	WITHOUT RA: 5.10	0.6792
DIRECTION:		
DIRECTION BY COMMAND	WITH RA: 4.70	
	WITHOUT RA: 6.30	0.4005
DIRECTION BY EXPLANATION/ DEMONSTRATION	WITH RA: 3.80	
	WITHOUT RA: 7.20	0.0749
DIRECTION BY SPECIFIC FEEDBACK	WITH RA: 6.50	
	WITHOUT RA: 4.50	0.1336
DIRECTION BY GENERAL FEEDBACK	WITH RA: 8.00	
	WITHOUT RA: 3.00	0.0082*
DIRECTION BY PERSUASION	WITH RA: 6.50	
	WITHOUT RA: 4.50	0.1360

TABLE 6.50 CONTD.

VARIABLE	MEAN RANK	SIGNIFICANCE
DIRECTION BY RHETORICAL QUESTIONS	WITH RA: 6.40 WITHOUT RA: 4.60	0.3457
NON-DIRECTION	WITH RA: 6.10 WITHOUT RA: 4.90	0.5296
EMPATHY:		
EMPATHY BY QUESTIONING FOR FEELINGS	WITH RA: 7.00 WITHOUT RA: 4.00	0.1161
EMPATHY BY REASSURING	WITH RA: 7.30 WITHOUT RA: 3.70	0.0586
EMPATHY BY USING STOP MECHANISM	WITH RA: 7.50 WITHOUT RA: 3.50	0.0182*
NON EMPATHY	WITH RA: 3.80 WITHOUT RA: 7.20	0.0758
PHYSICAL CONTACT:		
CONTACT DURING TREATMENT	WITH RA: 5.00 WITHOUT RA: 6.00	0.6015
CONTACT BY PATTING OR STROKING	WITH RA: 6.40 WITHOUT RA: 4.60	0.3413
ASSISTS CHILD IN CHAIR POSITION	WITH RA: 6.70 WITHOUT RA: 4.30	0.1736
NON CONTACT	WITH RA: 5.80 WITHOUT RA: 5.20	0.7511

6.8 ISSUES ARISING FROM THE REVIEW OF THE LITERATURE:

In this section there is a consideration of the major issues raised within the literature review, which have not so far been considered directly in the results section. The results are presented in the usual format of following the three major factors of dental anxiety.

The data relating to the medical/dental factor are contained in Tables 6.51 to 6.55. These tables show that the effects of routine dental treatment (Table 6.51 and 6.52), dental trauma and expectation of trauma 6.53, medical surgery 6.54 and effective management techniques by the dentist 6.55.

In table 6.51 the anxiety proneness rating is a combination of type of treatment and whether seen by the dentist before. These two variables when put together give four values: treated before, non-invasive (i.e. recall); treated before, invasive (i.e. restorative treatment); not treated before, non-invasive (i.e. initial examination); not treated before, invasive (i.e. emergency treatment). This allowed comparisons between initial examination, recall and restorative treatment to be made. These data indicate that there are some significant differences between these treatment procedures in dental anxiety. From Table 6.52 it is clear that initial examination is more frightening than restoration and recall, with no significant difference between the recall and restorative treatment, though this effect is only apparent on the three variables, parent rating childs treatment anxiety, dentist childs general dental

anxiety and Venham Anxiety Scale.

Table 6.53 shows there is a high correlation between pain expectation and anxiety for experimental and control group subjects but little correlation between unexpected dental treatment and anxiety. This implies that expectation of trauma rather than experience of trauma is a better predictor of a fearful child.

Table 6.54 shows there is little connection between medical surgery and anxiety, which suggest experience of medical surgery does not predispose a child to dental anxiety. Similarly, table 6.5.5 gives no indication that dentist management techniques change appreciably when treating anxious patients. The four variables in this table reflect the variables that Weinstein (1982) found to be related to the most effective anxiety management techniques. This dentist does give more general feedback as anxiety increases but does not significantly change the number of commands used, amount of specific feedback or empathising by questioning for feelings.

Tables 6.56 to 6.58 illustrate the effects of the individual factor on dental anxiety. Table 6.56 revealing no connection between age and anxiety, neither was there much connection between gender and anxiety, though the dentist consistently rated girls as more anxious than boys (Table 6.57). Table 6.58 suggests that pain expectation is extensively linked with dental anxiety but pain tolerance has little to do with fear of dentistry.

The environmental effects are noted in tables 6.59 to 6.63. Table 6.59 indicates that parental attitudes to treatment have no discernable effect on a childs anxiety, whereas table 6.60 shows there is a definite link between a childs reaction to treatment and the parents expectation of the childs behaviour. Tables 6.61 to 6.63 suggest there is little or no connection between socio economic status, peer influences and family influences and dental anxiety. There is a possible exception to this in that the child having problems changing schools (Table 6.63) appears reasonably well correlated with the dental anxiety scores.

TABLE 6.51 EFFECT OF ROUTINE TREATMENT ON DENTAL ANXIETY

KRUSKAL WALLIS	ANXIETY PRONENESS RATING	
	EXP.	CONT.
PARENT RATING CHILDS ANXIETY - PRE-TREATMENT	0.0053*	0.0317*
PARENT RATING CHILDS TREATMENT ANXIETY - POST-TREATMENT	0.220	0.4824
DENTIST RATING OF CHILDS TREATMENT ANXIETY	0.583	0.3385
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	0.0322*	0.2531
VENHAM PICTURE SCALE	0.2502	0.4642
CHILD MANIFEST ANXIETY SCALE	0.6724	0.9366
VENHAM ANXIETY SCALE	0.0205*	0.5010

TABLE 6.52 ANALYSIS OF SIGNIFICANT EFFECTS IN ROUTINE DENTAL EXPERIENCE USING MANN WHITNEY

I. CONTROL GROUP:

a) PARENT RATING CHILDS ANXIETY PRE-TREATMENT

		2 NOT TREATED BEFORE NON INVASIVE (INITIAL EXAMINATION) n = 16	3 TREATED BEFORE INVASIVE (RESTORATIVE TREATMENT) n = 11
1 TREATED BEFORE NON INVASIVE (RECALL) n = 14	MEAN	1 11.07	1 12.32
	RANK	2 19.38	3 13.86
	SIG	0.0080*	0.5568
2 NOT TREATED BEFORE NON INVASIVE (INITIAL EXAMINATION) n = 16	MEAN		2 16.38
	RANK		3 10.55
	SIG		0.0550*

ONLY 1 SUBJECT IN CATEGORY NOT TREATED BEFORE/INVASIVE.

TABLE 6.52 CONTD.

II. EXPERIMENTAL GROUP

a) PARENT RATING OF CHILDS ANXIETY PRE-TREATMENT

		2 NOT TREATED BEFORE NON INVASIVE (INITIAL EXAMINATION) n = 13	3 TREATED BEFORE INVASIVE (RESTORATIVE TREATMENT) n = 26
1 TREATED BEFORE NON INVASIVE (RECALL) n = 24	MEAN	1 15.60	1 27.77
	RANK	2 25.27	3 23.40
	SIG	0.0092*	0.2882
2 NOT TREATED BEFORE NON INVASIVE (INITIAL EXAMINATION) n = 13	MEAN		2 27.92
	RANK		3 16.04
	SIG		0.0021*

ONLY 1 CASE IN NOT TREATED BEFORE/INVASIVE.

TABLE 6.52 CONTD.

b) DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY

	2 NOT TREATED BEFORE NON INVASIVE (INITIAL EXAMINATION) n = 13	3 TREATED BEFORE INVASIVE (RESTORATIVE TREATMENT) n = 26
1 TREATED BEFORE NON INVASIVE (RECALL) n = 24	MEAN 1 15.79	1 20.17
	RANK 2 24.92	3 28.00
	SIG 0.113*	0.0440*
2 NOT TREATED BEFORE NON INVASIVE (INITIAL EXAMINATION) n = 13	MEAN	2 20.88
	RANK	3 17.15
	SIG	0.2882

ONLY 1 CASE IN NOT TREATED BEFORE/INVASIVE

TABLE 6.52 CONTD.

c) VENHAM VIDEO ANXIETY SCALE:

	2 NOT TREATED BEFORE NON INVASIVE (INITIAL EXAMINATION) n = 13	3 TREATED BEFORE INVASIVE (RESTORATIVE TREATMENT) n = 26
1 TREATED BEFORE NON INVASIVE (RECALL) n = 24	MEAN 1 15.79	1 24.77
	RANK 2 24.92	3 26.17
	SIG 0.0095*	0.7048
2 NOT TREATED BEFORE NON INVASIVE (INITIAL EXAMINATION) n = 13	MEAN	2 26.92
	RANK	3 16.54
	SIG	0.0036*

ONLY 1 CASE IS NOT TREATED BEFORE/INVASIVE

TABLE 6.53 THE EFFECT OF DENTAL TRAUMA AND EXPECTATION OF TRAUMA ON ANXIETY SCORES

SPEARMAN CORRELATIONS	PAIN EXPECTATION		UNEXPECTED DENTAL TREATMENT	
VARIABLES	EXP	CON	EXP	CON
PARENT RATING OF CHILDS ANXIETY PRE-TREATMENT	0.5690 n=65 0.000*	0.4460 n=42 0.002*	0.1248 n=65 0.161	-0.0812 n=42 0.305
PARENT RATING OF CHILDS ANXIETY POST TREATMENT	0.3168 n=58 0.008*	0.1032 n=42 0.258	0.1614 n=58 0.113	-0.1500 n=42 0.172
DENTIST RATING OF CHILDS TREATMENT ANXIETY	0.1015 n=65 0.211	0.2447 n=42 0.059	0.1855 n=65 0.070	-0.1676 n=42 0.144
DENTIST RATING OF CHILDS GENERAL ANXIETY	0.0682 n=62 0.299	0.3991 n=42 0.004*	0.1294 n=62 0.158	-0.1644 n=42 0.149
VENHAM PICTURE SCALE	0.2025 n=62 0.057	0.4321 n=42 0.002*	0.1431 n=62 0.134	0.0532 n=42 0.369
CHILD MANIFEST ANXIETY SCALE	0.2114 n=64 0.047*	0.2651 n=42 0.045*	0.1511 n=64 0.117	-0.0784 n=42 0.311
VENHAM VIDEO ANXIETY SCALE	0.1476 n=65 0.120	0.2996 n=42 0.027*	0.1256 n=65 0.159	-0.3558 n=42 0.010*

TABLE 6.54 EFFECT OF MEDICAL SURGERY EXPERIENCE ON DENTAL ANXIETY

SPEARMAN CORRELATIONS	NUMBER OF MEDICAL HOSPITALIZATIONS	
VARIABLES	EXP	CON
PARENT RATING CHILDS ANXIETY PRE-TREATMENT	-0.1193 n=65 0.172	-0.0269 n=42 0.433
PARENT RATING CHILDS ANXIETY POST-TREATMENT	0.0294 n=58 0.413	0.0165 n=42 0.459
DENTIST RATING CHILDS TREATMENT ANXIETY	-0.0983 n=65 0.218	-0.0352 n=42 0.412
DENTIST RATING CHILDS GENERAL ANXIETY	-0.1101 n=62 0.197	0.0020 n=42 0.495
VENHAM PICTURE SCALE	0.0641 n=62 0.310	0.3135 n=42 0.022*
CHILD MANIFEST ANXIETY SCALE	-0.0024 n=64 0.493	0.0101 n=42 0.475
VENHAM VIDEO ANXIETY SCALE	-0.0273 n=65 0.414	0.1322 n=42 0.202

TABLE 6.55 USE OF EFFECTIVE ANXIETY MANAGEMENT TECHNIQUES BY STUDY DENTIST:

SPEARMAN CORRELATIONS	ANXIETY LEVEL OF SUBJECTS	
VARIABLES	EXP	CON
DENTIST DIRECTS BY COMMAND	0.1215 n=64 0.169	-0.2046 n=42 0.097
DENTIST DIRECTS BY GENERAL FEEDBACK	0.3467 n=64 0.003*	0.3032 n=42 0.025*
DENTIST DIRECTS BY SPECIFIC FEEDBACK	0.0269 n=64 0.416	0.1212 n=42 0.222
DENTIST EMPATHISES BY QUESTIONING	0.0555 n=64 0.332	-0.0270 n=42 0.433

TABLE 6.56 AGE EFFECTS, WHERE ANXIETY AND COOPERATION ARE MEASURED AS SEPARATE VARIABLES

KRUSKAL WALLIS	GROUPED AGES 6-9, 10-12, 13-15, 16-18	
	EXP.	CONT.
ANXIETY MEASURES:		
PARENT RATING CHILDS ANXIETY PRE-TREATMENT	.940	.835
PARENT RATING CHILDS ANXIETY POST TREATMENT	.877	.449
DENTIST RATING OF CHILDS TREATMENT ANXIETY	.618	.283
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	.934	.553
CHILD MANIFEST ANXIETY SCALE	.544	.141
VENHAM ANXIETY SCALE	.330	.488
COOPERATION MEASURES:		
PARENT RATING OF CHILDS COOPERATION POST TREATMENT	.452	.503
DENTIST RATING OF CHILDS COOPERATION	.094	.437
MELAMED CHILD BEHAVIOUR PROFILE	.278	.431

TABLE 6.57 SEX EFFECTS IN DENTAL ANXIETY

SPEARMAN CORRELATIONS	GENDER	
VARIABLES	EXP	CON
PARENT RATING CHILDS ANXIETY PRE-TREATMENT	0.0415 n=65 0.371	-0.2942 n=42 0.029*
PARENT RATING CHILDS ANXIETY POST TREATMENT	-0.1274 n=58 0.170	-0.0264 n=42 0.434
DENTIST RATING CHILDS TREATMENT ANXIETY	-0.2280 n=65 0.034	-0.0150 n=42 0.463
DENTIST RATING CHILDS GENERAL ANXIETY	-0.2447 n=62 0.028	0.0020 n=42 0.495
VENHAM PICTURE SCALE	-0.0306 n=62 0.407	0.0597 n=42 0.354
CHILD MANIFEST ANXIETY SCALE	0.119 n=64 0.189	-0.1636 n=42 0.150
VENHAM ANXIETY SCALE	-0.1994 n=65 0.056	0.1356 n=42 0.196

TABLE 6.58 EFFECT OF PAIN EXPECTATION AND PAIN TOLERANCE ON DENTAL ANXIETY

SPEARMAN CORRELATIONS	PAIN EXPECTATION		PAIN TOLERANCE	
VARIABLES	EXP	CON	EXP	CON
PARENT RATING CHILDS ANXIETY PRE-TREATMENT	0.5690 n=65 0.000*	0.4460 n=42 0.002*	0.1063 n=64 0.202	0.2355 n=42 0.067
PARENT RATING CHILDS ANXIETY POST TREATMENT	0.3168 n=58 0.008*	0.1032 n=42 0.258	0.2169 n=57 0.053	0.2145 n=42 0.086
DENTIST RATING CHILDS TREATMENT ANXIETY	0.1015 n=65 0.211	0.2447 n=42 0.059	0.1259 n=64 0.161	0.1381 n=42 0.191
DENTIST RATING CHILDS GENERAL DENTAL ANXIETY	0.0682 n=62 0.299	0.3991 n=42 0.004*	0.1770 n=61 0.086	0.2488 n=42 0.056
VENHAM PICTURE SCALE	0.2025 n=62 0.057	0.4321 n=42 0.002*	-0.0840 n=61 0.260	0.1766 n=42 0.132
CHILD MANIFEST ANXIETY SCALE	0.2114 n=64 0.047*	0.2651 n=42 0.045*	0.0335 n=63 0.397	0.0942 n=42 0.277
VENHAM ANXIETY SCALE	0.1476 n=65 0.120	0.2996 n=42 0.027*	0.2381 n=64 0.029*	0.1407 n=42 0.187

TABLE 6.59a ROLE OF PARENTAL ATTITUDE TO TREATMENT ON CHILDS ANXIETY AND COOPERATION

SPEARMAN CORRELATIONS	PARENTS DENTAL ANXIETY SCORE	
VARIABLES	EXP	CONT
ANXIETY MEASURES PARENT RATING CHILDS TREATMENT ANXIETY - PRE-TREATMENT	-0.0721 n=61 .290	-0.1008 n=42 .263
PARENT RATING CHILDS TREATMENT ANXIETY - POST TREATMENT	-0.1366 n=56 .158	0.2077 n=42 .093
DENTIST RATING OF CHILDS TREATMENT DENTAL ANXIETY	-0.1056 n=61 .209	0.3555 n=42 .010*
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	-0.1297 n=59 .164	0.2425 n=42 .061
VENHAM PICTURE SCALE	-0.0541 n=58 .343	0.2424 n=42 .061
CHILD MANIFEST ANXIETY SCALE	0.0501 n=61 .351	-0.0211 n=42 .447
VENHAM VIDEO SCALE	-0.0047 n=61 .486	0.1365 n=42 .194

TABLE 6.59(a) CONTD.

SPEARMAN CORRELATIONS	PARENTS DENTAL ANXIETY SCORE	
VARIABLES	EXP	CONT
COOPERATION MEASURES		
PARENT RATING OF CHILDS COOPERATION	0.0732 n=56 .296	0.2778 n=42 .037*
DENTIST RATING OF CHILDS COOPERATION	0.0537 n=61 .341	0.2105 n=42 .090
MELAMED CHILD BEHAVIOUR PROFILE	-0.1428 n=61 .136	0.1492 n=42 .173

TABLE 6.59(b) ROLE OF PARENTAL ATTITUDE TO TREATMENT ON CHILDS ANXIETY AND COOPERATION

SPEARMAN CORRELATIONS	MOTHERS DENTAL HABITS	
VARIABLES	EXP	CONT
ANXIETY MEASURES PARENT RATING CHILDS TREATMENT ANXIETY - PRE-TREATMENT	-0.1959 n=64 .060	-0.1893 n=42 .115
PARENT RATING CHILDS TREATMENT ANXIETY - POST TREATMENT	-0.2011 n=57 .067	0.1091 n=42 .260
DENTIST RATING OF CHILDS TREATMENT ANXIETY	-0.2172 n=64 .042*	0.0998 n=42 .265
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	-0.2471 n=61 .027*	-0.0090 n=42 .477
VENHAM PICTURE SCALE	-0.0790 n=61 .272	0.0425 n=42 .395
CHILD MANIFEST ANXIETY SCALE	-0.0409 n=63 .375	-0.0942 n=42 .276
VENHAM VIDEO SCALE	-0.0350 n=64 .392	0.0272 n=42 .432

TABLE 6.59(b) CONTD.

SPEARMAN CORRELATIONS	MOTHERS DENTAL HABITS	
VARIABLES	EXP	CONT
COOPERATION MEASURES		
PARENT RATING OF CHILDS COOPERATION	-0.1539 n=57 .127	0.1862 n=42 .119
DENTIST RATING OF CHILDS COOPERATION	-0.0403 n=64 .376	0.1091 n=42 .246
MELAMED CHILD BEHAVIOUR PROFILE	-0.1174 n=64 .178	0.1343 n=42 .198

TABLE 6.59(c) ROLE OF PARENTAL ATTITUDE TO TREATMENT ON CHILDS ANXIETY AND COOPERATION

SPEARMAN CORRELATIONS	FATHERS DENTAL HABITS	
VARIABLES	EXP	CONT
ANXIETY MEASURES PARENT RATING CHILDS TREATMENT ANXIETY - PRE-TREATMENT	-0.1176 n=60 .185	-0.0661 n=39 .345
PARENT RATING CHILDS TREATMENT ANXIETY - POST TREATMENT	-0.0932 n=53 .254	-0.0214 n=39 .449
DENTIST RATING OF CHILDS TREATMENT ANXIETY	-0.0857 n=60 .258	-0.1325 n=39 .211
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	-0.0001 n=58 .500	-0.2841 n=39 .040*
VENHAM PICTURE SCALE	0.0136 n=57 .460	0.0641 n=39 .349
CHILD MANIFEST ANXIETY SCALE	-0.1285 n=59 .166	-0.1480 n=39 .184
VENHAM VIDEO SCALE	-0.1554 n=60 .118	-0.1606 n=39 .164

TABLE 6.59(c) CONTD.

SPEARMAN CORRELATIONS	FATHERS DENTAL HABITS	
VARIABLES	EXP	CONT
COOPERATION MEASURES PARENT RATING OF CHILDS COOPERATION	-0.0490 n=53 .364	-0.0706 n=39 .335
DENTIST RATING OF CHILDS COOPERATION	-0.1044 n=60 .214	-0.2465 n=39 .065
MELAMED CHILD BEHAVIOUR PROFILE	0.0697 n=60 .298	-0.0086 n=39 .479

TABLE 6.60(a) EFFECTS OF PARENTS ATTITUDE TO TREATMENT ON CHILDS PERCEPTION OF TREATMENT

SPEARMAN CORRELATIONS	PAIN EXPECTATION	
VARIABLES	EXP	CONT
PARENT RATING CHILDS TREATMENT ANXIETY PRE-TREATMENT	0.5690 n=65 .000*	0.4460 n=42 .002*
PARENT RATING CHILDS TREATMENT ANXIETY POST TREATMENT	0.3168 n=58 .008*	0.1032 n=42 .258
PARENT RATING OF CHILDS COOPERATION	0.1655 n=58 .107	0.0791 n=42 .309

TABLE 6.60(b) EFFECTS OF PARENTS ATTITUDE TO TREATMENT ON CHILDS PERCEPTION OF TREATMENT

SPEARMAN CORRELATIONS	CMAS	
VARIABLES	EXP	CONT
PARENT RATING CHILDS TREATMENT ANXIETY PRE-TREATMENT	0.1967 n=64 .060	0.0819 n=42 .303
PARENT RATING CHILDS TREATMENT ANXIETY POST TREATMENT	0.1830 n=57 .087	0.1252 n=42 .215
PARENT RATING OF CHILDS COOPERATION	0.2333 n=57 .040*	0.0042 n=42 .494

TABLE 6.60(c) EFFECTS OF PARENTS ATTITUDE TO TREATMENT ON CHILDS PERCEPTION OF TREATMENT

SPEARMAN CORRELATIONS	PICTURE SCALE SCORE	
VARIABLES	EXP	CONT
PARENT RATING CHILDS TREATMENT ANXIETY PRE-TREATMENT	0.2868 n=62 .012*	0.1272 n=42 .211
PARENT RATING CHILDS TREATMENT ANXIETY POST TREATMENT	0.4345 n=55 .000*	0.2971 n=42 .028*
PARENT RATING OF CHILDS COOPERATION	0.2753 n=55 .021*	0.1594 n=42 .157

TABLE 6.61 EFFECT OF SOCIO ECONOMIC STATUS (S.E.S.) ON DENTAL ANXIETY

SPEARMAN CORRELATIONS	S.E.S.	
VARIABLES	EXP	CON
PARENT RATING CHILDS ANXIETY PRE-TREATMENT	0.3329 n-65 0.003*	0.1654 n=42 0.148
PARENT RATING CHILDS ANXIETY POST-TREATMENT	0.1618 n-58 0.112	0.3470 n=42 0.012*
DENTIST RATING OF CHILDS TREATMENT ANXIETY	0.0181 n=65 0.443	0.2705 n=42 0.042*
DENTIST RATING CHILDS GENERAL DENTAL ANXIETY	0.0602 n=62 0.321	0.3512 n=42 0.011*
VENHAM PICTURE SCALE	0.2429 n=62 0.029*	0.2362 n=42 0.066
CHILD MANIFEST ANXIETY SCALE	0.1515 n=64 0.116	0.1550 n=42 0.163
VENHAM ANXIETY SCALE	0.2391 n=65 0.028*	-0.1137 n=42 0.237

TABLE 6.62(a) PEER GROUP INFLUENCES ON DENTAL ANXIETY

SPEARMAN CORRELATIONS	PEERS HAVING BAD DENTAL EXPERIENCE	
VARIABLES	EXP	CON
PARENT RATING CHILDS TREATMENT ANXIETY PRE-TREATMENT	0.1691 n=65 .089	-0.1770 n=42 .130
PARENT RATING CHILDS TREATMENT ANXIETY POST TREATMENT	0.0075 n=58 .478	-0.0841 n=42 .298
DENTIST RATING OF CHILDS TREATMENT ANXIETY	-0.0407 n=65 .374	-0.1343 n=42 .198
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	-0.0974 n=62 .226	-0.2095 n=42 .092
VENHAM PICTURE SCALE	-0.0082 n=62 .475	-0.0426 n=42 .394
CHILD MANIFEST ANXIETY SCALE	0.1678 n=64 .093	-0.0478 n=42 .382
VENHAM ANXIETY SCALE	0.0846 n=65 .251	-0.0400 n=42 .401

TABLE 6.62(b) PEER GROUP INFLUENCES ON DENTAL ANXIETY

SPEARMAN CORRELATIONS	REACTION TO STRANGE CHILDREN	
VARIABLES	EXP	CON
PARENT RATING CHILDS TREATMENT ANXIETY PRE-TREATMENT	0.0713 n=65 .286	0.0083 n=42 .479
PARENT RATING CHILDS TREATMENT ANXIETY POST TREATMENT	0.0947 n=58 .240	-0.4623 n=42 .002*
DENTIST RATING OF CHILDS TREATMENT ANXIETY	0.1021 n=65 .209	-0.1653 n=42 .148
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	0.1223 n=62 .172	-0.1613 n=42 .154
VENHAM PICTURE SCALE	-0.0507 n=62 .348	-0.1632 n=42 .151
CHILD MANIFEST ANXIETY SCALE	0.0483 n=64 .352	-0.2976 n=42 .028*
VENHAM ANXIETY SCALE	0.0477 n=65 .353	0.0949 n=42 .275

TABLE 6.62(c) PEER GROUP INFLUENCES ON DENTAL ANXIETY

SPEARMAN CORRELATIONS	CHILDS REACTION TO SCHOOL	
VARIABLES	EXP	CON
PARENT RATING CHILDS TREATMENT ANXIETY PRE-TREATMENT	-0.0181 n=65 .443	0.2034 n=42 .098
PARENT RATING CHILDS TREATMENT ANXIETY POST TREATMENT	0.0396 n=58 .384	0.1088 n=42 .246
DENTIST RATING OF CHILDS TREATMENT ANXIETY	0.1814 n=65 .074	0.1981 n=42 .104
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	0.1568 n=62 .112	0.2422 n=42 .061
VENHAM PICTURE SCALE	-0.0596 n=62 .323	0.0295 n=42 .426
CHILD MANIFEST ANXIETY SCALE	0.3406 n=64 .003*	0.1326 n=42 .201
VENHAM ANXIETY SCALE	0.0209 n=65 .434	0.2075 n=42 .094

TABLE 6.62(d) PEER GROUP INFLUENCES ON DENTAL ANXIETY

SPEARMAN CORRELATIONS	RELATIVE AGE OF CHILDREN'S FRIENDS	
VARIABLES	EXP	CON
PARENT RATING CHILDS TREATMENT ANXIETY PRE-TREATMENT	-0.0543 n=65 .332	-0.2294 n=42 .072
PARENT RATING CHILDS TREATMENT ANXIETY POST TREATMENT	-0.1486 n=58 .133	0.0415 n=42 .397
DENTIST RATING OF CHILDS TREATMENT ANXIETY	0.1375 n=65 .137	-0.0873 n=42 .291
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	0.0265 n=62 .419	-0.2948 n=42 .029*
VENHAM PICTURE SCALE	-0.1935 n=62 .066	-0.019 n=42 .473
CHILD MANIFEST ANXIETY SCALE	0.0705 n=64 .290	-0.1174 n=42 .229
VENHAM ANXIETY SCALE	-0.0860 n=65 .248	-0.0875 n=42 ,291

TABLE 6.62(e) PEER GROUP INFLUENCES ON DENTAL ANXIETY

SPEARMAN CORRELATIONS	CHILD'S REGULAR PLAYMATES	
VARIABLES	EXP	CON
PARENT RATING CHILDS TREATMENT ANXIETY PRE-TREATMENT	0.0169 n=65 .447	0.1070 n=42 .250
PARENT RATING CHILDS TREATMENT ANXIETY POST TREATMENT	-0.1157 n=58 .194	0.2048 n=42 .097
DENTIST RATING OF CHILDS TREATMENT ANXIETY	-0.0700 n=65 .290	0.2613 n=42 .047*
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	-0.1083 n=62 .201	0.3439 n=42 .013*
VENHAM PICTURE SCALE	0.0830 n=62 .258	0.2604 n=42 .048*
CHILD MANIFEST ANXIETY SCALE	0.1540 n=64 .112	0.2218 n=42 .079
VENHAM ANXIETY SCALE	0.0177 n=65 .444	0.2176 n=42 .083

TABLE 6.63(a) FAMILY INFLUENCES ON DENTAL ANXIETY

SPEARMAN CORRELATIONS VARIABLES	NUMBER OF BROTHERS & SISTERS EXP	 CON
PARENT RATING CHILDS TREATMENT ANXIETY PRE-TREATMENT	-0.0190 n=65 .440	-0.2240 n=42 .077
PARENT RATING CHILDS TREATMENT ANXIETY POST TREATMENT	0.0709 n=58 .299	-0.1230 n=42 .219
DENTIST RATING OF CHILDS TREATMENT ANXIETY	0.1374 n=65 .138	-0.2640 n=42 .046*
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	0.1379 n=62 .143	-0.1536 n=42 .166
VENHAM PICTURE SCALE	-0.1017 n=62 .216	-0.1934 n=42 .110
CHILD MANIFEST ANXIETY SCALE	-0.0884 n=64 .244	0.0801 n=42 .307
VENHAM ANXIETY SCALE	0.0080 n=65 .475	-0.2982 n=42 .028*

TABLE 6.63(b) FAMILY INFLUENCES ON DENTAL ANXIETY

SPEARMAN CORRELATIONS VARIABLES	POSITION OF CHILD IN FAMILY EXP	CON
PARENT RATING CHILDS TREATMENT ANXIETY PRE-TREATMENT	-0.0416 n=65 .371	0.1493 n=42 .173
PARENT RATING CHILDS TREATMENT ANXIETY POST TREATMENT	-0.0306 n=58 .410	-0.0661 n=42 .339
DENTIST RATING OF CHILDS TREATMENT ANXIETY	-0.0237 n=65 .426	0.3267 n=42 .017*
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	0.0240 n=62 .427	0.2009 n=42 .101
VENHAM PICTURE SCALE	0.0782 n=62 .273	0.1446 n=42 .180
CHILD MANIFEST ANXIETY SCALE	0.0016 n=64 .495	-0.0019 n=42 .495
VENHAM ANXIETY SCALE	0.0076 n=65 .476	-0.1521 n=42 .168

TABLE 6.63(c) FAMILY INFLUENCES ON DENTAL ANXIETY

SPEARMAN CORRELATIONS	CHILD PROBLEMS CHANGING SCHOOLS	
VARIABLES	EXP	CON
PARENT RATING CHILDS TREATMENT ANXIETY PRE-TREATMENT	0.1996 n=65 .055	-0.0767 n=42 .315
PARENT RATING CHILDS TREATMENT ANXIETY POST TREATMENT	0.2451 n=58 .032*	0.3049 n=42 .025*
DENTIST RATING OF CHILDS TREATMENT ANXIETY	0.2415 n=65 .026*	-0.0401 n=42 .400
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	0.2523 n=62 .024*	0.0574 n=42 .359
VENHAM PICTURE SCALE	0.1447 n=62 .131	0.0400 n=42 .401
CHILD MANIFEST ANXIETY SCALE	0.0685 n=64 .295	-0.2173 n=42 .083
VENHAM ANXIETY SCALE	0.3684 n=65 .001*	0.2850 n=42 .034*

TABLE 6.63(d) FAMILY INFLUENCES ON DENTAL ANXIETY

SPEARMAN CORRELATIONS	NUMBER OF RECENT LIFE EVENTS	
VARIABLES	EXP	CON
PARENT RATING CHILDS TREATMENT ANXIETY PRE-TREATMENT	-0.0111 n=65 .465	-0.2656 n=42 0.045*
PARENT RATING CHILDS TREATMENT ANXIETY POST TREATMENT	0.0492 n=58 .357	-0.0008 n=42 .498
DENTIST RATING OF CHILDS TREATMENT ANXIETY	0.1172 n=65 .176	-0.1543 n=42 .165
DENTIST RATING OF CHILDS GENERAL DENTAL ANXIETY	0.1089 n=62 .200	-0.2514 n=42 .054
VENHAM PICTURE SCALE	-0.2628 n=62 .020*	0.0244 n=42 .439
CHILD MANIFEST ANXIETY SCALE	0.1218 n=64 .169	-0.1190 n=42 .226
VENHAM ANXIETY SCALE	-0.0522 n=65 .340	-0.1061 n=42 .252

6.9 ASSESSMENT OF PSYCHOLOGICAL MODEL USED:

This section is concerned with the two statements about anxiety measurement made in the literature review. These stated, firstly, that anxiety and cooperation had previously been regarded as measuring the same reaction to dentistry and that this need not necessarily be the case. Secondly, that a cognitive model of anxiety was being used which required only a low positive correlation between behavioural and cognitive measures of anxiety.

Table 6.64 illustrates that measures of anxiety and cooperation are highly correlated with each other. This suggests that anxiety and cooperation are not as separable as the model suggested for this project had predicted.

Table 6.65 indicates that the model of anxiety put forward appears to represent the data collected. The Venham Picture Scale and the Child Manifest Anxiety Scale, both cognitive measures of anxiety achieved a positive correlation with the behavioural measure, the Venham Anxiety Scale. In addition, the Venham Picture Scale achieved a particularly high correlation with the behavioural measure. This accords with data from results section 6.3 which suggests dental anxiety represents a phobic response to dentistry. This is evident as the Venham Picture Scale measures anxiety immediately before treatment whereas the Child Manifest Anxeity Scale measures the child's general level of anxiety.

Table 6.64 TEST OF PSYCHOLOGICAL MODEL OF CONNECTION BETWEEN ANXIETY AND COOPERATION:

SPEARMAN CORRELATIONS	CHILD BEHAVIOUR PROFILE	PARENT CHILDS COOPERATION	DENTIST CHILDS COOPERATION
PARENT CHILDS ANXIETY - PRE-TREATMENT	0.1219 n=107 0.105	0.2156 n=100 0.016*	0.4181 n=107 0.000*
PARENT CHILDS ANXIETY - POST-TREATMENT	0.3275 n=100 0.000*	0.5935 n=100 0.000*	0.5671 n=100 0.000*
DENTIST CHILDS TREATMENT ANXIETY	0.4098 n=107 0.000*	0.4712 n=100 0.000*	0.7662 n=107 0.000*
DENTIST CHILDS GENERAL DENTAL ANXIETY	0.3935 n=104 0.000*	0.4849 n=98 0.000*	0.7440 n=104 0.000*
CHILD MANIFEST ANXIETY SCALE	0.0324 n-106 0.371	0.1568 n=99 0.061	0.1919 n=106 0.024*
PICTURE SCALE	0.1672 n=104 0.045*	0.3135 n=97 0.001*	0.4327 n=104 0.000*
VENHAM ANXIETY SCALE	0.4308 n=107 0.000*	0.2684 n=100 0.003*	0.4430 n=107 0.000*

TABLE 6.65 TEST OF PSYCHOLOGICAL MODEL OF ANXIETY USED IN THIS PROJECT:

SPEARMAN CORRELATIONS VARIABLES	VENHAM ANXIETY SCALE
VENHAM PICTURE SCALE	0.3352 n=104 0.000*
CHILD MANIFEST ANXIETY SCALE	0.0279 n=106 0.229

6.10 RELIABILITY OF VIDEO DATA:

This section is concerned with the reliability of the three video scales used, Venham Anxiety Scale, Melamed Behaviour Profile and Weinstein Dentist Behaviour Profile. The Weinstein Dentist Behaviour Profile does not give a single figure analysis of behaviour, as such a selection of variables representative of the overall scale were chosen to test the reliability of the scale. As each section of the profile summed to 1, the four variables concerned with non use of the target behaviour (dentist non-vocalisation, dentist non-direction, dentist non-empathy and dentist non-contact) were selected to give a representative sample of the data.

Two types of reliability study were carried out, firstly an intra observer reliability study to test the researchers consistency of rating over time and secondly, an inter observer reliability to examine the researchers ratings as compared with two psychologists and two dentists ratings.

The Intra observer reliability (Tables 6.66 and 6.69) show that the researchers ratings were consistent over time ($P<0.001$). The inter observer reliability (Tables 6.67, 6.68 and 6.70) is rather more complex. The Venham Anxiety Scale proved impossible to analyse beyond a descriptive level owing to the number of tied scores obtained. However, it is evident from the descriptive statistics (Table 6.68) that there is an acceptable variance in judges scores (0.7 to 2.17) with the

researcher rating in the middle of the variance (1.2). The Melamed Behaviour Profile, analysed using a Chi-Squared analysis (Table 6.70), shows no significant differences across judges. The Weinstein Dentist Behaviour Profile analysed using an analysis of variance shows very little of the variance is due to the judges for dentist non-vocalisation (7%), dentist non-direction (9%) and dentist non-contact (½%). The dentist non-empathy owing to the number of tied scores, had to be analysed using a Friedman Analysis, this showed there were significant differences across judges ($P < 0.05$). For this test judge 3's scores for subject 8, 9 and 10 had to be estimated, the estimated scores (80, 100 and 92 respectively) were associated with the subjects mean scores and as judge 3 generally rated lower than the mean score were a conservative estimate of this judges likely score.

During the inter observer reliability test of the Dentist Behaviour Profile video rating 7 was omitted as two judges had missing data on this scale.

Overall, the data show the intra observer reliability to be very consistent and reliable and the inter observer reliability to be generally reliable with problems regarding dentist non-empathy.

TABLE 6.66 DESCRIPTIVE STATISTICS RELEVANT TO THE INTRA OBSERVER RELIABILITY STUDY

CANDIDATES RATING	VENHAM ANXIETY SCALE	MELAMED CHILD BEHAVIOUR PROFILE	DENTIST NON-VOCALISATION %	DENTIST NON-DIRECTION %	DENTIST NON-EMPATHY %	DENTIST NON-CONTACT %
1	1	5.50	23	16	95	22
2	1	4.00	24	17	96	26
3	1	4.00	24	17	96	20
4	1	5.00	30	26	92	25
5	1	4.00	18	24	88	28
6	1	4.50	24	24	96	29
7	1	4.50	30	24	95	35
8	1	4.00	15	21	95	25
9	1	4.00	19	30	77	27
10	1	4.00	13	22	88	31
TOTAL MEAN	1	4.35	21.7	22.5	91.8	26.8

TABLE 6.67 DESCRIPTIVE STATISTICS OF VENHAM VIDEO ANXIETY SCALE AND MELAMED BEHAVIOUR PROFILE RELEVANT TO INTER OBSERVER RELIABILITY STUDY:

i) VENHAM VIDEO ANXIETY SCALE:

SUBJECT	JUDGE 1	JUDGE 2	JUDGE 3	JUDGE 4	JUDGE 5	SUBJECT MEAN
1	0	1	1	0	0	0.4
2	1	1	2	1	1	1.2
3	0	1	2	0	1	0.8
4	0	1	1	0	1	0.6
5	2	3	3	2	2	2.4
6	4	4	4	3	4	3.8
7	1	2	*	0	1	0.8
8	2	3	*	1	1	2.25
9	0	0	*	0	0	0
10	0	1	*	0	1	0.5
JUDGE MEAN	1	1.7	2.17	0.7	1.2	

TABLE 6.67 CONTD.

ii) MELAMED BEHAVIOUR PROFILE:

SUBJECT	JUDGE 1	JUDGE 2	JUDGE 3	JUDGE 4	JUDGE 5	SUBJECT MEAN
1	1.00	0.00	1.00	0.00	1.00	0.60
2	1.50	1.00	1.00	0.00	0.50	0.80
3	0.50	1.00	3.00	0.00	1.00	1.10
4	0.75	0.00	0.00	0.00	1.00	0.35
5	7.50	9.25	3.75	7.50	4.75	6.58
6	4.75	7.40	5.75	8.60	4.60	6.22
7	2.80	4.33	*	5.20	3.17	3.88
8	5.50	5.50	*	4.00	3.00	4.50
9	0.00	0.00	*	0.00	0.00	0.00
10	0.00	7.00	*	0.00	2.00	2.25
JUDGE MEAN	2.43	3.55	2.42	2.53	2.10	

TABLE 6.68 DESCRIPTIVE STATISTICS OF SUMMARY OF WEINSTEIN BEHAVIOUR PROFILE RELEVANT TO INTER OBSERVER RELIABILITY STUDY

i) DENTIST NON-VOCALISATION:

SUBJECT	JUDGE 1	JUDGE 2	JUDGE 3	JUDGE 4	JUDGE 5	SUBJECT MEAN
1	15	16	25	29	21	21.2
2	13	21	27	25	21	18.4
3	19	27	6	32	20	20.8
4	21	14	15	21	27	19.6
5	7	14	33	13	8	15.0
6	4	4	11	12	9	8.0
7	*	25	*	19	27	23.67
8	6	14	*	27	18	16.25
9	0	14	*	15	0	7.25
10	29	20	*	30	38	29.25
JUDGE MEAN	12.67	16.9	23.4	22.3	18.9	

TABLE 6.68 CONT.

ii) DENTIST NON DIRECTION:

SUBJECT	JUDGE 1	JUDGE 2	JUDGE 3	JUDGE 4	JUDGE 5	SUBJECT MEAN
1	29	43	50	32	13	33.4
2	16	17	42	25	10	22.0
3	38	44	40	37	32	38.2
4	66	58	87	70	57	67.6
5	13	19	30	22	16	20.0
6	12	11	7	10	6	9.2
7	*	82	*	79	70	77.0
8	45	18	*	95	25	45.75
9	0	29	*	23	0	13.0
10	38	46	*	60	60	51.0
JUDGE MEAN	28.5	36.7	42.67	45.3	28.9	

TABLE 6.68 CONTD.

iii) DENTIST NON EMPATHY:

SUBJECT	JUDGE 1	JUDGE 2	JUDGE 3	JUDGE 4	JUDGE 5	SUBJECT MEAN
1	100	100	91	100	77	93.6
2	73	79	56	67	76	70.2
3	100	89	88	100	88	93.0
4	93	85	81	100	93	90.4
5	65	42	38	82	61	57.6
6	63	60	10	100	79	62.4
7	*	83	*	87	91	87.0
8	76	76	*	85	84	80.25
9	100	100	*	100	100	100
10	86	80	*	100	100	92.0
JUDGE MEAN	82.89	79.4	60.67	92.1	84.9	

TABLE 6.68 CONTD.

iv) DENTIST NON CONTACT:

SUBJECT	JUDGE 1	JUDGE 2	JUDGE 3	JUDGE 4	JUDGE 5	SUBJECT MEAN
1	57	54	64	58	70	60.6
2	50	67	71	68	61	63.4
3	38	33	13	50	33	33.4
4	31	39	35	40	38	36.6
5	57	58	60	57	59	58.2
6	63	68	57	67	74	65.8
7	*	67	*	71	64	67.3
8	42	45	*	38	44	42.25
9	70	62	*	69	70	67.75
10	29	50	*	50	36	41.25
JUDGE MEAN	48.56	54.3	50.0	56.8	54.9	

TABLE 6.69 KENDAL COEFFICIENT OF CONCORDANCE OF INTRA OBSERVER RELIABILITY DATA

CASES	W	CHI-SQUARE	D.F.	SIGNIFICANCE
10	.09381	309.5649	33	.0000*

TABLE 6.70 ANALYSIS OF INTER OBSERVER RELIABILITY DATA

a) MELAMED CHILD BEHAVIOUR PROFILE:

ANALYSIS OF DIFFERENCE ACROSS JUDGES:

$X^2 = 2.84$ with 4 df

Therefore no significant differences across judges.

b) WEINSTEIN DENTIST BEHAVIOUR PROFILE

i) ANALYSIS OF VARIANCE:

SOURCE	df	SS	MS	VR
JUDGES	4	366.68	91.67	1.958
PATIENTS	8	1156.22	144.53	3.088
ERROR	27	1263.61	46.80	
TOTAL	39	2883.975		

COMPONENTS OF VARIANCE ANALYSIS

SOURCE		% VAR.
JUDGES	4.99	7
PATIENTS	19.55	27
ERROR	46.80	66
TOTAL	71.34	

TABLE 6.70 CONTD.

ii) DENTIST NON-DIRECTION

ANALYSIS OF VARIANCE

SOURCE	df	SS	MS	VR
JUDGES	4	1189.19	297.29	1.74
PATIENTS	8	12609.77	1576.22	9.22
ERROR	27	4618.08	171.04	
TOTAL	39	18604.97		

OWING TO SKEWNESS OF DATA LOGGED ANALYSIS OF VARIANCE WAS ALSO CARRIED OUT:

SOURCE	df	SS	MS	VR
JUDGES	4	0.9276	0.2569	2.19
PATIENTS	8	12.94	1.6175	13.8
ERROR	27	4.5630	0.1170	
TOTAL	39	18.4306		

TABLE 6.70 CONTD.

COMPONENTS OF VARIANCE

NORMAL			LOGGED		
SOURCE		% VAR	SOURCE		% VAR
JUDGES	14.03	3	JUDGES	0.02798	9
PATIENTS	281.04	60	PATIENTS	0.1667	53
ERROR	171.04	37	ERROR	0.117	38
TOTAL	466.11		TOTAL	0.31168	

iii) DENTIST NON EMPATHY

Due to large number of tied scores analysis of variance was not possible, Friedman analysis carried out on data with Judge 3 cases 8-10 estimated at 80, 100 and 92 respectively.

FRIEDMAN ANALYSIS

X^2 with 4 df = 11.02 P = 0.026

Therefore there are significant changes between judges.

TABLE 6.70 CONTD.

iv) DENTIST NON CONTACT:

ANALYSIS OF VARIANCE

SOURCE	df	SS	MS	VR
JUDGES	4	250.33	62.58	1.16
PATIENTS	8	6799.47	849.93	15.85
ERROR	29	1555.45	53.64	
TOTAL	41	8688.12		

COMPONENTS OF VARIANCE ANALYSIS

SOURCE		% VAR
JUDGES	0.99	½
PATIENTS	159.26	74½
ERROR	53.64	25
TOTAL	213.89	

7. THE MAIN FINDINGS:

1) The questionnaire/interview data showed the dental refusers to be more anxious and less cooperative than non-refusers.

2) The variables providing the major distinctions between refusers and non-refusers are located in the medical/dental factor, which indicates that dental anxiety is closely related to specific fears or phobias.

3) The individual factor showed major differences between the experimental and control group in terms of attention span, pain tolerance, pain expectation and number of specific fears. This suggests that attention span and expectations of trauma are in some way connected with the development of specific fears.

4) No major differences between experimental and control group subjects for the environmental factor were observed.

5) Children in the experimental group were more likely to have a reason for dental fear, most commonly citing gas, dentists manner and any dental treatment.

6) From the childs self report data on anxiety the CMAS showed no difference between the groups with regard to general anxiety about everyday events (experimental group mean score 16.0, control group mean score 16.8). In contrast the Venham Picture Scale did discriminate between the groups, with regard to anxiety felt immediately prior to treatment (experimental group mean 2.2, control group mean (0.8), significant at $P < 0.05$). This supports the suggestion that dental

anxiety is a speciic fear or phobia.

7) The video data indicated the experimental group displayed more fear ($P<0.01$) and were more disruptive ($P<0.05$) than the control group. The dentist spent more time empathising ($P<0.01$) and less time in contact ($P<0.05$) with experimental group subjets.

8) The parents pre-treatment rating of the childs anxiety and the post treatment questionnaires provided evidence that both the dentist and parent consistently rated experimental group subjects as more anxious and less cooperative than control group subjects. In addition, there was a high correlation between the parents assessments and the dentists assessments of anxiety and cooperation. The dentist was more likely to rate dental refusers as more anxious and less cooperative than the parent.

9) Whether the type of treatment was non-invasive (examination or scale and polish) or invasive (fissure sealing, injections, filling, restoration) had only a small effect on anxiety and cooperation for children in the experimental group. In contrast whether the dentist had treated the child before had a marked effect on the anxiety scores of the experimental group subjects. These results indicate that the type of treatment only marginally affects anxiety scores whereas visiting a new dentist creates a particular stress on already anxious children.

10) The parents rating of the childs anxiety pre-treatment and the childs pain expectation were the only variables sensitive to changes in

anxiety for experimental vs control groups, type of treatment and whether treated before by this dentist.

11) From the multiple regression analyses of the four variables most potentially predictive of changes in dental anxiety (parents rating of childs anxiety pre-treatment, pain expectation, reaction to previous dental visits and whether treated by this dentist before) it is evident that only the parents rating of the childs anxiety pre-treatment proved to be a predictive variable.

12) The dentist behaviour, as measured using the video recordings, showed marked changes in dentist behaviour when treating the two groups. He talked more to anxious children and less to other people in the surgery when treating anxious children, gave more specific and general feedback and tried to persuade anxious children more, spent more time empathising, using questioning for feeling and reassurance. A similar effect on dentist behaviour was noted when he treated new patients, with whom he spent more time explaining/demonstrating procedures, gave less specific feedback and spent more time directing in general, carried out less treatment but patted and stroked the child more and was in contact with these children for less time.

Therefore, it appears that anxious children and new patients have a marked effect on a dentists behaviour.

13) Dentist behaviour and various anxiety measures correlated to show changes in both child and dentist behaviour with regard to the childs

anxiety level. All the anxiety measures correlated with the amount of time the dentist spent talking to the child and others, the level of general feedback given, the amount of persuasion used, how much time the dentist spends empathising in general and questioning for feeling and reassuring in particular and the extent to which the dentist pats or strokes the child.

The childs anxiety level (as per the Venham Anxiety Scale) correlated with the number of rhetorical questions asked and how often a stop mechanism was used. The parents anxiety rating pre-treatment correlated with the amount of time the dentist spent demonstrating/explaining, amount of specific feedback given, fault finding and time spent in contact. The parents post treatment rating correlated with how much the dentist talked, the number of rhetorical questions, how much the dentist denied the childs feelings, and how much difficulty he had in maintaining the childs positioning. The parents rating of the childs cooperation scores correlated the level of fault finding and playing down of the childs feelings.

All the dentist ratings correlated with how much he talked and how many rhetorical questions he asked. Individually the dentist rating of childs treatment anxiety correlated with his use of stop mechanisms and level of difficulty in maintaining the childs positioning. The dentist rating of the childs cooperation also correlating with difficulty of maintaining childs positioning.

The behavioural measures correlated individually with various variables, the Venham Anxiety Scale correlated with the number of rhetorical questions. The Melamed Behaviour Profile correlated with the number of commands given, the level of fault finding, underplaying the childs feelings, non-acceptance of the childs anxiety and difficulty in maintaining the childs positioning.

In total it is evident that dentist behaviour has a marked and varied effect on differing anxiety measures.

14) No difference in medical/dental individual and environmental factors were found between those children in the experimental group who had had RA and those in the experimental group who had not had RA (i.e. the RA group was not a homogeneous subgroup of apprehensive children with clearly defined behavioural characteristics).

15) Data from 5 videos of children taken when undergoing RA and when not undergoing RA, showed that there is no difference in child behaviour across these two groups.

16) When treating children who have had RA before this dentist talks less to others on the surgery, gave more specific but less general feedback and had to hold children in position during treatment more often. In contrast, when actually using RA this dentist is more likely to give general feedback and use a stop mechanism.

17) An initial examination provokes greater anxiety, in both experimental and control group, than subsequent restorative procedures

or recall, though this general effect occurred on a minority of variables.

18) There was a high correlation between pain expecation and anxiety for experimental and control group subjects, but little correlation between unexpected dental treatment and anxiety. Thus expectation of trauma rather than experience of trauma appears to be a better predictor of a fearful child.

19) There was little connection between medical surgery and dental anxiety in this project

20) With regard to the individual factor, no connection between age and anxiety could be found, though this may be due, in part, to the minimum age being set at 6 years for entry to the study. There was little connection between gender and anxiety although the dentist consistently rated girls as more anxious than boys.

21) The most significant environmental factor observed was a definite link between a childs reaction to treatment and the parents expectation of the childs behaviour.

22) Measures of anxiety and cooperation were highly correlated, thus it appears anxiety and cooperation are not as separable as the model suggested for this project had suggested. However, the cognitive model of anxiety put forward appears to represent the data collected, achieving positive correlations between behavioural and child self report anxiety measures. In addition a higher correlation was obtained

between behavioural anxiety and specific self report anxiety (Venham Picture Scale) than between general self report anxiety (CMAS) and behavioural anxiety. This accords with earlier findings in this study which suggest dental anxeity represents a phobic response to dentistry. 23) The video scale reliability studies show that over the three scales used the intra observer ratings were very reliable and the inter observer ratings generally reliable with problems concerning dentist non-empathy.

8 DISCUSSION

8.1 INTRODUCTION:

The experimental and control groups were sufficiently similar to allow valid comparisons to be made across groups. To assess these differences it is necessary to divide the discussion into seven sections. First, the major factors of dental anxiety (medical/dental, individual and environmental) will be considered, together with the changes in anxiety and cooperation ratings between the groups. Then an analysis of the extra factors assumed to have an effect on anxiety (type of treatment, whether treated before and dentist behaviour) will be considered, leading to the formulation of a set of observations/questions which may isolate at risk children at initial examination. Fourthly, the effect of RA upon child and dentist behaviour wil be discussed, followed by consideration of the results pertaining to the literature review. Finally, an assessment of the psychological models used followed by a discussion on the effectiveness of video recordings will be given.

8.2. MAJOR DIFFERENCES BETWEEN EXPERIMENTAL AND CONTROL GROUP SUBJECTS:

The results clearly indicate that experimental group subjects were more anxious and less cooperative than control group subjects. This manifested itself in two ways, which will be discussed separately. Firstly, through the differences in the medical/dental, individual and environmental factors of dental anxiety and secondly, through the measures of anxiety and cooperation used in this project.

8.2.1: SIGNIFICANT CHANGES IN RESPONSES TO MAJOR FACTORS OF DENTAL ANXIETY:

The majority of significant changes in reaction to the major factors occurred in the medical/dental factor. This implies that fear of dentistry is a specific situational anxiety. This is at odds with much of the dental literature which suggests dental anxiety is acquired as a consequence of parental fear or bad dental experience. Specific situational anxieties or phobias are well recognised in the psychological literature. The behavioural paradigm providing the most widely accepted framework for explaining the development of phobic responses (see Literature Review 3.2.2). The behavioural and cognitive theories are very closely related upon the issue of how fears develop, with Gray using his Behavioural Inhibition System (B.I.S.) in almost exactly the same way as Beck postulates the hypersensitive alarm system. However, the cognitive theory gives greater scope for understanding the more human thought related aspects of fear which are factor, increased pain expectation and decrease pain tolerance, allows

so important when attempting to explain and/or understand the anxiety experience. As such a cognitive understanding of specific fears has been favoured in an attempt to clarify the experience of dental anxiety. Phobias, as the cognitive theory of anxiety postulates, develop as an over reaction to a potentially threatening situation, where experience of a fear inducing event is not as important as the expectation of something "bad" happening which may explain the power of the pain expectation variable. Moreover, phobias are not hereditary, thus parental fear need not be associated with a childs dental anxiety in any way, this accords with the findings of this project.

This conclusion is reinforced by the data from the individual and environmental factors. The individual factor provides a very interesting combination of differences in childrens responses. These indicate that anxious children have a lower attention span than control children. This, when put into a cognitive anxiety perspective, would indicate that at an initial examination these children acquire less relevant information about their environment to make accurate predictions about the threatening nature of the dental environment. This when combined with the other significant differences in this factor, increased pain expectation and decreased pain tolerance, allows the conclusion that children, by attending less to initial dental contacts, develop unreasonable pain expectations and consequently lowered pain tolerance (as per Melzack and Wall's work). These in turn

make the development of a phobic response to dentistry much more likely. This interpretation is given added weight by the other major difference in this factor that anxious children develop more specific fears or phobias than non-anxious children. In addition, the environmental factor showed no major differences between experimental and control group subjects. This result can only be tentative as the variables used in this section were a first attempt to measure the effect of a very complicated area of human experience. However, the data do suggest that family and peer group have little effect on a childs reaction to dentistry. This strengthens the phobic anxiety reaction outlined above and certainly confirms the finding that the anxious children generally cited gas, dentist manner and any treatment as the most common reasons for developing dental fear. These are all specific reactions to parts of the dental environment, gas only being given when a child cannot be treated routinely, dentist manner becoming more frustrated and less sympathetic as refusal to accept treatment becomes more intense and dental treatment being the specific fear in dental anxiety.

Therefore, it appears that fear of dentistry is a phobic response to the dental environment precipitated by low attention to initial dental contacts, which produces increased pain expectation and lowered pain tolerance.

8.2.2 CHANGES IN ANXIETY AND COOPERATION RATINGS BETWEEN EXPERIMENTAL AND CONTROL GROUP SUBJECTS:

The child self report anxiety measures show that both groups have similar levels of general anxiety about everyday events but the study group show more fear of dentistry itself. This supports the finding that dental anxiety is a phobic response and ties in closely with the results outlined above.

The video data again show a marked increase in anxiety and non-cooperation for the experimental group. This suggests that anxious children not only cognitively feel more fear but will tend to behaviouraly express more fear. This appears to contradict the observation by Williams et al. that anxious children give a "frozen response" in the dental situation, which implies that children do not respond behaviouraly to anxiety symptoms and are more passive in the dental situation. However, from the results of this study it is evident that anxious children do respond with outward manifestations of anxiety and are less willing to allow treatment to take place. This may well be due to the behaviour of this dentist, in that by empathising more and attempting less treatment he allows the children to express their fear. In contrast a less receptive dentist may induce a "frozen response" by not allowing children to express their fear in an attempt to induce compliance and thus complete treatment.

The parent and dentist ratings of the child anxiety provide clear evidence that they consider anxious children to be more anxious and less

cooperative than control subjects and that the parent and dentist consistently rated the levels of anxiety and cooperation as being of similar magnitude. The dentist was inclined to rate anxiety at a higher level and cooperation at a lower level. This may well relate to the dentists expectations of the child, as the dentist was aware, through the referal letters, of the childs previous dental behaviour. In addition, this effect may be due to the parents natural desire to underrate their childs anxiety.

The combination of significant changes in anxiety and cooperation measures provide evidence to assess the nature of anxiety responses to dentistry. Using a cognitive model of anxiety it is necessary to collect information from at least two of the possible channels for measuring anxiety (cognitive, behavioural, physiological). The data collected show a definite correlation between behavioural and cognitive anxiety measures, thus it is evident that fear of dentistry fits with the cognitive conception of anxiety. This leads to the conclusion that dental anxiety is an over reaction to threat which sets in motion primal responses to threat. These in turn provoke the range of behavioural and cognitive responses seen. Therefore it may be more useful to conceive fear of dentistry as a fear of potential injury. This would also explain the connection between fear of medical and dental situations, as in both situations an authority figure (doctor/dentist) is attempting to examine areas of the body to assess possible damage and effect necessary

treatment. It is the treatment which is feared and as the doctor/dentist is the person who carries out the treatment in a specific environment (the surgery/theatre) the dentist and environment become the feared objects in the childs mind.

Therefore, the anxiety and cooperation measures show parents and dentist are able to distinguish fearful and non-fearful children and provide evidence to postulate that fear of dentistry may be conceived as a fear of potential injury.

8.3 OTHER FACTORS HAVING A SIGNIFICANT EFFECT ON CHILD BEHAVIOUR

This section is concerned with those factors outside of the childs immediate control which can affect the way the child will respond. These fall into two categories, firstly the type of treatment and whether the dentist has treated the child before. Secondly, an analysis of changes in dentist behaviour from experimental to control group subjects.

8.3.1: EFFECTS OF TYPE OF TREATMENT AND WHETHER TREATED BEFORE:

The results show the type of treatment to have a marginal effect on anxiety whereas visiting a new dentist has a marked effect on dental anxiety. This suggests that one of the major dental stressors on children is visiting a new dentist. The children appear to develop a fear of dentistry, then as they visit a dentist over a period of time to develop a level of trust with one dentist (cf Venham 1977, 1979). If they then have to change dentists this reawakens all their fears about injury and pain and they have to learn to trust a new dentist.

The finding that type of treatment has only a marginal effect on anxiety may well be very misleading, as those who had not been treated before would only have received an initial examination. As initial contact with a dentist is so stressful this would affect the difference between the invasive and non-invasive procedures. This assumption is supported by data from section 6.8 of the results, where initial examination (non-invasive) was seen to be more stressful than

restorative treatment (invasive). In addition the type of treatment did not include any extractions, whose stressful nature may well have increased the significance of type of treatment on a childs response to dentistry.

Therefore, it is apparent that visiting a new dentist is a significant stressor on already anxious children and that this may have affected the significance of type of treatment by increasing the anxiety reported at initial examination.

8.3.2 EFFECT OF CHILD ANXIETY ON DENTIST BEHAVIOUR

Various conclusions can be reached concerning dentist behaviour from the data collected. It appears that when treating anxious patients the dentist talks more to the child and less to others in the surgery, gives more general feedback and persuades more, questions for feelings and reassures and pats/strokes children more. These variables are also closely connected with the anxiety measures used in the project. When comparing this with Weinstein's (1982) conclusions the following model becomes apparent. This dentist markedly changes his behaviour with regard to anxious patients, but not necessarily maximising anxiety reducing dentist behaviour. By concentrating more on the anxious child, by directing his vocalisations to the child in particular the dentist is obviously working hard to overcome the childs anxiety. This is reinforced by his use of general feedback, questioning for feelings and

patting/stroking the child, which are all identified by Weinstein as behaviours likely to reduce anxiety. However, this dentist also increases the amount of persuasion to accept treatment used and the level of reassurance given. Both of these variables are associated in Weinstein's work with increasing a childs anxiety about treatment and are associated with frustration on the dentists part.

The dentists treatment of new patients can be analysed in the same way, where specific and general feedback, questioning for feelings and patting or stroking the child all increase. However, so do persuasion and reassurance which are not beneficial and explaining/demonstrating procedures which Weinstein found was not as beneficial as has previously been supposed, e.g. the tell-show-do technique.

In addition the anxiety measures correlated with various other dentist behaviours. The most frequently occurring associations were between rhetorical questions, non-direction, gently stopping the child from moving too much and denying feelings of anxiety and fear levels in children. These are all behaviours outlined by Weinstein as likely to increase the anxiety of a child.

Therefore, it is evident that this dentist does alter his behaviour when treating anxious children and often changes his behaviour in ways beneficial to the child. However, two statements can be made from this evidence which could possibly improve the childrens response to dentistry. Firstly, this dentist should concentrate more on questioning

for feelings and giving general and specific feedback and less on persuasion and reassurance. Secondly, the tell show do technique which forms the basis of this dentists philosophy needs to be reassessed in the light of Weinstein's work.

As a final comment in this section, the author would like to state that this dentist has had considerable experience with children and it is a compliment to his work that the anxiety and cooperation levels of the children in the study were never beyond what would be expected from averagely anxious children.

.4 ANALYSIS OF VARIABLES MOST LIKELY TO PROVIDE A CHECKLIST OF OBSERVATIONS TO ISOLATE CHILDREN AT RISK OF REFUSING TREATMENT:

From the data it was evident that four variables (pain expectation, arents pre-treatment rating of the childs anxiety, childs reaction to st dental appointments and whether treated by this dentist before) uld be isolated as the most potentially predictive of dental refusal. wever, when subjects to a multiple regression analysis only the rents rating of the childs anxiety pre-treatment proved to be gnificantly connected with various anxiety measures.

From this evidence it is obvious that the parents are the best dicators of a childs likely behaviour.

In addition, the evidence presented in this discussion provides rong evidence for childrens fear of dentistry to be best described as phobia. As such asking the parent about a childs previous dental periece and reaction to any treatment procedures, when taken in njunction with the parents expectation of the childs behaviour, may ovide useful information about a childs exposure to and tolerance f dental procedures.

Lastly, it is evident from this discussion that an initial contract ith a new dentist is particularly stressful for a child, particularly a ild already nervous about dentistry. Therefore, dentists should take rticular care, through using behavioural management and counselling chniques, to make an initial contact an experience which is likely to

gain trust and respect from the child.

In short, a checklist of observations which would be beneficial when treating a new patient could be:

1. Ask the parent how they think their child is likely to react to todays appointment.
2. Ask the parent what dental procedures the child has experienced in the past and how the child reacted to these procedures.
3. Be particularly careful about what is said and what is attempted at the first session, as one slip could ruin the trust and respect you are hoping to build up.

8.5 THE EFFECTS OF RA ON DENTIST AND CHILD BEHAVIOUR

This project attempted to look at the effects of RA on both the dentist behaviour and the childs anxiety, to do this both the areas to be analysed will be discussed separately. Before discussing the effect of RA it is necessary to state that as the groups used were so small (14 children had had RA, of which 5 were videoed with and without receiving RA) any conclusions reached are extremely tentative, though at least worth putting forward for discussion.

8.5.1 EFFECTS OF RA ON CHILD BEHAVIOUR:

The data shows that there were no significant changes in behaviour for either those children who had had RA or when undergoing RA as opposed to when not undergoing RA. Therefore it appears that RA has very little effect upon a childs behaviour and that those selected to receive RA do not constitute a homogeneous subgroup of the apprehensive children.

There are two points which can be raised concerning this finding. Firstly, the children undergoing RA were receiving restorative treatment, whereas when not undergoing RA, they were not receiving any treatment other than an examination or fissure sealant. As neither of these procedures is particularly stressful, the fact that there is no difference in behaviour with or without RA could represent a decrease in anxiety when having RA. Secondly, the data show that clinical judgement as to who received RA does not discriminate between those who would most benefit from RA and those who could be treated in

other ways. This raises two questions, is there such a subgroup of anxious children ? and if there is such a subgroup how could you identify a child who belonged to that group ?

Overall, the data in this section suggest that much more research needs to be done into the use and effectiveness of RA upon children.

8.5.2: EFFECTS OF RA ON DENTIST BEHAVIOUR:

When using RA the dentist was more likely to give general feedback and use stop mechanisms and talk less to others in the surgery. This shows the dentist is concentrating on the child and using two beneficial behaviours (general feedback and provision of a stop mechanism) with greater regularity in order to control anxiety. This implies that when using RA the dentist is aware of a childs anxiety but does not seem to reach the frustration point of persuading and reassuring which he reaches with the experimental group as a whole. Therefore an effect of RA may be to relax the child enough for the dentist to be able to complete his work in a time scale which prevents frustration becoming a problem.

When treating children who had had RA the dentist again talks less to others in the surgery, implying increased concentration on the child, gives more specific but less general feedback and had more problems maintaining treatment contact (which necessitates holding the child). This implies that having had RA the child is still nervous about dentistry, but the dentist is working hard to overcome this by praising

good behaviour, criticising bad and trying to complete treatment. However, holding a child is more likely to increase rather than decrease a childs anxiety and would seem to indicate a level of impatience or frustration at the childs behaviour.

Overall, very little can be concluded about dentist behaviour, though it seems that giving RA in some way allows the dentist to work with less frustration.

8.6 ANALYSIS OF FACTORS ARISING FROM THE LITERATURE REVIEW:

This section concerns an analysis of those points of the summary of findings which were not directly assessed by this project, in an attempt to find out how closely the results in this section fit with the developing perspective of this project and with the dental literature. The data will be presented in three sections, as per the three major factors of dental anxiety, medical/dental, individual and environmental.

8.6.1 MEDICAL/DENTAL FACTOR:

For the majority of anxiety variables no significant differences were found between initial examination, restorative treatment and recall. However, for those where a significant difference was found the initial examination proved more stressful than restorative procedures and recall. This conflicts with the dental literature, where it was found that initial examination and restorative treatment were more anxiety provoking than recall. It is difficult to see why this effect should have been found, except that the skill of this particular dentist, whose experience with anxious children has been developed over many years, has masked the stressful nature of restorative treatment and to a certain extent initial examination. This would certainly explain the generally low behavioural anxiety scores and may also reflect the more relaxed atmosphere of working in a dental hospital as opposed to general practice. Indeed, the pressure of time in a general practice may directly affect the whole reaction between dentist and child.

The high correlation between pain expectation and dental trauma and correspondingly low connection between unexpected dental treatment and dental trauma accords with the findings of the literature review. This adds weight to the finding that it is expectation of trauma rather than experience of trauma which is related to developing dental anxiety. This is also in accord with the psychological literature where expectation of a painful stimulus is more stressful than repeated experience of the same painful stimulus. This suggests that much of the focus of the phobic response to dentistry is centred upon expectations of hurt or injury rather than on dentistry itself.

Little connection was found between medical surgery and dental anxiety, this conflicts with the majority of data in the dental literature, though there is very little work done in this area. However, as one of the criteria for exclusion from this project were major physical problems such as heart defects, where one could expect a child to have undergone major surgery, these data may not accurately reflect the effect of medical surgery.

8.6.2: INDIVIDUAL FACTOR:

This project found no data which would confirm or deny any of the individual variables seen to affect dental anxiety. However, the lack of significant age effects may be due in part, to the minimum age for inclusion being set at 6 years. This was the age at which the data suggested children began to react independantly of their parents to the

dental situation. Overall, the individual factor appears to have little connection with dental anxiety and this may explain the generally ambivalent nature of previous findings in this area.

8.6.3: ENVIRONMENTAL FACTOR:

The only major environmental factor which proved significant was the connection between a childs reaction to treatment and the parents expectation of the childs behaviour. This supports the finding that the parents pre treatment rating of the childs anxiety was the only variable capable of predicting a childs anxiety. It appears that parents are very aware of their children's likely responses and that those responses do not necessarily reflect the parents, siblings or peers reactions. There may be two reasons for this discovery, either the assessment of environmental variables needs to be investigated more thoroughly or dental anxiety is indeed a focused fear or phobia.

Overall, these results suggest that the model of dental anxiety as a phobia with little individual or environmental precursors reflects the wider findings of the project. In addition, the data do generally reflect the findings of the literature review, though differences have been noted and could be explained by the skill of the dentist, the groups selected and the ambivalence of previous findings.

8.7 AN ASSESSMENT OF THE PSYCHOLOGICAL MODEL USED:

This section deals with the results relevant to the treatment of anxiety and cooperation as separate entities and the use of a cognitive perspective of anxiety.

The measures of anxiety and cooperation were highly correlated, implying that anxiety and cooperation are not separable and actually reflect the same inner state. This may not be as cut and dried as it appears, because most measures of anxiety involve assessments of a childs cooperation and vice versa. Therefore to assess this assumption it would be essential to develop scales where assessment of anxiety responses and cooperation responses could be isolated.

The cognitive perspective used was validated by the correlation between child self report anxiety and behavioural measures of anxiety. It certainly appears that in order to reach any certain conclusions about the anxiety level of a child it is necessary to acquire data from at least the cognitive and behavioural channels. This also adds weight to the theory that anxiety is a construct not a concept and that anxiety should be viewed as a symptom and not a cause of refusal of treatment.

8.8 AN ASSESSMENT OF THE EFFECTIVENESS OF VIDEO RECORDING FOR RESEARCH PURPOSES:

The most fundamental assessment of the effectiveness of video recording is the reliability with which raters can gain data from the recordings. This project showed that the scales used achieved a very high intra observer reliability and an acceptable level of inter observer reliability. There were some problems with the inter observer reliability, namely the Weinstein Dentist Behaviour Profile empathy section. This was a particularly complex scale which took the author at least three months to master. When teaching other raters to use the scale, this level of training was impractical and the problems with reliablity reflect this. It would be useful to have a simpler assessment of dentist behaviour for future projects as this area of the dental situation has been seen to provide useful insights into the childrens reactions to dentistry.

In a wider context the video provided a lasting record of behaviour which could be analysed at leisure and facilitated a much greater level of information about behaviour in the dental setting to be obtained. Video recordings also have the added advantage of providing valuable teaching material, and an ability to observe anxious chidren without adding to the stress of the situation by having students present in the surgery.

Overall, the videos proved to be very effective in a research

context and to provide a valuable teaching resource. However, measurement of dentist behaviour would benefit from the development of a simpler scale, which would allow this important aspect of the dental environment to be assessed with greater reliability.

9 SUGGESTIONS FOR FURTHER RESEARCH:

1. The environmental factor of dental anxiety, as has been stated throughout this project, has received very little attention from dental researchers. A study devoted to explaining the psychological literature on family and peer group effects upon a subject's behaviour and applying this to the dental situation may well yield significant results.

2. The notion of a "frozen response" by anxious children in a dental setting, first noted by Williams et al. (1985), needs explaining further. This idea is very difficult to assess and does not readily accomodate behavioural assessment. Thus some form of measure for "frozeness" may be a required first step to testing the effect of "freezing" in dentally anxious patients.

3. A further experiment is needed to assess the effect of type of treatment given and whether treated before. These two variables may well have been adversely affected by the number of children undergoing initial examination in this study. Thus a study looking at the relative merits of these two variables as determinants of behaviour in the dental situation is necessary to unravel the complex interaction between the two variables seen in this study.

4. More research into the effectiveness of RA is still needed. There are two particular areas of concern outlined by this project, firstly, are there a group of children for whom RA would be the most effective treatment ? Secondly, how much of a dentists decision to use RA is

related to the dentist rather than the child ?

5. An assessment of anxiety and cooperation as separate measures was hampered by the overlap in measurement criteria for the two variables. To enable a more accurate assessment of the possible differences between these two variables more accurate measuring techniques need to be devised.

6. The Weinstein Dentist Behaviour Profile has proved to be a good, reliable measure of dentist behaviour. However, the profile takes a long time to score and is unnecessarily detailed for most experimental purposes. Therefore, it is suggested a simpler version of this profile would facilitate research into the effect of dentist behaviour upon childrens responses.

10. CONCLUSIONS

1. Dental refusers will be more anxious and/or less cooperative than non-refusers.

Dental refusers were shown to be more anxious and less cooperation than non-refusers.

2. The major variables associated with dental anxiety (medical/dental, individual and environmental) will provide data to enable the distinguishing of high risk children with regard to dental refusal.

The above variables allowed the following conclusion to be reached, that fear of dentistry leading to dental refusal is a phobic response to the dental environment. It is postulated that this phobic response is precipitated by lowered attention to initial dental contacts, which increases pain expectation and lowers pain tolerance. There is also evidence that fear of dentistry can be conceived as a fear of potential injury rather than a fear of dentistry itself.

3. The variables type of treatment and whether treated before by this dentist will significantly affect a childs reaction to the dental situation.

The variable whether treated before by this dentist indicated that visiting a new dentist markedly increases the anxiety of already anxious children. Type of treatment did not prove to have a significant affect on childrens behaviour, but this may have been masked by the powerful effect of whether treated by this dentist before.

4. The data will provide information which will allow the construction of a checklist of questions/observations to enable dentists to detect possible treatment refusers at initial examination.

The data allowed the formulation of the following checklist that could be used to aid dentists assess a childs anxiety at an initial examination:

1. Ask the parent how they think their child is likely to react to todays appointment.

2. Ask the parent what dental procedures the child has experienced in the past and how the child reacted to these procedures.

3. Be particularly careful about what is said and what is attempted at the first session, as one slip could ruin the trust and respect you are hoping to build up.

5. The RA group of children will form a homogeneous group who differ with regard to some medical/dental, individual and environmental variables and/or dentist behaviour from the rest of the experimental group.

This project produced no evidence that the RA group could in any way be distinguished from the rest of the experimental group either in terms of the major variables or changes in dentist behaviour.

6. Dentist behaviour will not alter as a consequence of treating anxious children.

The dentist did significantly alter his behaviour when treating anxious children, and the majority of these changes in behaviour could be identified as beneficial in reducing the childs anxiety.

7. Anxiety and cooperation are two distinct facets of behaviour that need not correlate with each other.

Anxiety and cooperation appear to be part of a unitary concept and were inseparable in this project. However, questions as to the validity of anxiety and cooperation measures themselves have been raised by this study.

8. Video tapes are an effective tool for assessing dental anxiety in a research setting.

The video tapes proved a very effective research tool in terms of reliability, information gathering potential and by providing a valuable teaching resource.

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13. APPENDICES

APPENDIX 1: INITIAL INTERVIEW QUESTIONNAIRE

NEWCASTLE DENTAL HOSPITAL

We are studying the attitudes of children and their parents to dental treatment.

It would be a great help if you would answer some questions.

All the information we obtain will be kept in the strictest confidence and will be used *only for* the purpose of research:

We would like to thank you for your time and the help you have given us.

CHILD'S NAME: _____ AGE: _____

SEX: M/F _____ TODAY'S DATE: _____

HUSBAND'S OCCUPATION: _____

Is this your child's FIRST visit to the Dental Hospital ? YES/NO

If not, how many times has he/she been before ? _____

What treatment is your child going to recieve today ? _____

_____

GENERAL MEDICAL INFORMATION

1. HAS YOUR CHILD EVER HAD ANY OPERATIONS, SURGERY, ACCIDENTS OR ILLNESS REQUIRING A STAY IN HOSPITAL ?

If yes, how many ? _____ How long in hospital ? _____

2. HAS YOUR CHILD EVER HAD ANY ACCIDENTS OR ILLNESS REQUIRING OUTPATIENT TREATMENT ?

If yes, how many ? _____ How many outpatient visits ? _____

3. a) HOW HAS YOUR CHILD REACTED TO PAST MEDICAL PROCEDURES ?

Very poorly _____ Poorly _____ Moderately Well _____ Very Well _____

b) If Poorly/Very Poorly then ask whether there is any reason the mother can attribute this to.

4. IN THE LAST 2 YEARS, HOW HAS YOUR CHILD LOOKED FORWARD TO CONTACTS WITH MEDICAL PEOPLE ?

With much fear _____ A little fear _____ No fear at all _____

5. IN THE LAST 2 YEARS, HAS YOUR CHILD EXPERIENCED ACTUAL PHYSICAL PAIN IN CONNECTION WITH MEDICAL PROCEDURES ?

Quite often _____ (3 or more) Occasionally _____ (1-2 times) None _____

ABOUT THE DENTIST

1. AT WHAT AGE DID YOUR CHILD FIRST GO TO THE DENTIST ? _____

For what reason ? Toothache _____

Swelling of face _____

Bleeding of gums _____

Routine check up _____

Other _____

What was done at this 1st visit ?

Examination _____

Cleaning of teeth _____

Filling(s) _____

Extraction with injection _____

Extraction under general anaesthetic _____

Prescribed medicine _____

Any other treatment _____

2. HOW WAS THE FIRST VISIT ?

Pleasant _____ Neutral _____ Unpleasant _____

3. a) HOW WERE SUBSEQUENT VISITS TO THE DENTIST ?

Pleasant _____ Neutral _____ Unpleasant _____

b) HAS THERE BEEN AN INCIDENT WHICH YOU THINK COULD HAVE CONTRIBUTED TO YOUR CHILD'S DENTAL FEAR ?

4. HOW WOULD YOU RATE YOUR CHILD'S ANXIETY (FEAR/NERVOUSNESS) AT THIS MOMENT ?

Not at all anxious 10 20 30 40 50 60 70 80 90 100 Extremely anxious

5. HOW DO YOU EXPECT YOUR CHILD TO REACT TO THE DENTAL CHAIR ?

Very poorly _____ Poorly _____ Moderately Well _____ Very Well _____

6. HOW WOULD YOU RATE YOUR OWN ANXIETY (FEAR/NERVOUSNESS) AT THIS MOMENT ?

Not al all anxious 10 20 30 40 50 60 70 80 90 100 Extremely anxious

7. DURING THE PAST YEAR, HAS YOUR CHILD BEEN IN CONTACT WITH ANYONE WHO HAS HAD AN UNPLEASANT DENTAL EXPERIENCE ? Yes _____ No _____

8. HAS YOUR CHILD EVER RECEIVED ANY UNEXPECTED DENTAL TREATMENT ?

9. DO YOU AND YOUR HUSBAND GO TO THE DENTIST ?

Regularly _____ Sometimes _____ Not at all _____

TEMPERAMENT SCALES BASED ON WORK BY THOMAS CHESS AND BIRCH

COULD YOU RATE YOUR CHILD ON EACH OF THE 5 SCALES BELOW TO SHOW HIS/HER TYPICAL STYLE OF BEHAVIOUR.

1. ACTIVITY: High = Engages in vigorous activity (e.g. sports) - runs around house.

Low = Very quiet person

Low 0 10 20 30 40 50 60 70 80 90 100 High

2. APPROACH/WITHDRAWAL: Approach = Reacts well to new situations/people/places

Withdrawal = Reacts badly to new things - prefers not to change (disturbed by novelty)

Withdrawal 0 10 20 30 40 50 60 70 80 90 100 Approach

3. ADAPATABILITY: Adaptable = settles down soon after a disruption (e.g. moving house, school, new teacher)

Non-adaptable = Finds it difficult to settle down

Non-adaptable 0 10 20 30 40 50 60 70 80 90 100 Adaptable

4. QUALITY OF MOOD: Positive = Smiles at everyone - a 'happy' child
Negative = Cries a lot - generally 'unhappy'

Negative 0 10 20 30 40 50 60 70 80 90 100 Positive

5. ATTENTION SPAN/PERSISTENCE: Persistent - will spend a long time at a task
Non-persistent - quickly loses interest

Non-persistent 0 10 20 30 40 50 60 70 80 90 100 Persistent

ABOUT YOUR CHILD

1. DO YOU THINK YOUR CHILD IS PARTICULARLY UNABLE TO TOLERATE PAIN OR DISCOMFORT ?

Tolerates Pain Well 0 10 20 30 40 50 60 70 80 90 100 Cannot tolerate any pain or discomfort

2. HOW WORRIED WOULD YOU SAY YOUR CHILD GETS ABOUT VARIOUS THINGS (E.G. SCHOOL, HOLIDAYS, ETC.) ?

Not Worried 0 10 20 30 40 50 60 70 80 90 100 Extremely Worried

3. HOW MANY BROTHERS AND SISTERS DOES HE/SHE HAVE ? _____

What ages are they ? _____

4. HOW DOES YOUR CHILD LIKE SCHOOL ?

Likes it a lot _____ Neutral _____ Doesn't like it at all _____

5. DOES YOUR CHILD PLAY EASILY WITH UNFAMILIAR CHILDREN ?

Plays easily _____ Neutral _____ Finds it difficult to mix with children he/she doesn't know _____

6. HAVE THERE EVER BEEN PROBLEMS WHEN YOUR CHILD HAS CHANGED SCHOOL ?

7. WHO DOES YOUR CHILD PLAY WITH MOST ?

Brothers and sisters _____

Relatives _____

Brothers and sisters friends _____

Own friends _____

8. ARE THESE MOSTLY YOUNGER, OLDER OR THE SAME AGE AS YOUR CHILD ?

9. IS YOUR CHILD AFRAID OF ANYTHING IN PARTICULAR LIKE DOGS, CATS, ETC. ?

If yes - how many things is he/she afraid of ? _____

10. HAVE THERE BEEN ANY MAJOR FAMILY CHANGES RECENTLY ?

11. HAVE YOU ANY OTHER WORRIES ABOUT YOUR CHILD ? _____

12. ASK CHILD: CAN YOU LOOK AT THIS SCALE FOR ME AND TELL ME HOW MUCH YOU THINK THE DENTIST MIGHT HURT YOU TODAY ?

Not at all 0 10 20 30 40 50 60 70 80 90 100 A lot

CORAH DENTAL ANXIETY SCALE

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

   (b) I wouldn't care one way or the other

   (c) I would be a little uneasy about it

   (d) I would be afraid it would be painful and unpleasant

   (e) I would be very frightened of what the dentist might do.

2. When you are waiting in the dentists office for your turn in the chair, how do you feel ?

   (a) Relaxed

   (b) A little uneasy

   (c) Tense

   (d) Anxious

   (e) So anxious that you sometimes break out in a sweat or almost feel physically sick.

3. When you are in the dentists chair waiting while he gets his drill ready to begin working on your teeth, how do you feel ? (Same alternatives as 2).

4. You are in the dentists 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 gums, how do you feel ? (Same alternatives as 2).

question	1	2	3	4
score				

CHILDREN'S MANIFEST ANXIETY SCALE

How I Usually Feel

Name ..... Age .....

Read each question carefully. Put a circle around the word YES if you think it is true about you. Put a circle around the word NO if you think it is not true about you.

1. It is hard for me to keep my mind on anything ..... YES NO
2. I get nervous when someone watches me work ..... YES NO
3. I feel I have to be best in everything ..... YES NO
4. I blush easily ..... YES NO
5. I like everyone I know ..... YES NO
6. I notice my heart beats very fast sometimes ..... YES NO
7. At times I feel like shouting ..... YES NO
8. I wish I could be very far from here ..... YES NO
9. Others seem to do things easier than I can ..... YES NO
10. I would rather win than lose in a game ..... YES NO
11. I am secretly afraid of a lot of things ..... YES NO
12. I feel that others do not like the way I do things ..... YES NO
13. I feel alone even when there are people around me ..... YES NO
14. I have trouble making up my mind .....: YES NO
15. I get nervous when things do not go the right way for me ..... YES NO
16. I worry most of the time ..... YES NO
17. I am always kind ..... YES NO
18. I worry about what my parents will say to me ..... YES NO

19. Often I have trouble getting my breath ..... YES NO
20. I get angry easily ..... YES NO
21. I always have good manners ..... YES NO
22. My hands feel sweaty ..... YES NO
23. I have to go to the toilet more than most people ..... YES NO
24. Other children are happier than I ..... YES NO
25. I worry about what people think about me ..... YES NO
26. I have trouble swallowing ..... YES NO
27. I have worried about things that did not really make any difference later ..... YES NO
28. My feelings get hurt easily ..... YES NO
29. I worry about doing the right things ..... YES NO
30. I am always good ..... YES NO
31. I worry about what is going to happen ..... YES NO
32. It is hard for me to go to sleep at night ..... YES NO
33. I worry about how well I am doing in school ..... YES NO
34. I am always nice to everyone ..... YES NO
35. My feelings get hurt easily when I am scolded ..... YES NO
36. I tell the truth every single time ..... YES NO
37. I often get lonesome when I am with people ..... YES NO
38. I feel someone will tell me to do things the wrong way ..... YES NO
39. I am afraid of the dark ..... YES NO
40. It is hard for me to keep my mind on my school work ..... YES NO

41. I never get angry ..... YES NO

42. Often I feel sick in my stomach ..... YES NO

43. I worry when I go to bed at night ..... YES NO

44. I often do things I wish I have never done ..... YES NO

45. I get headaches ..... YES NO

46. I often worry about what could happen to my parents ..... YES NO

47. I never say things I shouldn't ..... YES NO

48. I get tired easily ..... YES NO

49. It is good to get high grades in school ..... YES NO

50. I have bad dreams ..... YES NO

51. I am nervous ..... YES NO

52. I never lie ..... YES NO

53. I often worry about something bad happening to me ..... YES NO

RELIABILITY AND VALIDITY DATA ASSOCIATED WITH STANDARD MEASURES USED IN INITIAL INTERVIEW

Corah Dental Anxiety Scale: (Corah, 1969).

Internal consistancy using Kuder-Richardson Formula 20 = 0.86.

Test-Retest reliability using Kuder-Richardson Formula 20 = 0.82.

Validity, based on two dentists ratings compared with patient score, correlations of dentist ratings with patients score were 0.41 x 0.42 which yielded a significance level $p < 0.01$.

Child's Manifest Anxiety Scale: (Castenada & McCandless, 1956)

Test-Retest Reliability using Pearsons r: for anxiety scale = 0.90

for lie scale = 0.70

APPENDIX 2: MEASURES TAKEN DURING TREATMENT

WEINSTEIN DENTIST BEHAVIOUR PROFILE

Behaviour profile rating scale

	Successive 3-minute observation periods							
	1	2	3	4	5	6	7	8
Vocalization								
(1) Dental (to child)								
(2) Non-Dental (to child)								
(3) Dental (to other than child)								
(4) Non-dental (to other than child)								
(5) No vocalization								
Direction								
(1) Directs immediate behaviour by command								
(2) Shows, demonstrates, orients/explains and responds to questions concerning the treatment or appointment								
(3) Sets rules and limites for future behaviour (do's and don'ts)								
(4) Provides specific feedback concerning behaviour - positive and negative								
(5) Provides non-specific feedback concerning behaviour - positive and negative								
(6) Finds fault with behaviour angrily, threatens, acts gruff to dental behaviour to gain co-operation; criticisms								
(7) Tries to persuade (personal appeal), coaxes, pleads, to direct behaviour or gain confidence								
(8) Raised rhetorical questions (interest not in question but patient response)								
(9) No direction								

Empathy								
(1) Questions for feelings or pain, or acknowledge feeling or pain								
(2) Reassures - verbal/non-verbal								
(3) Ignores expressed feeling, or statement of pain (apparent, e.g. "ouch")								
(4) Denies statement or expression of feeling or pain								
(5) Humiliates, belittles, other putdowns or name calling								
(6) Provides signal mechanism to stop procedure or asks about child preference								
(7) None of the above								
Physical Contact								
(1) Touches face or mouth as part of normal procedure								
(2) Touches, pats, strokes child or tickle								
(3) Hold child (child not moving or interfering with treatment)								
(4) Restrains child in any way - including placement of mouth props (child moving or interfering with treatment)								
(5) Assist child enter/leave chair; or positioning								
(6) No physical contact								

MELAMED CHILD BEHAVIOUR PROFILE

Successive 3-minute observation periods

	1	2	3	4	5	6	7	8	9	10
Office Behaviour										
(1) Inappropriate mouth closing										
(1) Choking										
(2) Won't sit back										
(2) Attempts to dislodge instruments										
(2) Verbal complaints										
(2) Overreaction to pain										
(2) White knuckles										
(2) Negativism										
(2) Eyes closed										
(3) Cries at injection										
(3) Verbal message to terminate										
(3) Refuses to open mouth										
(3) Rigid posture										
(3) Crying										
(3) Dentist uses loud voice										
(4) Restraints used										
(4) Kicks										
(4) Stands up										
(4) Rolls up										
(5) Dislodges instruments										
(5) Faints										
(5) Leaves chair										

VENHAM ANXIETY RATING SCALE

0. Relaxed, smiling, willing and able to converse.

1. Uneasy, concerned. During stressful procedures may protest briefly and quietly to indicate discomfort. Hands remain down or partially raised to signal discomfort. Child willing and able to interpret experience as requested. Tense facial expression, may have tears in eyes.

2. Child appears scared. Tone of voice, questions and answers reflect anxiety. During stressful procedure, verbal protest, (quiet) crying, hands tense and raised, (not interfering much - may touch dentist's hand or instrument, but not pull at it). Child interprets situation with reasonable accuracy and continues to work to cope with his/her anxiety.

3. Shows reluctance to enter situation, difficulty in correctly assesing threat. Pronounced verbal protest, crying. Using hands to try to stop procedure. Protest out of proportion to threat. Copes with situation with great reluctance.

4. Anxiety interferes with ability to assess situation. General crying not related to treatment. More prominent body movement. Child can be reached through verbal communication, and eventually with reluctance and great effort he or she begins the work of coping with the threat.

5. Child out of contact with the reality of the threat. General loud crying, unable to listen to verbal communication, makes no effort to cope with threat. Actively involved in escape behaviour. Physical restraint required.

VENHAM PICTURE SCALE

RELIABILITY AND VALIDITY OF DATA ASSOCIATED WITH THE STANDARD MEASURES USED TO RECORD BEHAVIOUR DURING TREATMENT:

Venham Picture Scale: (Venham & Krember, 1979).

Internal Consistency estimated by Kuder-Richardson formula 20 = 0.838.

Test-Retest reliability of 0.70 using Pearson's r.

Melamed Child Behaviour Profile: (Melamed et al., 1975).

Interobserver reliability using Spearman rank correlation coefficient = 0.977.

Weinstein Dentist Behaviour Profile: (Weinstein et al., 1982).

Inter Observer reliability, Pearson's r = 0.85 - 0.94 for each specific behaviour.

Venham Anxiety Scale: (Venham et al., 1980).

Inter Observer reliability using Pearson's r = 0.78 - 0.98. Validity data comprised significant correlations with several self report and physiological indices.

APPENDIX 3: **FINAL MEASURES TAKE AFTER TREATMENT**

FOR MOTHER

COULD YOU PLEASE INDICATE ON THE FOLLOWING SCALES HOW YOU FEEL YOUR CHILD HAS BEEN FEELING AND BEHAVING DURING THE PRESENT TREATMENT SESSION:

HOW ANXIOUS DO YOU FEEL YOUR CHILD WAS ? :

Not anxious 0 10 20 30 40 50 60 70 80 90 100 Anxious

HOW CO-OPERATIVE DO YOU FEEL YOUR CHILD WAS ? :

Co-operative 0 10 20 30 40 50 60 70 80 90 100 Unco-operative

NAME OF CHILD .....

NAME OF DENTIST .....

COULD YOU INDICATE ON THE FOLLOWING SCALES HOW YOU FEEL THE CHILD YOU HAVE JUST BEEN TREATING REACTED TO THE DENTAL SITUATION:

HOW ANXIOUS WAS THE CHILD ? :

Not Anxious 0 10 20 30 40 50 60 70 80 90 100 Anxious

HOW CO-OPERATIVE WAS THE CHILD ? :

Co-operative 0 10 20 30 40 50 60 70 80 90 100 Unco-operative

COULD YOU INDICATE HOW ANXIOUS YOU FEEL THIS CHILD IS, IN GENERAL, ABOUT DENTISTRY ?

Not Anxious 0 10 20 30 40 50 60 70 80 90 100 Anxious

HAVE YOU TREATED THIS CHILD BEFORE ? YES/NO

COULD YOU TICK ANY OF THE FOLLOWING PROCEDURES THAT YOU USED DURING THIS TREATMENT SESSION:

Injection _____

Filling _____

Fissure Sealant _____

Scale and Polish _____

HAS THIS CHILD HAD A GENERAL ANAESTHETIC AND/OR RA BEFORE ? YES/NO