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YOUNG CHILDREN'S DISTRESS DURING RADIOLOGICAL EXAMINATIONS

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ABSTRACT

This thesis presents a series of studies aiming to understand young children's (12 to 41 months of age) distress behaviour during radiological examinations. A multifactorial model is proposed to account for variations in the amount of distress behaviour children exhibit during radiological examinations. By way of testing the model, the research examines the relative contribution of a number of variables to such distress behaviour.

The *Feasibility Study* (*n*=34) was designed mainly to obtain an overall understanding of the different examinations that young children receive at the Department of Paediatric Radiology in a children's hospital. It involved twelve different examinations.

The purposes of the *Pilot Study* (*n*=48) were to ensure that it was possible to assess in a systematic way the patterns of behaviour presented by young children undergoing ultrasound scans, and to identify and refine the structure of the instruments to be used in a substantial study which would be submitted to the hospital's Research Ethics Committee. The ultrasound scan was the sole examination observed in this study.

The *Intervention Study's* (*n*=213) main purpose was to assess whether an approach which involved prior rehearsal of the examination and an active, structured role for the parent and child, was effective in reducing children's distress. For this study, two different examinations, i.e., micturating cystogram and ultrasound scan were included.

The aims of the *Study of Staff Behaviour* (*n*=41) were to show whether the behaviour of the staff contributed to the child's reduced level of distress during the examination. It comprised observations of the ultrasound scan examinations.

The results demonstrated that the ultrasound examination, which was not painful or uncomfortable, was almost as distressing for these young children as an examination (the micturating cystogram) which involved substantial discomfort. Parent-child preparation was not effective in preventing or reducing the children's distress. However, staff behaviour during the initial phase of the examination was an important determinant of the child's subsequent distress behaviour.

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To the memory of my uncle
Sylvio Ferreira Guedes

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PREFACE

Most children experience, at one time or another, a visit to hospital for surgery, a medical examination or an out-patient appointment (e.g., Golding & Haslum, 1986). The visit may take place in a large teaching hospital, general or specialized in children, or in a health centre. Young children, especially, tend to find such encounters rather frightening.

Few studies have considered young children's distress during medical examinations and, to date, none have investigated distress during an examination considered to be non-invasive (i.e., where no discomfort or pain is involved in the procedure) and which requires little restraint for the children.

This thesis reports the results of a series of empirical studies aiming to understand young children's distress while undergoing a radiological examination.

A theoretical framework is presented whereby individual differences in the distress shown by young children are argued to be related to their individual and developmental limitations and to the way parents and staff support them during the examinations.

Chapter One reviews distress as a discrete emotion relevant to the study of young hospitalised children. The historical background of the study of children in hospital is presented, with special emphasis on the attachment theory postulated by Bowlby. This theory contributed to changes in hospital practice and is presented as a possible explanation for distress in young hospitalised children. Further aspects of attachment theory relevant to distress in hospital are considered in the light of more contemporary research which has criticised some of Bowlby's principal assumptions. Distress is then presented as a result of developmental characteristics, individual differences and environmental resources. Finally a multifactorial model is proposed which attempts to explain children's distress during hospital examinations.

Chapter Two reports a feasibility study designed to understand children's distress behaviour during radiological examinations. This sought to determine which examinations would be most suitable to be considered in a further study and which observational methods and instruments would be most appropriate.

Chapter Three presents the results of a pilot study where information was gathered in relation to one type of the radiological examination, ultrasound scan, and the behaviours young children presented during this examination. This enabled the adequacy of a standard observation procedure to be established.

Chapter Four describes two different radiological examinations: micturating cystogram and ultrasound scan. The major difference between the examinations was that one presented a certain degree of discomfort or pain whereas the other was non-invasive. The study was designed to test the efficacy of a specially designed intervention as compared with the preparation provided by play staff for young children undergoing these examinations, and with no preparation.

Chapter Five examines the importance of staff behaviour for the onset of distress in young children undergoing an ultrasound scan.

Chapter Six discusses the results of the empirical studies in the light of the multifactorial model of distress proposed in the initial chapter. The conclusions of the research and its implications for hospital practice are presented.

CHAPTER ONE

YOUNG CHILDREN'S DISTRESS IN HOSPITAL

It has been recognised for many years that young children find hospital treatments to be distressing (e.g., Golding & Haslum, 1986). Early research showed that parental presence (e.g., Brain & Maclay, 1968) and preparation for the procedures (e.g., Prugh, Staub, Sands, Kirschbaum & Lenihan, 1953) were beneficial in reducing distress.

Parallel to this increased awareness of the needs of children in hospital, changes in policy and practice related to their welfare while in hospital (The Platt Report, 1959) were generated.

However, children even now still show distress behaviour when experiencing a non-invasive medical examination on an out-patient basis (Goldberger & Wolfer, 1991). Studies have considered developmental characteristics and individual differences as well as aspects of the environment in an attempt to show how these variables contribute to the onset of distress.

Before considering the historical background to the study of young children's distress in hospital in detail, it seems essential to have an overall understanding of the concept of distress, as it is the core for the framework presented throughout this chapter and, broadly speaking, the whole thesis.

1.1 - DEFINING DISTRESS

The individual who dutifully accepts the task of finding a plausible explanation for a psychological term such as distress, will certainly note that the information gathered is difficult to present in a simple way. However, this same individual will have had an unique experience of distress. And having had such an experience does not mean that s/he will be able to put it in words.

As with many of the phenomena considered by psychologists, distress is a complex and difficult concept to define and with no clearly delimited boundaries. Distress is part of life. In fact, birth is often considered to be the first occasion of distress, perhaps due to the sudden exposure to a high level of stimulation upon being born. Crying is then the prototypical and most common indication of distress and this is the way infants and young children, as well as sometimes adults, express it (Izard, 1977; Murphy, 1983).

Kessen & Mandler (1961) suggest that distress is a state of discomfort and uneasiness. Mandler & Watson (1966) say that distress relates to the unavailability of effective alternative responses to an event.

According to Izard & Tomkins (1966) distress is a distinct class of negative affect which serves both biological and psychological functions. The authors support the view that a continued excessive level of stimulation generates distress. They add that "distress is the affect of suffering" (p.118). However, they suggest that although distress is a negative affect, it is less disturbing as well as less psychologically debilitating than the affect of fear.

Frankenhaeuser (1986) states that distress is built from 4 different feelings: anxiety, uncertainty, boredom and dissatisfaction. Anxiety, considered a vague feeling of uneasiness or apprehension, is related to the uncertainty linked to threat and fear (in a progressive way). Boredom arises because the individual is not interested in the situation and dissatisfaction enters into the scenario because (for example, in the case of a child undertaking a medical examination) s/he can not get out of it before being allowed to - the individual does not have the final word.

The three psychological functions of distress according to Tomkins (1963) are that firstly, distress communicates to the self and others that all is not well. Secondly, distress motivates to do what is necessary to reduce it and, thirdly, distress provides *negative motivation* that is not too debilitating or too intolerable for the individual. This means that the individual will search for strategies to use against the source of distress. Because of these functional characteristics,

> distress permits the individual to mobilize all his resources including those which take time (e.g., thinking through a problem) to solve the problems which activate distress. (Tomkins, 1963, p.5)

In other words, distress does not induce "avoidance strategies, but rather promotes remedial strategies which can attack the sources of distress. The presence of distress indicates a potential for remedial action either by the individual, or with his support" (Tomkins, 1963, p.54).

1.1.1 - Distress as a basic emotion

Distress is an "emotion somewhat different from general excitement" and also it "is the concomitant of unsatisfying experience" (Bridges, 1931, p.201).

According to Arnold (1960):

> emotion is the felt tendency toward anything intuitively appraised as good (beneficial), or away from anything intuitively appraised as bad (harmful). (p.182)

To Izard (1991), and according to Differential Emotions Theory, emotion is:

> a complex process with neural, neuromuscular/expressive, and experiential aspects. At the neural level emotion is defined primarily in terms of patterns of electrochemical activity in the central nervous system. ... At the expressive or neuromuscular level emotion is primarily facial activity and facial patterning. Secondarily it is bodily (postural-gestural, visceral-glandular, and sometimes vocal) response. At the experiential level emotion is essentially motivating experience or experience that has immediate meaning and significance for the person. The experiencing of emotion can constitute a process in consciousness completely independent of cognition. (p.44)

Izard (1978) suggests that there are five, innate early appearing, emotional/affective expressions: distress cry, smile, interest, startle and disgust. He adds that, although not necessarily present at birth, the mature human affective-motivational system comprises nine innate or *primary* emotions: distress, interest, enjoyment, surprise, fear, anger, shame, contempt, and disgust (Izard, 1977). To him, distress is among the most basic of *negative* emotions, in contrast to positive emotions such as interest and enjoyment. Specific stimuli or groups of stimuli elicit different emotions. According to Izard (1977), for example, pain, hunger, and cold cause distress; threat of pain, hunger or cold causes fear; insults and frustrations cause anger; personal loss causes grief; satisfaction causes joy.

Not all theorists accept Izard's arguments about the number and origins of *basic* emotions. Emotion can also be viewed as the result of a match or mismatch between events and the individual's concerns (Frijda, 1986). This *constructivist* view of emotions places more emphasis on the way in which emotions and cognitions are coordinated and integrated in attaining the individual's goals.

From a constructivist point of view, Lazarus & Folkman (1984) assume that emotions are the products of people's interpretation of changes in their most precious values and commitments. Similarly, Campos, Campos & Barrett (1989) say that "emotions are considered to be processes of establishing, maintaining, or disrupting the relationship between the organism and the environment on matters of significance to the person" (p.394). Lazarus (1991) supports a similar view but giving even more emphasis to conscious reflection, deliberation and even verbal instructions as major factors in affect elicitation and regulation.

In his publication *Emotion and Adaptation,* Lazarus (1991) considers distress not so much a basic emotion but as some sort of negatively valenced emotional overtone with diffuse meaning and that is "apt to be used in the context of stress rather than for identifying a particular emotion with a particular content" (p.83). Lazarus (1991) has also postulated a broader approach to the study of emotions: "...centered on the relationship between a person and the environment rather than either environmental or intrapersonal events alone" (p.40). He adds that "we cannot understand the emotional life solely from the standpoint of the person *or* the environment as separate units" (Lazarus, 1991, p.89).

A similar view has been put forward by Campos, Campos & Barrett (1989) and according to them, ecological factors are important aspects in emotion generation and regulation. Overall, "to understand emotion, one must understand that the human being lives in a web of interrelationships with social and physical objects" (Campos *et al.*, 1989, p.397).

Although Differential Emotions Theory and Constructivist accounts of emotion differ in a number of important ways, they both agree that emotions stem from a biological substrate and change with development. Initially the child, whenever disturbed, presents distress behaviour which is expressed mainly through crying (Izard, 1977; Murphy, 1983). As the child grows older the behaviour tends to be differentiated towards the source of distress and is more specific in its expression. Exemplifying this assumption, a study involving children from 2 to 19 months old receiving routine inoculations (Izard, Hembree, Dougherty & Spizzirri, 1983; Izard, Hembree & Huebner, 1987) observed that the emotional reactions following the needle penetration were mainly distress and anger. There was, however, an age difference in the expression of these emotions: young children presented mainly distress (crying and other behaviours which were interpreted as signalling the need for help) whereas the older children demonstrated more anger (as a kind of defensive action). Studies by Stenberg & Campos (1990) and by Campos (1988) reached similar results.

As well as developmental considerations, the onset and expression of distress and other emotions in children are generally considered to be influenced by two other processes: *appraisal* and *social* *referencing*. The way an individual responds to a distressing situation is related to the way s/he appraises it. Bowlby (1969) says that appraisal is the starting point of emotion. According to Arnold (1960):

> what we call *appraisal* or *estimate* is close to ... a sense judgment. In emotional experience such appraisal is always direct, immediate; it is a *sense judgment* and includes a reflective judgment only as a secondary evaluation. (p.175)

In contrast, for Constructivists such as Campos and Lazarus, the appraisal is not so much an immediate sensory or perceptual experience as a cognitive one. That is, the appraisal is not directly elicited by the environmental stimulus but, rather, is a process influenced by learning and experience, whereby the individual synthesises sensation and representation to produce an emotional response.

Parallel to the importance they give to appraisal in influencing distress, both Differential Emotions and Constructivist viewpoints consider social experience to be central to emotional development, although here too they adopt somewhat different perspectives. From a Differential Emotions viewpoint, basic emotions are not themselves learned, since they are biologically programmed. However, social experience allows the child to learn to regulate her/his emotions, using cognitive strategies to mediate their impact and expression. For the Constructivists, social and cultural experiences are the building blocks for emotional development, giving emotions their meaning and unique character. The phenomenon of *social referencing* has often being used to convey this idea. According to Campos *et al.* (1989), the term *social referencing* refers to "how the child seeks meaning from the emotions of the caregiver" (p.397). The parent's social cues help the child to understand how to respond when in an unfamiliar situation (Klinnert, Campos, Sorce, Emde & Svejda 1983). The young child will look to the parent, for instance, when in need of reassurance about whether to approach a non-familiar situation or a stranger. The parent's behaviour will then be reflected in the behaviour the child presents in relation to that situation, on this and subsequent occasions (Feinman, 1982; Rheingold & Eckerman, 1973).

1.1.2- Distress behaviour

Like other psychological variables, distress as an emotional experience has what Gilbert Ryle has referred to as *privileged access* (Ryle, 1949). That is, only the person experiencing the emotion is, strictly speaking, able to detect its occurrence. This presents obvious challenges to studies, like the present one, which aim to measure an emotion such as distress. This problem is exacerbated when studying young children, since they lack the linguistic and, possibly, reflective sophistication needed in order to report the existence of an emotion.

This problem has exercised the wits and ingenuity of scholars and scientists alike, leading to voluminous literature both in psychology and philosophy about the number of emotions, their defining features, and so on. This material will not be duplicated here. Instead, the approach adopted will be the pragmatic one of assuming that a close relationship exists between distress as an emotion and distress behaviour as the expression of the underlying mental state. This assumption is axiomatic to Differential Emotions Theory (Izard, 1977; 1991) which assumes a direct neurological connection between the basic emotions and their behavioural expression, particularly in infancy, where the link has not yet been extensively mediated by experience and learning (Izard, 1992; Izard, Huebner, Risser, McGinnes & Dougherty, 1980). Although such a direct correspondence is not assumed by the Constructivists, they too accept the existence of a close relationship between distress and distress behaviour during infancy. There is also substantial empirical evidence to support the use of measures of behavioural expression as indices of distress. For example in a study carried out by Kagan (1984), distress was defined as the occurrence of any of the behaviours of crying, going to the mother's lap, inhibition to play, throwing of toys or leaving the situation. A similar approach to and view of distress will be adopted here.

The instruments devised to measure distress comprise, in general, observation procedures which measure the occurrence, duration and frequency of behaviours which have been frequently related to distress. Associated with this type of observational measure, self-report of one's feelings and impressions in relation to an experienced situation may be included with older children and adults (Prestlik & Hindley, 1993). Physiological measures such as heart rate and palmar sweat may also provide information about people's arousal and distress (e.g., Elliott, Jay & Wood, 1987; Gonzalez *et al.*, 1989). Research on children's distress upon hospital admission or during examinations has devised and used instruments that rely on specific behaviours the children present and which are considered to be more or less direct indicators of distress. This point will be returned to more specifically when the instruments used to measure distress and applied to the research reported here are presented.

This brief introduction to contemporary ideas about the nature, origins and measurement of distress has hopefully conveyed some of the central findings, theories and issues which face research in this area. It has left many questions unanswered. For instance, there are questions about the relationship and distinction between cognitive and emotional aspects of distress, about the role of appraisal, about the influence of the environment on the regulation and expression of distress, and about the relationship between distress as a mental and behavioural phenomenon. These issues will be returned to later (section 1.5). For the moment, it is important to emphasise that, although there is disagreement among theoreticians about the characteristics of distress, their agreement is at least as great as their disagreement.

In accordance with all the existing theories, the view to be adopted here is that distress is a biologically-rooted, negatively valenced emotional state which is present at birth, has powerful motivational effects for the child and those who interact with her/him, and is affected by the child's individual characteristics and by development, experience and environmental factors. Although a distinction needs to be drawn between *distress* and *distress behaviour*, distress behaviour can be taken as a more-or-less direct index of the existence and degree of distress, particularly in young children.

In the following section, early research into the reasons for children's distress in hospital is reported. The influence attachment theory has had both as an explanation for young children's distress behaviour and as a potential generator of changes in the hospital provision for this young age group is then considered.

1.2 - THE STUDY OF DISTRESS IN CHILDREN IN HOSPITAL

The landmark in the study of children's distress in hospital was set by Beverly (1936) when referring to the emotional problems experienced by young children during and after their hospital admission. Spitz (1945) took this idea forward with his study of *hospitalism*[1] and his report of the harmfulness of institutionalisation for young children. Spitz studied 130 institutionalised children throughout their first year of life and showed that children living in institutions (or admitted since an early age to a long stay in hospital) tended to present a remarkable delay in their intellectual and motor development and, in some cases, with no obvious way of reversing this situation. This research was also seminal to the advancement of infant psychiatry as a discipline.

The most relevant finding in Spitz's study was the lack of stimulation experienced by the children, due to a dearth of contact with an individual carer. These children, despite being fed and cared for in their basic needs, were denied a more exclusive relationship as generally happens between the mother and her offspring. Stimulation through an effective contact and interaction with a principal carer started to be considered a crucial requirement for children's adequate development and future well being.

Some years after Spitz's initial attention to the psychiatric aspects of children in institutions, Bowlby (1951, 1958, 1969, 1973; Bowlby, Ainsworth, Boston & Rosenbluth, 1956; Bowlby & Robertson, 1952) theorized on attachment and separation issues which he believed to be essential in preserving the child's adequate emotional development.

Bowlby's theory and its impact on hospital policies are considered next.

[1] "The term hospitalism designates a vitiated condition of the body due to long confinement in a hospital, or the morbid condition of the atmosphere of a hospital " (Spitz, 1945, p.53).

1.2.1 - Bowlby's attachment theory

Bowlby's theory can be thought of as a unique blend of ideas from Psychoanalysis, Cognitive Psychology, Ethology and General Systems Theory. At the heart of this approach was the assumption that, just as evolutionary pressures had led to the development of neurological and behavioural systems to meet physiological needs (such as hunger and thirst), so innate avoidance and attachment systems existed in infants and parents as a means of promoting the infant's survival due to her/his total helplessness when born and considerable dependency throughout the early years (Bowlby, 1964; Illingworth, 1983; King, 1966).

Infant distress behaviour was the earliest manifestation of this system, so that the newborn infant was pre-programmed to produce crying and other distress signals which elicited caregiving from the mother or other carers. As the infant became more mobile, a further system, evolved in order to keep the infant in proximity to the caregiver, was added. At this age, fear and other emotional and cognitive functions developed to the point where strange people or environments were recognised and elicited wariness, leading the infant to seek to avoid the fear object and maintain proximity to the caregiver (Bowlby, 1969; 1973).

As well as accounting for early behaviour, Bowlby also developed his ideas to explain longer term behaviour and development more generally. Similarly to Piaget's (1954) ideas about cognitive development, Bowlby (1969) argued that children gradually internalise a cognitive *representation* of the external world and their place in it. Children who had experienced responsive care would see the world as a secure and reliable place, while the *secure base* provided by the parent would enable the child to explore the environment confidently and independently, knowing that a protective source was available when needed. In time, this view would be developed into an expectation that the world is controllable, while the child's view of her/himself would be that of a competent person with good self-esteem. In this way, children's early attachment relationships provided the seeds of their later ability to function as autonomous adults. In contrast, children who did not experience a sensitive and supportive environment during early life would grow up insecure, anxious, and lacking in self-esteem (Bowlby, 1973).

For Bowlby (1973) "the behaviour that reduces distance from persons or objects that are treated as though they provide protection is nothing other than attachment behaviour" (p.89). In principle, this could be distinguished from avoidance behaviour: "For behaviour that tends to increase distance from persons and objects that are treated as though they were threatening, the terms "withdrawal', 'escape' and 'avoidance' are all convenient" (Bowlby, 1973, p.90). However, it is clear in his writing that Bowlby considered avoidance and attachment systems to be intimately linked, biologically based systems, which had evolved together to protect immature offspring. Moreover, although he recognised that environments which were strange or provide what he called "naturally occurring clues to danger" could give rise to avoidance, particularly as the infant developed, he remained convinced that detachment from the main caregiver was the predominant factor mediating the onset and intensity of infant distress (Bowlby, 1973, p.86). For example, in the second volume of Attachment and Loss: Separation, Anxiety and Anger, he wrote that "whether a child or adult is in a state of security, anxiety or distress is determined in large part by the accessibility and responsiveness of his principal attachment figure" (Bowlby, 1973, p.23). In turn, this primary focus on the attachment figure led him to emphasise the issues of separation and insecurity as primary building blocks for development.

Bowlby proposed that the primary attachment behaviours can be mostly reliably observed in infants from about six months to three years of age. After that, as the child's level of development progresses, such needs are expressed in other ways. For instance, the child may talk more instead of clinging to the mother whenever requiring attention or comfort. A three-year-old child is also better able to accept the mother's absence for a period and tends to be more interactive when playing with other children (Sroufe, 1983). It seems that, as the infant develops into a child, the reaction to a strange place is much milder than at an earlier age and, as long as there is another familiar person with her/him, the child tends to feel secure and explores the new setting (Ainsworth, 1982).

When engaged in social interactions, children's expressions of positive affect appear to be intricately coordinated with visual fixations towards and away from the partner (Stern, 1974). As a result of these higher level integrations, more specific approach-avoidance procedures are added to the child's behavioural repertoire. These existing elements may, in turn, be accessed by subsequently maturing motivational systems such as those related to dependency, sadness, defiance, shame and pride. Therefore as children grow older they may react differently when in a distress situation; for instance, when approached by a stranger (Greenberg & Marvin, 1982; Kagan, Reznick, Snidman, Gibbons & Johnson, 1988; Lütkenhaus, Grossmann & Grossmann, 1985).

To Bowlby the lack of an attachment figure would have a negative effect on the child's development. He postulated that children who have a secure attachment have better possibilities of a normal and more adjusted life in the future. In Bowlby's (1988) own words:

> the model of self and attachment figure(s) that are built in the mind during childhood are held to be central features of personality functioning throughout life. (p.123)

Therefore, hospital admission of young children, according to the policy and practice of the past (where parents were not allowed to accompany their children while in hospital and, in many cases, even visits were restricted), was a threat to the prospect of a well adjusted mental life. Once the child was admitted to hospital and, as a result, separated from her/his mother or carer, the possibility of damaging the child's emotional and psychological development was established. The outcome of the separation would be related to disturbances or adjustment problems after discharge and in later life.

Prior to Bowlby's work, the assumption was that young hospitalised children tended to forget their parents' absence and adapted to the hospital environment, behaving normally. However, following the observations of Robertson (1953a; b, 1955, 1970; Robertson & Bowlby, 1952; Robertson, Bowlby & Rosenblunt, 1952; Robertson & Robertson, 1971), it became clear that the compliant behaviour of a child in hospital did not necessarily mean that s/he was adjusted to the hospital setting. The child was said to pass through three different stages during this period: *protest* (cries intensely and rejects attention from others), *despair* (withdrawal and enters a state of mourning for the loss of the mother/carer) and *detachment* (interacts and accepts the ward's offers, tends to ignore when the parent arrives and may not cry when the parent leaves). Through case studies recorded on film Robertson (1953a; 1958) demonstrated that these three different stages were the outcome behaviour of the emotional hardship these children experienced when away from their familiar people, things and places.

1.2.2 - Initial inquiry into distress of hospitalised children

Parallel to these initial observations by Spitz and Robertson and the work by Bowlby, empirical studies were carried out.

The literature in this area shows that the study of children in hospital and of child-parent separation due to hospital admission was approached from two different points of view. One considered that the provision of some sort of preparation for the child admitted to hospital would be beneficial in generating a better adjustment to the hospital environment, despite the separation from the parent. These children were allowed to receive some visits although these were often restricted by hospital policy. The other approaches, more closely related to Bowlby's assumptions, concentrated on the study of the relationship between separation upon hospital admission, its relationship with distress during the stay in hospital, and disturbance after discharge.

Overall, these studies attempted to throw some light on the ways in which children could adjust better to their hospital experience and to reinforce in a more scientific way the assumptions highlighted by Bowlby.

Additionally, policy changes were generated and some research was carried out in order to evaluate and monitor the implementation of the legislation.

Improving children's adjustment to the hospital experience

The studies under this heading considered preparation as a helpful tool when the child was admitted to hospital and, as a result, separated from the parent. Here, the issue of separation is considered as just one aspect of children's distress upon hospital admission and there is a focus on how aspects of the hospital environment can be made less threatening, in the belief that it would help reducing children's distress during medical treatment. These studies pursued a more holistic view in studying children's behaviour in hospital.

For example, the classical study by Prugh, Staub, Sands, Kirschbaum & Lenihan (1953) compared 100 children, aged 2 to 12 years, who had to be hospitalised for a period of one week under a variety of medical conditions, some of them requiring surgery. The purpose was to "clarify the nature of the effects of the experience of brief rather than prolonged hospitalisation upon children and parents" (p.73).

The study was carried out in the United States and the children's behaviours were observed under two different conditions. Fifty children who were treated according to the hospital's normal practice and who were allowed to receive the visit of the parent once a week formed the control group. The other group of 50 children were involved in an experimental program of ward management which allowed them to receive a parental visit daily, to participate in a play program scheme, and to receive preparation and support when about to undertake a medical examination. The parents in this group were oriented in how to get involved in the care of their hospitalised child. Observation of the children's behaviour was carried out at specific points during their stay in hospital.

The results showed that children in the experimental group presented less distress during their hospital stay and fewer disturbances to their behaviour (e.g., waking/sleeping, eating) on returning home, compared to children in the control group. The children in the control group presented more post-operative complications. The study also showed that the post-surgical recovery and discharge were shorter for children who were in the experimental group. Not least important was the finding that children younger than 4 years old

> ... who had undergone very severe stress in hospital, and who had shown the greatest difficulty in adapting to the ward milieu were those who tended to show persistent signs of emotional disturbance at three months following hospitalisation. (p.86)

This led to the suggestion that the younger children were particularly vulnerable to hospital admission. A further possible implication was that reducing the threatening nature of the hospital environment might be helpful independent of the effects of separation. However, the most frequent disturbance observed after these children's discharge from hospital was related to anxiety over separation from the parent.

Considering the relationship between preparation for hospital admission and later disturbance, Vaughan (1957) looked at a group of 20 children admitted to hospital for strabismus surgery and who, as a type of preparation, were specially interviewed prior to their admission to hospital. This group was compared to a control group who were admitted according to the ward's current practice (i.e., no preparation). This study was carried out in a British hospital and the conclusions reached were similar to the American study by Prugh *et al.* (1953). In relation to disturbance after hospital discharge, Vaughan stressed that the younger children (in his sample there were 4 children under the age of four years) were reported as presenting disturbed behaviours for as long as 6 months after discharge.

Even though some methodological differences made the studies of Prugh *et al.* and Vaughan not directly comparable, both of them highlighted the vulnerability of young children to distress due to their admission to hospital. Similar findings were observed in other studies (Godfrey, 1955; Illingworth & Holt, 1955). It was proposed that young hospitalised children should have their emotional and social needs attended to, as well as their medical ones. Also demonstrated was that changes in hospital practice and environment could have an important impact on the way children responded to their hospital experience. These studies tackled the question of separation as one of the aspects to be considered when the child was admitted to hospital. Their approach attempted to provide the children with alternatives that would help them in adjusting to the hospital environment. Prugh *et al.*'s study proposed a more holistic view where the hospital ward management, working as a team, would be supportive of the child's stay in hospital. Vaughan's study concentrated more directly on the role of preparation in the children's behaviour upon hospital admission.

Separation upon hospital admission and later disturbance

Here, the studies concentrated on the specific question of whether separation from the parent due to hospital admission was related to distress during the hospital stay and to disturbance after discharge. Five of these studies analyzed the relationship between hospitalisation and post discharge disturbance. The other study tested empirically the role of the separation from the parent on the children's behaviour upon admission to hospital as well as after being discharged.

Schaffer and Callender (1959) studied a group of 76 infants younger than 12 months (aged 3 to 51 weeks old) who were hospitalised without their parents for a period ranging from 4 to 49 days in hospital. The main focus of the investigation was to study the effect of admission to hospital within this age range.

The results demonstrated that the children's behaviour could be classified into one of two groups according to their age. The younger group (aged below 7 months) seemed to accept the hospital environment and the unfamiliar people in it with no problems. These young children apparently showed very little difficulty in exchanging the mother for another carer.

The older group (above 7 months old) reacted with distress behaviour (mainly crying) when hospitalised. These children demonstrated negative behaviour, such as avoidance or by being frightened, when approached by a stranger. They exhibited strong clinging behaviour toward the mother when she visited. Some of these children presented exacerbated *autoerotic behaviour* (as Schaffer & Callender named it) such as thumb sucking or rocking.

After discharge, most children "were, according to the reports of the mothers, *strange* in their behaviour and the main feature of this *strangeness* consisted in excessive attention to the environment" (Schaffer & Callender, 1959, p.536). When home, they "were subdued and quiet, staring around with a blank expression" (p.536). Some feeding problems such as vomiting and sleeping disturbances were also observed. Particularly among the older group, more *overdependence* was observed. These children cried more intensely when left alone, were more clinging to their mother, demonstrated increased fear of strangers as well as sometimes being apprehensive of familiar people such as siblings and close relatives.

Schaffer and Callender concluded that infants younger than 1 year old presented two different responses to hospital admission. Below 7 months old, no protest was observed although they were quieter and presented less vocalisations than similar non-hospitalised children. Above 7 months old, the children's behaviour corresponded to the classical separation picture as reported by Bowlby and his co-workers (Bowlby, 1973; Robertson, 1958). In Schaffer & Callender's (1959) words:

> from the point of view of the hospitalisation issue it follows that separation from the mother cannot be automatically regarded as a traumatic experience for all children, but must be related to the particular stage of development of the individual. (p.538)

They add that "it is evident that the considerable distress which is such a striking feature of the separation behaviour of children more than 7 months old is absent before this point" (p.538).

Summing up, it was suggested by Schaffer & Callender (1959):

> ... that the critical period when separation from the mother is experienced as a traumatic event does not commence until after the middle of the first year of life, and that consequently in those cases where there is a choice, admission to hospital should be arranged to occur before the crucial age is reached. (p.539)

An interesting aspect of Schaffer & Callender's study was that it was possible to observe differences in the reaction to separation in a narrow age range. As a result, they assumed that there was a critical age where distress upon separation did not seem to be an issue. However, they supported the view that independent of age, separation from the mother should be avoided, not just during infancy, but also in the preschool years.

In a study intended to verify to what extent hospital admission was associated with later disturbance, Vernon, Schulman & Foley (1966) developed and used a parental questionnaire comprising 27 behavioural symptoms parents could observe in children after hospital discharge. The age range of the children was 1 to 9 years and they were hospitalised for minor surgery (tonsils or hernia, among others). The results showed that a significant number of the hospitalised children suffered a psychological upset in the post-hospitalisation period. Children under 3 or 4 years of age were found to be more susceptible to upset. Overall, unfamiliarity with the hospital setting, separation from parents, age and behaviour before admission to hospital were the variables most related to children's disturbance following their hospital experience.

With the aim of verifying the long term relationship between hospitalisation and later disturbance, Douglas (1975) reported on his longitudinal study of a sample of children who were born in 1946. The findings showed that young children's multiple admission or long stay in hospital was related to the occurrence of behaviour problems and reading difficulties at school age (assessed at 15 years). The author concluded that these children's social and emotional development had been affected by early hospital admission. A possible explanation for some of the problems presented by these children was their admission to hospital without their parents accompanying them.

Quinton & Rutter (1976) attempted to replicate Douglas's study. Their sample comprised some four hundred children and the results pointed towards a relationship between emotional and behavioural problems of children aged 8-10 years and multiple hospital admissions during their first 5 years of life. In a more recent study, Haslum (1988) found a relationship between early hospital admission and behavioural as well as educational difficulties later in life. These findings provide some evidence that, even in recent years, hospital admission may still entail long term disturbance for some children.

A clinical study of parent-child dyads in hospital was carried out by Brain & Maclay (1968). The aim was to evaluate the children's adjustment during and after hospital admission. The children's age range was 2 to 6 years. They were referred for tonsil/adeno surgery and spent a period of 3 days in hospital. The study comprised a sample of 197 children. The experimental group (101 children) was accompanied by their mothers during their hospital stay. The control group (96 children) was admitted alone, as was the practice in most hospitals at that time. The results demonstrated that the control group presented more emotional and post-surgical complications than the experimental one. In addition to this, after being discharged, the disturbance presented by children in the control group tended to be of longer duration. It was also observed that the younger the child the higher the overall disturbance (most of the children in the control group aged 2 to 3 years and 11 months presented a relatively high overall degree of disturbance).

Considering parental behaviour, Brain & Maclay (1968) observed that the more anxious the mother was to accompany the child to the hospital, the more likely was the onset of emotional problems if the child was admitted alone. Some of the nursing staff, not being used to the presence of parents on the wards, did not favour the change and stated that it was more difficult for them to carry out their duties. The staff also mentioned that the parents' presence made it more problematic for them to build up relationships with the children. It was added that some of the mothers were 'difficult' and that their presence generated more distress for the children as well as for the other mothers. However, the nursing staff admitted that when the need to comfort a toddler arose, the mother was the person best able to do so.

Bowlby's theory of attachment and separation (section 1.2.1) was supported by the studies reported above. However, it is noteworthy that Brain & Maclay's findings were the most supportive to Bowlby's postulations, demonstrating the importance for the children's well being of having the parent present during their hospital stay.

Overall, these studies continued to be powerful tools in pressing for changes of policy and practice in hospital settings.

Policy changes in the care of hospitalised children

Parallel to the studies cited above, legislation for the care of children in hospital was generated. In Britain, as a result of a survey on the needs of patients in hospitals - which aimed at providing guidelines for better practice (The Platt Report, 1959) - new policy was put forward. This included new regulations giving parents the possibility and choice of non-restricted visiting time to their children in hospital. Follow-up studies were carried out to verify the implementation of the policies and to monitor the improvement of hospital provision for children.

During 1964, at the request of the Ministry of Health, questionnaire interviews were given to 655 mothers of children under the age of 5 years living in South Wales (Robinson, 1967). This study had three aims: first, to provide information on the implementation of some of the Platt Report (1959) recommendations; second, to verify the difficulties for parents in accompanying their child during hospital admission or in taking advantage of unrestricted visiting, and finally to learn about the attitudes and family background of parents of young hospitalised children.

Robinson's (1967) study comprised a sample of 337 children who were hospitalised during 1964, a non-hospital sample (276 children without hospital experience) and a living-in sample (42 mothers with their hospitalised children in a mother-child unit). Most of the children in this study, including those who were accompanied during hospitalisation (85.7%) had a length of stay of less than one week. One of the findings was that younger mothers were more ready to live-in but, as the number of children in the family increased, their readiness to be with a hospitalised child decreased.

The parents' comments on the preparation offered by the hospital (i.e., an information leaflet about the hospital, and a verbal explanation of the medical procedure the child was going to undertake) indicated that these were not adequate or useful, especially when accounting for children in the younger age group. The parents reported the need for more contact between the hospital staff and the families before the children's admission. This way a parent would be better informed of the coming situation which would facilitate, whenever possible, the preparation of the child for the event. The parents of children who had never been hospitalised were unaware of the needs of children in hospital, neither did they know where to get such information should they need it. Robinson concluded that attention to the recommendations stated in the Platt

Report was still overlooked and that preparation for admission to hospital and/or medical procedures was one of the most neglected areas of medical practice.

The opinions of children and their parents in relation to a short hospital stay for elective surgery were investigated by Harris (1979). A sample of 60 children aged 5-12 years (thirty undergoing tonsil/adenoidectomy and 30 undergoing genital surgery) and their parents were interviewed one week before admission. The children were observed during their hospital stay. Questionnaires were sent to both parents and children one week after discharge, and to parents only, two months after discharge. No significant distress or disturbance, during or after staying in hospital, was observed in the children studied although a number of them were upset at particular times during their stay (e.g., during anaesthesia induction or blood test). No clear relationships were found between particular personality types and reaction to hospital. But there was an association between those children who tended to be worried or had had a recent stress of some kind and their adverse reaction to hospital. It was observed that parents' emotions during their children's hospitalisation were in many cases very intense. It was suggested that parents' need to receive staff attention was as great as that of their children.

A study by Fahrenfort (1993) presents a similar view in relation to parents' need for information and/or support throughout their children's hospital stay. In keeping with Harris' earlier findings, McGrath (1992) stated that the process of diagnosis, medical test and treatment, as well as the hospitalisation and threat of separation from the parent, may have a more devastating effect on the child and her/his family than the disease itself.

In summary, the research discussed above shows that, for a long time, hospitalised children have received the attention and expertise of people interested in various ways in the nature of and reasons for their distress.

Initially, two issues were isolated as central to the onset of distress upon hospital admission: young age and separation from the family. As a result of these studies it was possible to show that parental presence and sensitivity to the situation contribute to distress reduction in young children in hospital (Brain & Maclay, 1968). The positive effect of keeping the main caregiver near the child may manifest itself by reducing the impact of external stressors. Illness, as a potential source of distress, may activate the attachment behavioural system where the child feels more need for the parent's proximity for comfort (Bowlby, 1969; Rutter, 1983). These variables (age and separation) were also correlated with post-surgical complications and disturbances after hospital discharge, such as slow recovery and emotional and social problems.

Associated with these initial findings, proposals for essential changes were put forward. These contributed to a definitive change in the policies and practices advocated by the health services concerned with young children. The parent, no longer considered *persona non grata*, is nowadays encouraged to accompany the sick child when hospital admission cannot be avoided or where treatment on a day case basis is not appropriate. The changes in the way medical treatment was provided were reflected into a general decline in the total length of time young children spend in hospital (Henderson, Goldacre & Griffith, 1990/91; Shelley, 1991; Spencer & Lewis, 1991).

1.2.3 - The needs of young children in hospital

Despite its benefits in a better understanding of young children's emotional needs and its huge influence in generating policy and practice changes in the way young hospitalised children were cared for by the health services, Bowlby's theory is not universally accepted.

By the time Rutter's empirical study of parent-child separation (1971) and his book *Maternal Deprivation Reassessed* (1972) reflected growing criticism of the importance of separation itself as a disruptive influence, many of the changes in hospital policy which can be observed in the 1990's had already taken place. This is certainly not the only case in which changes in hospital policy have been built on a conceptual foundation which is not thoroughly corroborated by evidence. In this case, it can at least be argued that many of the changes which took place were to the benefit of children and their parents.

Attachment theory provided a partial explanation for the children's distress following hospital admission. That is, it seems reasonable to conclude that the actual separation of young children from their familiar caregivers (i.e., parents) was one reason for their distress. But it is also important to observe that some of the initial studies of child-parent separation upon hospital admission (eg., Vernon *et al.*, 1966; Douglas, 1975), concentrated only on the effects of this event on the child's behaviour *after* discharge. Hence, these studies provided little insight into how the particular characteristics of the hospital environment contributed to the child's distress during the period s/he spent in hospital.

On the other hand, studies such the ones by Brain & Maclay (1968), Prugh *et al.* (1953), Schaffer & Callender (1959) and Vaughan (1957) offered a broader understanding of these children's distress. These researchers considered not only the after effects of hospital experience on the children's behaviour at home, but also attempted to get a better view of the children's behaviour during their hospital stay. This particular environment is a strange one for the child and is usually associated with unpleasant experiences. As such, the child was not just someone who was distressed because her/his attachment figure was not present (Bowlby, 1973), but was part of a strange environment, experiencing a diversity of situations that could be very much a source of distress. This was particularly an issue for young children given such children's limited understanding of the reasons for their hospital admission (Rutter, 1983). Environmental factors such as medical procedures and the sheer number of staff dealing with the child (e.g., Vaughan, 1957) could, with no doubt, also contribute to their distress. There is convincing evidence that young hospitalised children are distressed even when accompanied by their parents (Goldberger, 1988b; Goldberger, Gaynard & Wolfer, 1990). It seems plausible to argue that hospital is a more or less hostile environment for all young children. Consequently, specific aspects of a hospital examination or treatment will often elicit child distress even if the attachment figure is present.

The present thesis in mainly concerned with the immediate, proximal effects of hospital examinations upon children's distress, rather than with longer-term disturbance. However, it is appropriate to point out that the view that unfamiliar hospital environments are inherent sources of distress for young children implies a somewhat different explanation of the later disturbance from the one postulated by Bowlby. Bowlby's psychoanalytic orientation led him to posit that the long-term problems of hospitalised children were due to violation of their trust in the relationship with their parents (Bowlby, 1973).

Instead it is plausible to speculate that the hospital environment is normally distressing for young children, but that parents mediate the impact of the environment by providing information, reassurance and support. According to this explanation, the children's long-term disturbances are less a result of violated trust than a consequence of prolonged exposure to an unfamiliar, distressing and uncontrollable environment.

Whether or not this speculative explanation of the early hospital studies is correct, it is the case that studies of child-parent attachment in general have found that Bowlby may have over-stated the importance of a secure child-mother attachment as essential to the child's normal development and to a well adjusted life.

It also seems likely that Bowlby's concern with child-parent separation prevented him from considering whether other variables such as family hardship or disruption could be related to the disturbances he observed.

Rutter (1971) stated that in addition to the importance of the nature of child-parent interaction, what matters most is not so much the separation itself but its meaning for each person in the relationship and the context in which the separation takes place. In his own words:

> separation experiences have some association with the later development of antisocial behaviours but this is not due to the fact of separation itself, but rather to the family discord which precedes and accompanies separation. (Rutter, 1971, p.256)

Attachment theory led to particular ways of seeing and caring for children because its main postulations took little notice of the context in which the relationship occurred. It is relevant to consider that a diversity of variables influences which pathways a particular child takes and how this interferes in her/his adult behaviour (Rutter, 1981).

The claim that it is the separation from the parent/carer which influences the onset and repercussions of distress in young hospitalised children seems to neglect the fact that both the individual characteristics of the child and the environment of which the child and carer are a part may contribute to the child's response to a situation. It can be argued that by focusing mainly on children's attachment to and separation from their parents, Bowlby's writing led to a narrow perspective, so that many aspects of the hospital environment which may contribute to distress in young children were overlooked. Instead, questions about the nature of the environment, the deployment of staff associated with children's developmental level, individual differences, gender, and so on should receive systematic attention in order to give an accurate picture of the role of these variables in the onset of distress. It has been said that particular events or situations during the hospital stay may be perceived in a variety of ways by each of the children who experience them (Harris, 1979) or perceived differently by the same child at different occasions (Goldberger *et al.*, 1990). It seems important to learn more about the hospital environment if the interest is to improve practice and to promote the welfare of children.

In summary, Bowlby's theory made sense of why young children should be particularly vulnerable to and distressed by separation. It is also easy to understand why Bowlby's ideas should have led hospitals to link young children's distress solely or mainly with the presence or absence of their parents, rather than developing a more differentiated view which could account for:

i. the unfamiliarity and strangeness of the environment leading to a possible alarm on the part of the child;

ii. the little influence and control the child has over the situation; and,

iii. that hospital environments are often associated, from a young child's point of view, with unpleasant or painful experiences.

Considering these three factors, the author believes that more than merely avoiding child-parent separation is necessary in order to reduce children's distress in hospital. Indeed, it seems likely that the importance of child-parent separation, and of attachment theory itself, has been exaggerated in the literature on young children's distress during hospital examinations. In the following sections, three potential sources of variability in children's distress in hospital - one based on developmental characteristics, another mediated by individual differences and a third that considers aspects of the hospital environment - are considered.

Finally, an attempt is made to synthesize the research, so as to explain distress as a multifactorial phenomenon. This final section explains the theoretical approach to distress which is to be adopted in this thesis.

1.3 - Distress as mediated by development

Age and development may be seen as part of a cycle where maturation and experience add to each other. While age is not equivalent to development, since age in itself does not explain the level of development of a particular individual, it is customary and convenient to regard chronological age (the more concrete phenomenon) as a proxy for the more abstract notion of development.

The literature reviewed in section 1.2, although inconclusive in explaining this finding, makes it clear that young children are particularly prone to distress. Rutter (1983; 1987; 1988) for example, noted that children between 6 months and 4 years were most at risk of distress upon hospital admission. Schaffer & Callender (1959) likewise demonstrated that no apparent distress was observed in hospitalised infants younger than 7 months old, whereas children over this age were especially likely to show it.

More recently, Ludman, Lansdown & Spitz (1992) carried out a prospective study involving full-term infants requiring neonatal surgery. Their aim was "to try to clarify the effects of hospitalisation in the first few months of life" (p.86). The results showed that these children presented an increased rate of emotional and behavioural difficulties at the follow-up age of 3 years when compared with a matched healthy control group. These findings question Rutter's earlier assumption that hospitalisation before 6 months of age has no harmful effect, as well as Schaffer & Callender's findings. However, it is important to bear in mind that the referred sample of Ludman *et al.* involved high risk children, so that their behavioural responses might have been heightened beyond those which would normally occur. Alternatively it is possible to speculate that the failure to observe distress in young infants may reflect the insensitivity of our measures, as much as it reflects the absence of felt distress.

In any case, it is generally agreed that by the end of the first year the child is equipped with a number of basic emotional expressions (Izard, 1977; Snow, 1989). During the second year the child begins to understand verbal labels used by adults to describe feelings. Studies by Michalson & Lewis (1985) demonstrated that children aged 18 to 24 months could point to pictures of happy and sad faces. By the age of three, the ability to produce these verbal labels began to develop and these children were able to associate emotional expressions with the situations that produce them. Cox (1991) argues that infants and young children display considerable awareness of other people's behaviour and of different points of view. She says that infants are able to discriminate and understand the meaning of emotional expressions in adults. Dunn (1988) adds that the growth of empathy in young children supports their capacity to see things through others' points of view. As natural social beings, young children not only are able to understand other people's feelings and distress but try, on some occasions, to comfort them, for example, if they are sad. This recent research marks a move in contemporary developmental psychology away from the idea that biology programs fixed patterns of behaviours and towards the idea that the environment contributes for the shaping of an individual's behaviours.

Lamb & Campos (1982) add that motor activity plays an important role in emotional development. The child experiences success and failure through attempts to master her/his surroundings. This not only helps to shape her/his personality but to deal with different situations involving a diversity of emotions and various levels of distress. When frustrated or upset, tantrums may be a common occurrence, serving the purpose of externalisation of feelings and the development of self-control. However, motor development does not occur without the child's development of body awareness and self-image (White, 1975; 1985; Williams, 1983). Self-knowledge develops from the young child's social relationships. This leads her/him to become conscious of her/himself as an individual, distinct and separate from others (Lewis & Brooks, 1978). Initially these interactions are indiscriminate, then the relationship tends to concentrate on the main carer or mother (Ainsworth *et al.*, 1978). Next, the relationship is associated with other family members or close friends (Vandell & Mueller, 1980). Distress may be generated whenever the young child is approached by a stranger or finds her/himself in a strange environment. The absence of a familiar figure limits even more the child's understanding of the new setting. This is due to a lack of social cues normally obtained from the familiar person and her/his expression and behaviour. The unpredictable exacerbates the child's feelings of helplessness which may be expressed as crying, fear or other distress behaviour.

Izard (1978) provides a plausible explanation for the development and changes in the expression of distress and other emotions and also for the relationship between emotion and cognition. In his own words, "...what changes developmentally is not only the number of discrete emotions but equally importantly, the relationship between the emotion system and the other subsystems of the personality" (p.401). He added:

> that not only did emotions emerge at different times during the first two years of life but that a given emotion experience becomes increasingly organised and centered during the two years of life. The experiential component of an emotion present at birth achieves considerable organisational stability and centeredness by the age of 6-9 months. Fear may be relatively centered by the end of the first year, and the last emotions to emerge - contempt, fear, shame, and guilt - reach this level of phenomenological organisation toward the end of the second year. The developmental change in emotion experience ... is not a change in the quality of the phenomenon in consciousness. The invariance of the phenomenological components of the fundamental emotions provides an essential continuity in consciousness and in organism-environment interchanges. The change is one of decreasing diffuseness of the experience of a given emotion - for example, the change from diffuse distress that totally dominates the 2-month-old during acute pain following inoculation to the more organised and centered distress experience of the 6-month-old in the same situation. In general, the greater the organisation and centeredness of the

> emotion experience, the less diffuse and dominant it is in consciousness. That is, the organised, specific emotion experience allows for concomitant cognitive processes in consciousness that increase the infant's ability to act appropriately and to cope with the situation. While the acutely pained 2-month-old can only emit the distress cry, the 6-month-old can turn from the source of pain to the mother and initiate comforting behaviour. (p.404-405)

As stated previously (see section 1.1), appraisal and social referencing underlie the child's expression of distress and other emotions. The development of these phenomena is discussed below.

1.3.1- Appraisal

Scherer's (1984a; b) view is that we are constantly performing a series of *stimulus evaluation checks* upon the environment. These environmental checks constitute the appraisal phase of the emotion process. According to Frijda (1986):

> each emotion corresponds to a different appraisal ... and is characterised by it. ... One and the same event can give rise to a variety of emotions in behaviour and in experience depending upon how it is appraised, what aspects are emphasized or focused upon or overlooked. ... If a situation of danger is seen as one of threat that one doubts can be countered, it produces fear; if as one that is a willful obstruction, it produces anger; if as a challenge that can be met, it produces enthusiasm and eagerness. (p.195)

Lazarus & Folkman (1984) use the term *cognitive appraisal,* rather than appraisal, since in their view cognitive processes are of much greater importance in mediating between environmental stimuli and their emotional impact on the individual. According to this perspective, emotional responses are not just intuitive, but depend critically upon the individual's evaluation of the stimulus, which is influenced by learning and experience. It also follows that age may be an important consideration, since the individual's developmental level may influence the way an individual appraises a situation. Differently from a young child, at an older age the child develops the capacity to associate an actual event with previously acquired knowledge involving a same or similar experience. Memory and cognition then start to be more involved in the appraisal process.

As an illustration, we can take the observation of young children's reactions when restricted from movement. Babies present overall distress behaviour expressed through their vocal (cry) and facial expressions. However, the distress is directed to nobody in particular, not even at the source of it. By the age of 4 months, the child seems to direct her/his distress behaviour against the physical impediment and by 7 months old the child reacts to both the impediment and the person who is providing it (Cicchetti & Hesse, 1983; Stenberg & Campos, 1990; Stenberg, Campos & Emde, 1983). So, development affects and improves the way children target their behaviours towards the source of distress as a result of their differentiated appraisal of the situation.

Another related example refers to reactions to the symptoms of an illness (Murphy & Moriarty, 1976). In a young child, the disappearance of the symptoms is usually reflected in the disappearance of distress. In contrast, an older child may consider that the temporary absence of a symptom does not represent a cure of the illness and the expectation that the symptom might return continues to generate distress. But Murphy & Moriarty (1976) point out that persistent painful illness may be reflected not just in distress behaviour but also in irritability or depression, whereas a visible improvement of the condition or its cure may lead to an optimistic outlook.

Similar developmental patterns can be observed in relation to the onset of fear in children. Levy (1951; 1960) studied young children attending a health clinic for immunisation. It was observed that about the same age that a young child starts crying at the sight of a stranger, s/he may start crying also in anticipation of the occurrence of something unpleasant. Before the age of eleven months these children cried only very occasionally when seeing the doctor preparing an injection. Between eleven and twelve months, a quarter of the sample cried during the preparation phase. Such behaviour suggests that, by the age of one year old, a child starts to acquire a rapidly increasing grasp of the world around her/him and not only frightening but also painful situations are being differentiated. Schaffer (1974) states that when the child is able to compare the event with her/his internal representation of it (e.g., comparing the face of an adult with the child's internal representation of memory of face), fear will be the outcome when the face is found to be discrepant with, or unfamiliar relative to, all other faces that the child remembers. This change in children's ability to compare emerges by the age of about 7 to 8 months (Lewis, 1993).

Summarising, Lewis & Michalson (1983) state that:

> age differences in the experience or expression of emotions can be attributed to many factors, including differences in (1) the capacity of events to elicit a particular emotion; (2) the physical abilities of children to express an emotion through a particular behaviour; and (3) the degree of cognitive sophistication available to produce and experience the emotion. ... Perhaps, because of a more developed cognitive system, older children are likely to respond with laughter and delight to the same event that causes younger children to cry. (p.4-5)

1.3.2- Social referencing

Interactional experiences help the child to shape her/his social and emotional development. In other words, emotional states and expressions can be affected by social influences (Lewis & Michalson, 1983). These effects can be direct or indirect.

A direct effect is "defined as the product of interactions that reflects the influences of one person on the behaviours of another when both are engaged in mutual interaction" (Lewis & Michalson, 1983, p.198).

Indirect effects result "from the interactions among members of a system that occur in the presence of a person but that do not directly involve that person" (Lewis & Michalson, 1983, p.199). As an example, the parent's reaction to the approach of a stranger influences the way the child will react to the stranger. Such effects are also referred to as social referencing (Campos & Stenberg, 1981; Lewis & Weinraub, 1976) and that is the term used here.

Lewis & Michalson (1983) define social referencing as "the use of another's behaviour to form an understanding" (p.199). Social referencing is important to the shaping and expression of distress and other emotions. The child uses the social environment as a mediator of the way s/he manages her/his emotions. Around the age of 6 months, it is possible to observe that the young child uses social referencing whenever in a non-familiar situation. Studies by Feinman & Lewis (1983) suggested that by the age of 10 months young children's social and emotional behaviours towards an unfamiliar person can be influenced by their mother's behaviour toward the stranger. Klinnert *et al.* (1983) conducted similar studies and obtained results that confirm the fact that young children are capable of using others (i.e., the mother) in managing their social and emotional behaviours.

Harris (1989) says that "infants not only react within a social dialogue in an appropriate manner to an emotional expression, they are also guided by an adult's emotion in their behaviour towards objects or events in the environment" (p.21).

As an example, the study carried out by Sorce, Emde, Campos & Klinnert (1985) on young children's perception of a visual cliff, lent support to the idea that when encouraged by the mother's positive expression, the child would confidently cross the cliff. On the other hand, the child would demonstrate wariness and distress and become inhibited if the mother's expression was one of fear or anger. Young children have the "capacity to attach meaning to particular emotional expressions and to see them as making reference in a selective fashion to particular objects" (Harris, 1989, p.23).

The abilities of young children to imitate, to make simultaneous comparisons, and to perceive the emotional expressions of others emerge simultaneously with their learning of the skills needed for social referencing (Lewis & Michalson, 1983). As such, it is possible to assume that children's capacity to manage their own emotions is mediated by their attention to and their use of the social environment.

The children's behaviour is mediated and influenced by others in their social environment. Harris (1989; 1993) suggests that young children's emotional responses are initially automatic. However, as the child grows older, there is an increase in the ability to monitor her/his emotional responses which, in turn, is influenced by the way emotions are expressed in her/his socio-cultural milieu. Changes in the perception, appraisal and regulation of emotional states and expression occur during the child's development over the years. Meadows (1993) says that:

> infants react to notable changes with emotion, negatively if their goals are interfered with, positively if goals are reached or confirmed. Emotional expressions are detectable from birth, and there seems to be individual stability in the expression of anger and sadness over the first two years. By 9 months of age or thereabouts other people's emotional expression may guide the baby's own expression of affect. In babies there is a fairly clear relationship between their emotion, its expression, and the circumstances which caused it. (p.359-360)

Harris (1993) also supports the view that emotions are present in early infancy. To him, what these young children lack is the ability to conceptualise their emotional experience. However, with the acquisition of language, children are better able to explain and talk about their emotions (Bretherton & Beeghly, 1982) demonstrating, then, their awareness of personal emotional states.

The child's characteristics and the progressive maturation of her/his sensory abilities guide emotional development through an improved performance and mastery of situations, stressful or not, encountered through her/his interactions with the social and physical environment. Campos, Campos & Barrett (1989) say that the child's exposure to opportunities to encounter affect-eliciting circumstances, the acquisition of locomotion and the family emotional climate are influential components in the child's emotional shaping.

In summary, there are two broad views on the nature and development of young children's emotions in spite of all controversies related to the study of distress and more generally of emotions. On the one hand, Izard (1978) as well as Tomkins (1962, 1963) and more recently Harris (1989) support the theory that the child is born with an in-built system comprising basic emotions which unfold themselves with increasing age and maturation. To them what develops is the child's appraisal to the situation resulting in a differentiated response to the event as the child grows older.

On the other hand Lazarus & Folkman (1984) as well as Campos *et al.* (1989) share the view that cognition and social factors play an essential role in structuring and differentiating emotions during development. To them emotion is the result of increased understanding of self and the environment. Oatley (1993) states that "emotions are not just individual things, but part of the very substance of social interaction" (p.351).

This issue about the extent to which emotional development involves biological givens or social-cognitive constructions has attracted a lively debate in the literature and has given rise to an academic journal - *Cognition and Emotion* - devoted specifically to this issue. Given the complexity of the issues involved, it seems unlikely that the exact relationship between cognition, experience and emotion will be resolved to everyone's satisfaction in the foreseeable future. Fortunately for this researcher, a precise understanding is not necessary for the purposes of this thesis. From both viewpoints, it appears that when faced with unfamiliar environments, such as a hospital, the critical factor which changes with age is not the strange nature of the environment, so much as the individual's knowledge (or what may be called *emotional understanding*) about it. Even grownups become distressed in uncontrollable circumstances, but adults have the knowledge that routine hospital examinations are seldom of this kind, while young children lack this knowledge and understanding.

Presumably, too, age affords the individual with many more cognitive abilities and, associated with these, coping strategies - distraction, attention focusing and the like - which are unavailable to young children. The development of such abilities has been the subject of a large volume of research, much of it guided by Piaget's (1952; 1954) stage theory of cognitive development.

Although it is beyond the scope of this thesis to delve deeply into this voluminous literature, it is appropriate to point out that there is by no means a consensus among researchers on how exactly cognition enables children to cope with stressful environments. Eiser (1989), for example, has argued that experience affects children's responses more than their cognitive level per se, while Anderson (1993) has questioned the existence of stages in children's understanding of situations, as proposed by Piaget.

For present purposes, however, it is sufficient that, even if we do not yet understand the mechanisms exactly, there is general agreement that cognition and social learning are both increasingly important regulators of distress and emotional understanding as children get older.

The view to be advanced in this thesis is that although children's age level is important in changing the way a child appraises a situation and in influencing her/his adjustments, age itself does not provide a sufficient explanation for why one child becomes distressed and another does not in a given situation.

Individual differences and environmental factors also have a role to play in the onset of distress and they are examined in the next two sections.

1.4 - DISTRESS AS MEDIATED BY INDIVIDUAL DIFFERENCES

Even among a younger age group it is not rare to observe that some children react more than others when facing a similar problem or situation (Kagan, 1983; 1984). This suggests that individual differences play a role in mediating the distress behaviour children present (Emde & Harmon, 1984).

Two of the main aspects of individual differences believed to underlie this variability, *temperament* and *gender* will be considered in the following sections.

A third aspect of individual difference, *intelligence,* has attracted a good deal of research and might be considered to influence children's responses to distress (Rutter, 1981; 1987). Indeed, in older age groups there is already evidence that this is the case (Sylva, Bonn & Stein, 1993a).

The question of whether to include measures of intelligence or cognitive ability within the present research is a particularly important one. The distinction between these terms is that while intelligence is presumed to be a stable characteristic of the individual, the assumption that individual differences in intellectual abilities are stable traits is not held by all theorists. For many, cognitive abilities are expected to change as a function of development, so that a child who is intellectually advanced at one age need not score higher than others on intellectual tests at an older age. In either case, however, it could well be that, among a similarly aged group of children, those with superior intellectual abilities and, consequently, better understanding of the hospital situation or better coping strategies would be less distressed by it.

Although cognitive or intelligence tests were seriously considered, a number of factors led to the decision not to include them within the research reported here.

First, with a single exception (Kendrick *et al.*, 1986) the previous studies of children's hospital understanding have employed children of four or more years of age, at which age cognitive abilities probably start to exert a more powerful influence upon behaviour. Even at this age, whether it is children's intellectual ability or experience which is the critical factor underlying variations in distress has been disputed (Eiser, 1989).

Secondly, there is a lack of consensus about how to measure intellectual abilities in the 1-3 year old age-group targeted for this research. This is not to say that tests of infant cognitive development do not exist. Indeed, measures such as the Bayley scales (1969) and Uzgiris and Hunt assessments (1975) have attracted a larger number of studies. However, the most consistent finding from this literature has been the failure to show that individual differences in intellectual ability are reliable during early infancy (Slater, 1995). At present, the reasons for this failure are under scrutiny and many researchers believe that the findings owe more to the use of inappropriate measurements than to the lack of inter-infant differences in intellectual functioning. Measures of habituation, for example, show promise as more reliable and stable indices, although even in this case they appear more effective in identifying clinical groups than in distinguishing between infants in the general community (Staler, 1995).

Thirdly, the cost-effectiveness of such measurements for the children and families involved in the research, an for the researcher, was an important consideration. Bearing in mind that variations in children's age would be represented within the studies - and that age gives a reliable, if inexact, proxy index of intellectual development - the critical question was whether measures of intellectual ability would add explanatory power beyond that already provided by measures of age. In view of the uncertainties surrounding intellectual measurement in this age-range, the decision taken was that there was not sufficient justification to include intellectual measures within the research. Instead, the focus would be on temperamental and gender differences between infants, for which the evidence for a whole in distress was somewhat more robust.

1.4.1- Temperament

Temperament, according to Allport (1961), "refers to the characteristic phenomena of an individual's emotional nature, including his susceptibility to emotional stimulation, his customary strength and speed of response, the quality of his prevailing mood, and all the peculiarities of fluctuation and intensity of mood, these phenomena being regarded as dependent upon constitutional make-up and therefore largely hereditary in origin" (p.34).

Allport's definition of temperament refers to an individual's emotional nature and includes both constitutional and genetically based elements of an individual's make up. Emotional behaviour, as part of Allport's definition of temperament, is the core of Goldsmith and Campos' (1982; 1986) construct of temperament. To them, temperament and the emotional aspects of behaviour are interlinked. They add that temperament does not differ from personality, but the individual's personality is increasingly influenced by "social relations with others beside the primary caretaker(s) and the emerging concept of self" (p.179).

Thomas & Chess (1977) define temperament as a psychologically based attribute which mediates the influence of the environment upon the individual and expresses itself as a response to an external stimulus. In other words, temperament is the dominant style in how an individual child usually does things. It is the way s/he reacts and answers to people and to situations, rather than *what* the individual does (i.e., the content of the behaviour), or *why* s/he does it (i.e., motivation).

Longitudinal studies, such as the Australian Temperament Project (Prior, Sanson & Oberklaid, 1989) have pointed out that most children present only moderate stability in their temperament profiles at a younger age. Thomas & Chess (1977) contend that temperament tends to be most clearly observed if a wide age interval is measured.

As an example, Balleyguier (1986) followed a group of 35 children during their first 3 years of life. The results from temperament measures demonstrated that temperament did not appear to be fixed from birth. The first year of life was identified as presenting the most instability. However, as the children grew older, temperament was increasingly related to adaptation to the demands of the environment. From the age of 3 years old, temperament may be relatively stable.

Studies of twins (e.g., Louisville Twin Study; Matheny, 1984) have shown that a temperament measure at one age is not always predictive of a measure at a subsequent age. However, Matheny (1989; Matheny, Wilson & Nuss, 1984) points out that among monozigotic twins the changes in temperament are similar over time. He has suggested that individuals may change in their temperaments with age in a coherent way as a result of changes in the expression of genetic influences.

Developmental changes in aspects of cognitive, emotional and social relations seem to influence the variability in temperament from infancy throughout childhood. Here, temperament might be affected at least in its behavioural expression. The organisation of temperament may be affected by biological as well as environmental factors during the early years of life (Hagekull, 1989; Kagan, 1971; 1989). These behavioural manifestations are observed in social interactions expressed through behavioural attributes of emotion, attention and activity. Hence, temperament is part of the individual organism that interacts with the environment in a diversity of circumstances (Bates, 1989).

Dunn (1980) and Rutter (1967) have suggested that differences in children's temperament may influence their development through the effect of these differences on the way other people respond to and interact with the child. The child's reflections on her/his social adaptive capacity such as malleability and adaptability in responding to changed environmental circumstances may also play a part (Erickson, Sroufe & Egeland, 1985). For example, a child with a so called difficult temperament may behave as such when dealt with by her/his already distressed parents, but when dealt with by nursery staff will behave as normally adjusted to the environment. Of course the environment (in this case, including the nursery staff's attitudes) must be sensitive to the child's needs and demands in order to get the best from the child's behaviour.

The behaviour is also related to her/his maturational level and previous experiences (McCall, 1986; Plomin & Dunn, 1986). Thus, it seems accurate to attribute to heredity just part of the variability in temperament and to allow the environment a certain responsibility in this process. In a study of infants' reactions to strangers (Feinman & Lewis, 1983), the findings demonstrated that children classified as easy in temperament were more friendly to the stranger, especially when the mother had spoken positively about the stranger to the child.

Distress, temperament and hospital admission

In support of the idea that young children's temperaments will influence their reactions to distress upon hospital admission, the study carried out by Brain & Maclay (1968) found that children who presented disturbed behaviour before being admitted to hospital were the ones most vulnerable to further disturbance when admitted to the hospital ward.

Schechter, Bernstein, Beck, Hart & Scherzer (1991) studied the relation of temperament to 5 year-old children's response to immunisation. The results demonstrated that children characterised as difficult, mainly due to their poor score on the temperamental dimension of adaptability, presented the most distress during the immunisation. Parents' general ratings of their children as presenting a difficult temperament were the strongest predictor of these children's distress during the inoculation. A study comparing children's temperament and the pharmacological management of post-surgical pain was carried out by Wallace (1989). The sample involved children aged 3 to 7 years and the results demonstrated that children who presented higher scores in the temperamental dimension of intensity were those who required most analgesic medication post-operatively.

Sylva, Bonn & Stein (1993a) in their study of children requiring ophthalmic surgery for squint correction or due to acute asthma found that the strongest predictors of children's behaviour in hospital were their temperamental adaptability, mood, and approach/ withdrawal. Difficult or negative temperament was related most strongly to non-compliance, distress, non-engaged or empty behaviour, and lack of self control on the part of the child. Temperament was considered to be a powerful predictor of children's behaviour upon hospital admission.

In an earlier study involving temperament as related to children's adjustment to day nurseries, Lewis (1977) observed that four of the nine temperamental dimensions that were closely related to hospital behaviour in the study by Sylva *et al.*, (1993a), were not related to children's adjustment to day nursery. It seems possible that the level of distress children exhibit may be influenced not just by their temperament but also by the situation being experienced. That is, a distressing or demanding environment may unmask individual vulnerabilities and adaptive resiliences not seen in a less demanding environment.

Certain temperament characteristics have been found or suspected to predispose for functional disorders such as colic or abdominal pain (Davison, Faull & Nicol; 1986), sleep problems (Huttunen & Nyman, 1982), enuresis and disorders of nutrition (Gofman, Buckman & Schade, 1957) and growth as in failure to thrive, and obesity (Carey, Hegvik & McDevitt, 1988) and developmental retardation in deprivation of stimulation (Schaffer, 1965; 1966).

An interesting prospective follow-up study of the relationship between temperament and hospital admission due to accidents in children under the age of 5 years old was carried out by Nyman (1987). The analysis of the data showed that temperamental differences were not directly related to increased probability of accidents. As Nyman (1987) pointed out, "they might simply reflect a higher probability of hospitalisation. For example, a child with a negative mood and high intensity of responses will probably show stronger and more alarming responses to injuries or illnesses, which in turn increases the probability of hospitalisation" (p.401). Nyman's results demonstrated that young children who present certain temperamental characteristics (i.e., negative mood, high intensity of responses, persistence, high level of activity or negative reactions to new situations) were the ones who had been hospitalised as a result of accidents. But it was also observed that such temperamental characteristics correlated with these children's admission to hospital due to different illnesses (e.g., Davison, Faull & Nicol, 1986). Overall, the findings support the view "that some individual characteristics at a relatively early age are related to later hospitalisation and accidents" (Nyman, 1987, p.403).

Most of the studies of the relationship between temperament and distress have found significant correlations between these variables. But some variability has been observed in relation to the precise temperamental dimensions that are correlated, or not, with distress behaviour.

A pertinent issue here is to remember that the environment plays some sort of role in the way the child's individuality is expressed (Dunn, 1980; Erickson *et al.*, 1985; McCall, 1986; Plomin & Dunn, 1986; Rutter, 1977). This may account for part of the variation observed among the results.

1.4.2 - Gender

The issue of gender differences has been much discussed. A brief overview of the study of gender in general is presented below according to three different views: socio-cultural, biological and structural. Some trends that have emerged on the relationships between gender and distress are then indicated.

Gender differences as socio-culturally influenced

Gender differences have been considered mainly from a socio-cultural perspective (Maccoby & Jacklin, 1974; Maccoby, 1986; 1988; Thorne, 1986). A socio-cultural perspective on gender differences refers to the impact on and internalisation of values and norms by the individual. This view has been considered within a social learning or cognitive developmental theoretical background. The work of Maccoby and Jacklin (1974) has been influential in this area. However, their approach received some criticism concerning the procedures and methods applied to select and analyze the data they presented (Block, 1976). Maccoby & Jacklin's (1974) extensive review of gender differences concluded that, in some areas, there were reliable differences between boys' and girls' behaviours. More recent studies support this view and show that girls excel in verbal ability (Allred, 1990; Hyde & Linn, 1988) whereas boys excel in visual-spatial abilities (Benbow & Stanley, 1980; Baennenger & Newcombe, 1989) and quantitative skills (Eccles, 1983; Halpern, 1992; Walkerdine, 1989) as well as tending to be more aggressive (Maccoby & Jacklin, 1987; Pitcher & Shultz, 1983). Fagot & Leinbach (1983) looked at preschool children's behaviour in a play situation. The results showed that at age 2 years, girls and boys were quite similar in their play styles. This finding suggests the possibility of an environmental influence on the way girls and boys behave as they grow older. Birns (1976) regards the environment as the main source of differences between the sexes in the generation of gender stereotypes.

Gender differences as biologically determined

Alternatively, Hutt (1971; 1972a, b) and others have defended a *biological* view which considers that the variability between the sexes is the result of genetic inheritance that dictates sex-typical behaviour as a result of evolution.

The biological roots of sex differences have been demonstrated by some studies. For instance, Hutt (1972b) demonstrated significant correlations between certain hormones and aggression, competitiveness and assertiveness in boys and nurturance and affiliative aptitudes in girls. In another study by Hutt (1978), it was observed that aptitudes which, in large extent, determine preferences and choices "appear to have some biological basis" (p.191). Studies by Andrew & Rogers (1972) and by Klaiber, Broverman, Vogel, Abraham & Cone (1971) suggest hormonal factors as having some effect on attentional processes and learning of particular kinds.

At birth (Bell & Darling, 1965), and during childhood (Korner, 1969; Goggin, 1975), the activity level of boys is greater than in girls. During the preschool years boys engage in physical activities more often than girls (Earls, 1980; Eaton & Enns, 1986). Studying visual fixation in infants through operant conditioning and using visual and auditory reinforcement, Watson (1969) demonstrated that the nature of reinforcement effectiveness was markedly different for boys and girls as young as 10 weeks of age. Similar results were obtained by May & Hutt (1974) who observed differences in the memory performance of boys and girls when materials were presented auditorily or visually. More recent research on these issues has corroborated these results (e.g., Halpern, 1992). Variability between 5 to 12 year old boys and girls in the characteristics of problem solving strategies used was reported by Hutt (1972a). Clear sex differences in perceptual-motor skills have been demonstrated by Fairweather & Hutt (1970) and Hutt (1972a, b).

Gender differences as structurally based

A more recent proposal to explain gender differentiation - *structural* - has been put forward by House (1981) and Archer (1989; 1992). According to the structural view, gender differences are the result of hierarchical social structure (status) and power that are part of the social system the individual is part of and that influences her/his behaviours and dispositions. Archer (1992) says that " the distinction between this and a cultural explanation depends on whether internal dispositions or situational contingencies control behaviour" (p.32).

The concept of power is essential to the structural view. It refers to status. A higher social or professional position gives an individual higher status, which in turn gives him or her more power. Those in lower positions achieve lower status and are consequently less influential. The same concept applies to gender. Presumably, male power stems initially from larger size or assertiveness, but is then reinforced by the existing social structures. Eagley (1983) suggests that gender differences result from the individuals' experiences within these hierarchical social structures. In adult life, men who have experienced a higher status throughout their development have higher expectations about their positions and low expectations about women's status and behaviour.

According to the structural view, men and women's characteristics are directly related to their position in the wider social structure they are part of (Eagley, 1987) and that are manifested in their interactions and overall behaviour. In summary, Archer (1992) says that:

> many but not all aspects of the rules, organisational patterns and social context of childhood gender roles can be understood in terms of greater male power at a societal level. Examination of intergroup processes can illuminate the ways in which sex segregated groups are formed, and how status inequalities influence individual and group characteristics of boys and girls. (p.56)

In relation to these three major views of the development of gender - socio-cultural, biological and structural - this author is in broad agreement with Golombok & Fivush's (1994) conclusion that there are slight, biologically based, differences between male and female infants. These differences are then exaggerated or diminished by the experiences which follow from prevailing cultural beliefs. That is, cultures influence which aspects of behaviour are deemed important and, through socialisation and institutional structures, communicate to each developing individual the relevant gender norms of behaviour.

Distress, gender and hospital admission

In relation to distress Buss & Plomin (1984) argue that there are no inherited sex differences. To them, emotionality as a whole presents genetically based individual differences but there is no gender differentiation in emotionality (Buss & Plomin, 1975). However, parents may treat boys differently from girls and sex differences become more systematically observed after the child is 2 years of age (Golombok & Fivush, 1994). At this age the child is also becoming more independent through mobility, is developing oral communication as well as other skills and capabilities which contribute to the child's more differentiated behaviour, instead of just generalised distress when confronted with a challenging, strange or threatening situation (Buss & Plomin, 1984).

It seems that gender-role training probably differentiates the way emotions and feelings are expressed. This social modulation leads girls towards a more fearful behaviour whereas boys' behaviour become more prone to the expression of anger (Buss & Plomin, 1975; Maccoby & Jacklin, 1974). In a study by Crandall & Rabson (1960) the reactions of boys and girls were compared in a distressing situation. Girls were observed either to seek help from others or to withdraw from the situation. Girls were also more likely to lack confidence as well as to underestimate their abilities (Crandall, Katkovsky & Preston, 1962; Hamm & Hoving, 1969). But in a study of young children's behaviour in relation to brief separation from their mother, Stevenson-Hinde & Shouldice (1990) observed gender differences in the children's responses. Boys tended to attempt to follow the mother after a briefer period away from the mother. Girls took longer before initiating searching for the mother. Boys were more irritable and sensitive to sudden changes in the environment than girls. Goldberg & Lewis (1969) also observed more motor activity in boys than in girls.

The study by Schechter, Bernstein, Beck, Hart & Scherzer (1991) on children's reactions to immunisation showed that girls needed more time to calm down after the inoculation than was required for boys. Wallace (1989) found similar results. But Young & Fu (1988) observed no gender differences in children's reactions to pain and

Jay, Ozolins, Elliott & Caldwell (1983) and Sylva, Stein & Bonn (1993b) found no gender difference in distress behaviour.

Similarly, gender differences in temperament during infancy have sometimes been considered weak or negligible (Prior, 1992; Rothbart, 1986). But from toddlerhood onwards, sex related temperamental differences have been consistently observed, particularly in relation to activity level (Buss & Plomin, 1975; Eaton & Enns, 1986; Kohnstamm, 1989).

Rutter, Tizard & Whitmore (1970) and Offord, Boyle, Szatmari, Rae-Grant *et al.*, (1987) have demonstrated that in childhood, boys are more predisposed to psychiatric disorder than girls. Boys also seem more vulnerable than girls to the effects of family problems such as marital discord or maternal depression (Earls & Jung, 1987), parental divorce and the birth of a sibling (Rutter, 1983).

It seems fair to conclude that neither gender nor temperament are problem-free constructs, so that there is a continuing debate about how these variables should be measured, their causes, their theoretical status and their importance as mediators of children's responses to painful or demanding situations.

Nonetheless, there is sufficient evidence to indicate that these aspects of individual difference may play at least a modest part in influencing how children will respond to the demands of hospital admission and treatment. For the present author neither of these variables seems likely to play a predominant role in children's behaviour, so that other factors, such as differences in the hospital environments children encounter, may also contribute to variability in their distress. It is to these, situational, factors we turn next.

1.5 - DISTRESS AS MEDIATED BY ASPECTS OF THE HOSPITAL ENVIRONMENT

Blom, Cheney & Snoddy (1986), state that the main source of distress for young children is to be found in the environment and through the children's relationships with it.

In the following, the role of the setting and the type of examination as well as the parent and staff behaviours in a hospital environment are considered and related to distress behaviour in children.

1.5.1 - The setting

As observed through the earlier sections of this chapter, the relationship the child develops with a selected number of people facilitates her/his interaction and adaptation when in a novel situation which would otherwise generate distress. Strange places and people have the potential to exacerbate distress behaviour in young children (Bowlby, 1969; 1973; Ainsworth *et al.*, 1978).

The degree of contrast between the new setting or unfamiliar people and the environment and relationships with which the child is accustomed as well as how much a specific event differs from the child's previous experiences are, on the whole, additional factors in the onset of distress in children. In other words, the discrepancy from the familiar adds to the child's distress behaviour (Wolf, 1952).

Stern, Caldwell, Hersher, Lipton & Richmond (1969) attribute the shaping of emotional responses in the infant and child to the specific interactions with the mother/carer and imply that the influence of environmental conditions determines the nature of the child's emotions and their expression.

In a broad way, Kagan (1984) states that changes in the environment and in the way the child interacts with it may facilitate changes in the young child's emotional behaviour more easily than would happen with older children.

It is not surprising that hospitals are potential sources of distress for young children. Blom, Cheney & Snoddy (1986) state that it is important to consider, particularly in a hospital setting, that even more distressing than the illness itself may be the treatment procedure the child has to undertake. Staff may not realise that to the young child every single medical approach or examination, the interaction of different, unfamiliar people with the child and her/his parents as well as the peculiar environment are generators of distress for the child (Harris, 1979; McGrath, 1990; 1991).

The physical environment of the hospitals has been changing over the years so as to create a more friendly atmosphere. Such new approaches have been implemented especially in children's hospitals, although improvements have been taking place in paediatrics wards of general hospitals as well. The introduction of bright colours in decor and furnishing, toys and a variety of play activities, designed with the interests and characteristics of young children in mind are all valued parts of this enterprise.

But it may be that such physical/environmental changes have not been enough to make hospital staff consider their professional activities from the child's point of view. There seems to be a mismatch between the quality of technical care and the quality of emotional care (Goldberger, 1988b). Clinical/medical technology has advanced in recent years and, in general, is the main concern for the staff. Consequently the emotional needs of young children and their parents are considered less important and thus receive less attention from the staff (Jones, 1979; Smith, 1976; Thompson, 1985). That may be why a mother who was accompanying her hospitalised child commented that the hospital was a "holiday camp with needles" (Lansdown, 1987, p.1).

Giving children more attention may be easier to say than do when considering the business-like structure of the health services and the high work load for the staff. It is understandable that staff may think that devoting more attention to children would heighten the burden of an already stretched timetable of examinations, medical appointments and other hospital duties, as more time would be needed.

1.5.2- Type of examination

Examinations involving pain and discomfort (e.g. bone marrow aspiration) have been related to the onset of distress in children (e.g., Jay, Elliott, Katz & Siegel, 1987). Scientifically, pain is defined as 'an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage' (IASP[2], 1979). Arnold (1960) defines pain as a negative reaction, "a resistance to something sensed that is appraised as harmful and indicates impaired functioning" (p.74).

Pain, in the same way as distress, is part of an individual's life. Some assume it to be present from the neonatal period if not even before the child is born (Johnston, 1992). It can also be viewed as a complex multidimensional phenomenon (Schechter, Berde & Yaster, 1992), where the emotional and sensory systems, as well as the previous

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[2] IASP - International Association for the Study of Pain.

experiences of the individual, play a role in the way one may react and respond to pain. McGrath (1992) adds that pain perceptions are subjective experiences resulting from specialized sensory systems in response to certain physical stimuli, such as light, sound waves or tissue damage. Babies demonstrate generalised body movements in response to painful stimuli. Between 3 and 10 months of age, the reaction to pain seems localised in the specific part of the body where it is present. As mentioned earlier, it has been observed that babies older than 6 months of age provide some evidence of having developed a memory for painful experiences (Levy, 1951; 1960; Sarafino, 1986).

From a developmental point of view, Tomkins (1963) says that pain elicits an accompanying emotion (as does Izard, 1977; section 1.1). For the newborn the emotion is distress. But at an older age, the child is able to express fear or anger (or some combination of these) as a differentiated response to pain. Pain has also been viewed as crucial for survival; the individual tends to avoid painful experiences which, in general, is beneficial to her/him as most life-threatening and/or dangerous situations tend to involve a certain degree of pain.

As Johnston (1992) points out, painful symptoms are interpreted as the individual experiences them and learns from them that something in the body is not well. From the child's point of view, pain is something unpleasantly inflicted on her/him and that is often not related to a beneficial outcome. The child may consider pain as a punishment for a wrong doing. Although being told that s/he would feel better after surgery, in fact this seems not to happen due to the pain, discomfort or physical restraint not present prior to the surgery. Such a situation may just enhance the misunderstanding the child has in relation to pain.

Referring specifically to the relation between distress and pain, Izard (1977) suggests that:

> as long as the distress does not become severe, it can serve an adaptive function by increasing the individual's concern and effort to remove the cause of pain. (p.172)

But obviously, this conceptualisation has very little value without considering young children's developmental level. Children having an ultrasound scan which is considered a non-invasive procedure may cry as much during this examination as a child receiving an inoculation or having a blood sample collected (Goldberger *et al.*, 1990). The observation of children's play has led to the hypothesis that the way the child *perceives* the examination rather than the examination itself accounts for the most potential source of distress for the children (Azarnoff, 1974; Curry, 1988; Gibbons & Boren, 1985; Goldberger, 1988a).

Goldberger, Gaynard & Wolfer (1990) stated that what might be considered to be a quite simple and non-invasive procedure by hospital staff and even by the child's parents (e.g., a computed tomography) may be a real threat to a young child.

The child's appraisal of the situation is gained through her/his limited understanding of the facts involved. The child is not yet able to see things through others' point of view but "professionals who work with children can help young patients comprehend the procedures they must undergo" (Goldberger *et al.*, 1990, p.142).

Helping children cope with distress and pain

The assessment and management of pain and distress in young children are complex tasks for health professionals. But this has been an area in which some improvement has been achieved. Recently Buckingham (1991; 1993) devised and evaluated procedures such as observation schedules for measuring pain behaviour and simple pain scales for toddlers with post-surgical pain. Earlier studies by Davis (1990), Douthit (1990) and Eland (1985) obtained similar results. Buckingham (1991) concluded that the most effective strategies for helping young children cope with pain are those which encourage staff to use clear communication and explanation with the children and their families and which carefully observe the children's behaviours in order to be better able to detect pain symptoms.

Interestingly, most studies of children's distress and coping with medical procedures, including painful ones, support the double view that adults' attitudes may be helpful to children in some cases but not in others (e.g., Glasper, 1988; Mechanic, 1964; Schofield & White, 1989). As pointed out by Barr (1994), if the adult reacts in a consciously natural manner and attempts to highlight any single beneficial aspect of the medical procedure, the child is likely to present less distress behaviour. On the other hand, if the parent or other adult is afraid or scared or even critical towards the child's reaction, this may often be reflected in a child's increased distress. In spite of this, a study by Ross & Ross (1984), involving school age children reported that, on the whole, children consider the presence of their parents during their stay in hospital to be the most helpful strategy for coping with the pain and distress of a medical procedure.

Another pertinent consideration is that children are somewhat flexible in their reaction to distress or pain. Their developmental level, on the one hand, does not enable them to get a full understanding of the situation, putting them at a greater risk of distress. But, on the other hand, as the child is still very much involved with play and fantasy, their perception of the examination can be influenced through play and fun activities (Goldberger, 1988a; Goldberger *et al.*, 1990).

Providing children with information through practical play activities about the procedure or specific aspects involved in it can equip them with better strategies for dealing with the distress caused by an examination. The outcome of such a strategy may be to produce a less distressed child.

In a study carried out by Johnson, Kirchoff & Endress (1975) children were given information on the physical sensation resulting from a cast removal[3]. Less distress-pain behaviour was observed among children who learned about the sensory aspects of the procedure when compared with children in the control group who had received no information. The children in the experimental group had the opportunity to re-assess their perception of the procedure they were about to undertake and it seemed to help them to find strategies to handle the situation, even if in a very rudimentary or simple way. Involving children in the medical procedure is often associated with a better behavioural outcome (Johnson, 1972).

Preparation procedures

Changes in the way children are treated while in hospital have been

[3] The observation of children while having cast removal gives the impression that they are in pain during the procedure. But this is not really the case; the noise and type of equipment used seem to be the critical factors in exacerbating distress, so that the child may think that her/his limb is going to be damaged by the tool and, as a result, the *feeling* of pain seems present.

accomplished (section 1.2) and a variety of preparation procedures have been employed to help reduce children's distress during examinations. These may include the provision of information, the use of film modelling, puppets, distraction and even hypnosis. Appendix I summarises the main studies on the preparation strategies most used with children in hospital. It is important to note that these preparations for medical events are not applicable to such a young age range as the one studied by the research reported in this thesis.

The common aims of such preparations are to provide information to the child with or without the parent's presence, to encourage the child's emotional expression, and to serve as a medium for trust and confidence between the child and her/his family and the hospital staff (Wolfer & Visintainer, 1975). There are three intrinsic aspects that are tacit to any preparation used. The first is to correct any possible misinformation that the child and her/his family may have. Secondly, the technique serves to empower the child to, at least, attempt to master the situation by anticipating the different experiences involved in the examination. Finally, it has the task of promoting a clear understanding of why the examination is necessary.

Through a sensible and structured preparation procedure the child has the possibility of exploring her/his fears by asking questions, to rehearse the examination, and to observe and interact with someone who has available both the required information and the time to talk about these issues. A variety of empirical studies support the assumption that psychological preparation influences children's reaction to medical examinations, independent of their age or previous experience with hospitals (Field *et al.*, 1988; Goldberger *et al.*, 1990; White, 1959). Preparation helps children to develop and use strategies that are necessary in their lowering or mastery of distress during a medical procedure (Peterson, 1989; Wolfer & Visintainer, 1975).

But there is still concern about the best approach to employ with young children and their families in preparing for admission to hospital or medical examinations. Generally speaking, the clearest findings of the beneficial aspects of preparation for examination or surgery have been obtained with older children (i.e., age 5 years and above) with whom a sophisticated level of communication is possible. It is noteworthy that both the number of studies and success of the interventions is less with younger children. For obvious reasons, preparation with such children is especially challenging. This will be returned to later on (see Chapter Four, section 4.3.3).

1.5.3 - The parental role

Parental presence in the hospital can contribute to a reduction of distress behaviour in children, during and after medical examinations. But still nowadays, depending on the medical procedure the child is going to undertake, parents are viewed with a certain reserve. Sometimes parents are seen as adding to their children's level of distress instead of helping them to overcome the problem (Bevan, Johnston, Haig, Tonsignant, Lucy, Kernon, Assemes & Carranza, 1990). As a result, there is still some controversy about the parent's effect on the child's behaviour during hospital admission (Dahlquist, 1992; Dahlquist, Gil, Armstrong, DeLawyer, Greene & Wuori, 1986; Shaw & Routh, 1982).

The study by Brain & Maclay (1968) demonstrated that a parent's presence could make a difference to the whole period the child spends in hospital - during the admission, prior to and post-surgically, as well as after discharge. Other studies, too, have been carried out to press for more effective changes in current medical practice. Attention has been paid also to the parent's presence and participation in neonatal units, whether in normal post-natal wards or in special care units for premature babies (Als, 1982; 1986; 1992; Brimblecombe, Richards & Roberton, 1978; Hudson, 1985; McFadyen, 1994). These studies were extremely beneficial: the attempt to maintain close contact between the parent and the newborn baby led to staff recognition of the comfort that the parent's presence could bring for the very young child, whether sick or not.

Experimental studies that have considered the relevance of the parents' role to their children's treatment and how it can influence the children's level of distress behaviour and adjustment have been carried out by Skipper, Leonard & Rhymes, (1968; Skipper & Leonard, 1968) and by Mahaffy (1965). A particularly interesting aspect of these studies was that their approach concentrated on giving information to and preparing the parents, rather than the children.

The study by Skipper *et al.*, (1968) involved mothers whose children were having elective surgery. It was hypothesized that mothers receiving information and preparation (the experimental condition) would experience less emotional distress, would be more satisfied with the information given and the medical and nursing care received, and would feel that they were of more help to their children than the mothers in the control group (who did not receive the same amount of information and preparation). The authors labelled their approach *stress reduction interaction* and reported that it was associated with lowered levels of child distress. However, confounding variables made it impossible to determine if the positive effects on the children's behaviours were the result of the preparation and support provided by the special nurse assigned to the experimental group, rather than, or in addition to, the indirect effects of the mothers' lowered distress and improved coping.

The theoretical framework of the approach used by Skipper *et al.* as well as by Mahaffy, was based on *social theory* and the *emotional contagion hypothesis* (Campbell, 1957; Escalona, 1953). This theory postulates that the parents' emotional state may be transmitted to the child. In fact, the results from the studies of Skipper *et al.*, and Mahaffy showed that children of uninformed or emotionally upset parents were the ones who presented most disturbance during their hospital stay. Conversely these parents were less able to assist their children during the medical procedure. Recently Bevan *et al.*, (1990) found similar results in a study of parental anxiety as a predictor of behavioural and emotional responses to induction of anaesthesia in children.

Wolfer & Visintainer (1979) investigated the relationship between the level of distress presented by the child during a stay in hospital and the amount of psychological preparation and supportive care provided. The results demonstrated that, with such preparation, even the parents were less anxious and more satisfied with the information and attention received from the hospital.

On both theoretical and empirical grounds, a strong case can be made that the mother or father is a key figure to be included and considered in a paediatric hospital setting (Brain & Maclay, 1968; Prugh *et al.*, 1953; Skipper *et al.*, 1968). The unique relationship between the child and her/his parent can be very useful to the staff as the parent may act as a sort of *translator* for the child of what is going on in the ward, of aspects of the procedure the child is about to undertake and the reasons for it, as well as in relation to the necessary medication the child needs for her/his quick recovery. It is not an overstatement that the parent probably knows the child better than anyone else and may be more skilled with regard to the best way to explain things to the child.

If the staff are able to precisely inform the parent of what is about to happen during the examination, making sure that the parent understands and is comfortable with the situation, the parent is in a better position to inform the child about the procedure. The staff's support to the parent is essential as the staff play the role of a *negotiator* between the child and the hospital situation and this liaison may contribute to less distress behaviour on the part of the child.

The role of the parent in reducing children's distress is highlighted in most of the studies related to hospital (e.g., Brain & Maclay, 1968). It seems pertinent to notice that these studies also assigned special staff to carry out the intervention condition which, indirectly, may reinforce the role of staff as a negotiator. On the other hand, studies which challenge the relevance of parental presence in reducing children's distress (e.g., Bevan *et al.*, 1990) may have devised their interventions relying on direct information or guidance to parents in relation to their children's examination. But not much attention was paid to how to instill in the staff a supportive attitude towards the parents.

1.5.4 - The staff role

As previously mentioned, the vast majority of studies of children in hospital and/or preparation procedures have considered children's as well as parents' characteristics as factors which contribute to the onset of children's distress. It seems striking that staff behaviour has not received equivalent attention. A number of studies have documented the frequency, duration, and nature of interactions between children and staff (Cleary, 1977; 1979; Pantell, Stewart, Dias, Wells & Ross, 1982; Schulman, Kaspar & Child, 1970; Smith, 1976) but none of them have examined the possible relation between the characteristics of those interactions and children's responses to the care they have received.

Few studies have examined adult attitudes and their effect on children's behaviour in hospital. In one such study, Blount, Corbin, Sturges, Wolfe, Prater & James (1989) and Blount, Sturges & Powers (1990) studied the effects of adult behaviour on children with a diagnosis of cancer. Their results, similarly to the ones obtained by Bevan *et al.* (1990), suggested that adults' behaviours, such as non-procedural talk and humour directed to the child, tended to precede instances of child distress in some situations but not in others. Blount *et al.* (1989) also developed the *Child-Adult Medical Procedure Interaction Scale* - CAMPIS - which Gonzalez, Routh & Armstrong (1993) applied solely to the parents participating in their study.

Despite Gonzalez *et al.*'s (1993) findings that mother-child interaction could modify children's distress behaviour during medical procedures, it was also stated that the study was not able to establish with certainty whether maternal distraction preceded (prevented) and/or followed (ameliorated) child distress. This unclear result may have some relation to the methodology used in the study. If the observation of staff behaviour was considered, the relation between parent behaviour and child distress could be further clarified. Therefore Gonzalez *et al.* suggested that by considering interactions such as those involving medical personnel, it should be possible to provide additional insights into children's distress and its management in a hospital setting.

A critical review on the effects of hospital admission and surgery on children (Yap, 1988a) made no reference to staff behaviour as an important variable to be considered in relation to the distress presented by the hospitalised child.

However, in a review of paediatric preoperative preparation procedures, Yap (1988b) pointed out that "there has hardly been any systematic research examining ... hospital care" and adds that "preparation strategies do not stand detached from a relationship context which needs to be a positive one" (p.370).

In the study carried out by Davenport & Werry (1970) it was mentioned in relation to the children's distress upon admission to hospital, that the children's behaviour could be related to the ability of the staff to carry out the procedure (i.e., anaesthesia) and to how they interacted with the children. Kuttner, Bowman & Teasdale (1988) observed that young children "relied more heavily on staff for direction than did the older children" (p.379). Young children required the staff's help with the distraction techniques they were using as a relief from the pain and anxiety resulting from the medical procedure undertaken: bone marrow aspiration. It was reported by Harris (1979):

> that very often staff do not realise the effect their words and actions can have on the children ... who either misinterpret them, or react badly because they are already feeling sensitive due to soreness and the effects of a general anaesthetic. (p. 124)

Studies that have looked at the relationship between doctor communication and patient compliance with medical regimens (Fremon, Negrete, Davis & Korsch, 1971; Korsh, Gozzi & Francis, 1968; MacCarthy, 1974; Pantell *et al.*, 1982; Schulman *et al.*, 1970) have demonstrated that parents and children were more satisfied and tended to adhere more effectively to the required treatment when the doctor talked more sensitively about the child's medical condition and was willing to explain and clarify the child's and parent's queries.

Induction of anaesthesia is the only area which has addressed and examined staff behaviour as a variable related to children's distress during hospital procedures to any substantial degree. In this specific area, it is said that the staff understand the benefit for the child of having the parent present during the procedure of anaesthesia induction, but do not stimulate the parent to do so. Hickmott, Schaw, Goodyer & Baker (1986) and Hannallah, Abramovitz, Tae & Rutteman (1984) pointed out that the behaviour of the child may not just be influenced by parent behaviour but also by that of the staff. They suggested that both child and parent may suffer due to staff attitudes. However, it was also suggested that the staff may sometimes be more successful in producing a calm induction and, consequently, a less distressed child.

Recently, results from a study of children's coping with anaesthesia induction (Wiltshire, 1992) showed a "relationship between children's distress levels (as measured by the OSBD[4]) and the anaesthetist carrying out the anaesthetic induction procedure" (p.67).

It seems plausible to consider that the way the staff approach and deal with a child who is about to have an examination may influence

[4] OSBD - Observation Scale of Behavioural Distress; see Chapter Two, section 2.3.5.

the child's appraisal of the situation and, consequently the level of distress the child presents.

Despite a handful of studies that address the role of staff in relation to children's distress, this area should be considered a priority for research. If there is a relationship between staff behaviour and children's distress it may be possible through training and support to improve the way the professionals interact with the children during medical examinations and, as a result, to reduce children's distress behaviour.

The play-staff

Because the child may tend to appraise hospital examinations as distressing even if, from an adult's view point, there is no clear reason for this, attempts have been made to try to understand what in the examination seemed to exacerbate the child's distress. It was proposed that specially articulated strategies related to the procedure would reduce the level of distress through helping the child to get a better understanding of the situation. So, a professional with the task of developing the needed strategies to help children's understanding of procedures and enhancing their capabilities to deal with the distress - the *child life specialist* was created in the United States and Canada (Brazelton & Thompson, 1988). Similarly, the role of a *play specialist* (former play leader) was developed in the United Kingdom. However, the financial pressure faced by the health services has reduced the availability of play professionals both in paediatric wards and in outpatients clinics in the United Kingdom.

Despite the recognition of the valuable job done by a child life/play specialist, children still present negative reactions to hospital either during a visit for a routine check up or an examination (Gibbons & Boren, 1985).

The arrangement of specially devised strategies to help young children to deal with the distress provoked by a hospital environment requires both resources and a knowledge of child development (Goldberger, 1988a, b). Parents are also important figures in this process (e.g., section 1.2). However, on some occasions, the play professional commitment to providing the child with an optimal preparation for an impending procedure may prove disappointing to her or of little help or even no benefit to the child. It may be so if the medical staff who clinically assists the child do not work in a interdisciplinary way with the play specialist by taking into consideration not only the child's medical care but also her/his psychological needs.

The next section attempts to draw together the developmental characteristics, individual differences and contextual factors examined in section 1.3 to 1.5 into a theoretical model of the factors underlying young children's distress during hospital examinations. The model is intended to provide a framework for the empirical studies to be reported in the remainder of the thesis.

1.6 - A MULTIFACTORIAL MODEL OF DISTRESS

In view of the evidence reviewed in the previous sections, it seems plausible to hypothesize that distress in young children is the result of an association of multiple factors.

Four variables, as considered by early studies, seem to play a crucial role in the onset of distress in hospital:

i. the child's age (e.g., Wallace, 1989),

ii. the child's gender and temperament (e.g., Sylva *et al.*, 1993a),

iii. the parent's behaviour (e.g., Skipper *et al.*, 1968) and,

iv. the type of examination undertaken by the child, for instance, in relation to pain or discomfort (e.g., Jay, Elliott, Ozolins, Olson & Pruitt, 1985; Jay *et al.*, 1983). However, the perceived strange or threatening nature of the environment may also play a critical part in children's distress.

Parents play an essential role in supporting the young child during hospital examinations, even if they are not successful in reducing or averting the pain or distress the child may endure (e.g., Ross & Ross, 1984). But, whether or not parents are able to play this role, other aspects such as staff behaviour may have a part to play in reducing or exacerbating distress.

In other words, the lack of attention to the staff's role in children's distress could be a contributor not just to the behaviour the child presents, but also in relation to the poor effectiveness of some of the interventions devised and applied to prepare children for their medical examinations.

The multifactorial model proposed by this thesis comprises a set of variables that have been measured, with the exception of staff behaviour, in previous studies of distress in young children in a hospital environment. In summary, the group of variables considered for the model are:

i. the characteristics of the examination - they comprise (a) if the procedure is an invasive one or not, (b) the aspects of the examination room such as lighting and equipment used during the procedure, (c) its duration and (d) number of staff and family members accompanying the child during the procedure;

ii. child variables - (a) the child's age on the date of examination observed by the researcher, the date of the last similar examination, the date of the first examination undertaken, the dates of the first and last hospital admission and the date of the first and last surgery undertaken; (b) gender; (c) temperament; (d) the child's previous hospital experience, including the number of previous examinations and the number of previous hospital admissions and/or surgical operations undertaken by the child; and (e) the type of preparation received before the examination;

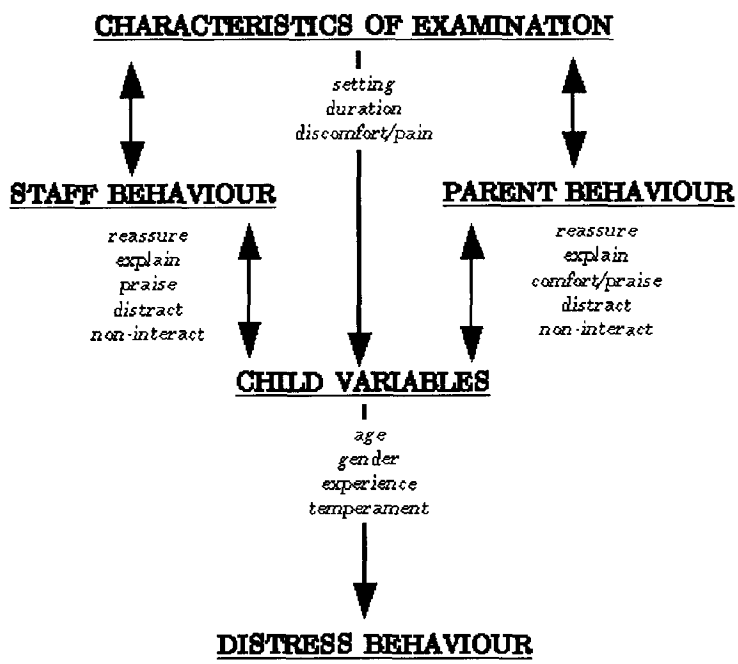
iii. parent behaviour - related to (a) its frequency and duration and (b) the type of interactive behaviour during the examination.

iv. staff behaviour - as for parent behaviour (item iii)

It seems likely that some of the variables included in this model will prove to be more powerful than others in influencing the way a child behaves. The foregoing review also highlights that social cognitive factors such as appraisal may have some sort of role to play in the onset of distress. These factors are also part of the model but their effects are presumed to be subsumed within the child's previous experience and learning. Their relationship with distress will be considered through the analysis of the results of the studies set up to test the model.

Figure 1.1 presents a schematic representation of a multifactorial model where the different variables each contribute equally to explain young children's distress during medical examinations, in general, and during the radiological examinations to be considered in this thesis in particular. The aim of the research reported in the remainder of this thesis is to discover whether the factors are equally important or some are more important than others.

Figure 1.1- YOUNG CHILDREN'S DISTRESS DURING RADIOLOGICAL EXAMINATIONS SCHEMATIC MODEL



The proposed model has its roots in Ecological Theory (Bronfenbrenner, 1979). Although the model of stress and coping postulated by Lazarus & Folkman (1984) could be cited as a relevant theoretical framework for the research presented here, these authors postulate a cognitively-oriented process model which may not be appropriate when studying young children, due to their cognitive limitations at this age. Moreover, as Bronfenbrenner (1979) points out, a limitation of cognitive developmental models is that they do not take sufficient account of the specific environmental features to which the child is exposed. Rather than cognitive ability alone, it seems likely that the child's experience, abilities, gender and temperament interact with features of the environment, such as its strangeness and whether or not adult support is available, to influence the child's distress.

The theoretical framework adopted in this thesis, like the ecological theory, assumes that the child, as a developing human being, is in contact and interacts with other unfamiliar people, things, and situations. The child influences the behaviour of others and has her/his behaviour influenced through these relationships. In one way or another, stress can be perceived in these situations and may lead, or not, to distress behaviours. This is so because the way a child appraises and responds to a specific situation depends both upon her/his cognitive-developmental level and previous experiences and on the context in which these experiences have taken place. The child's behaviour will also depend on the behaviour of these people who, sharing the same environment or social context as the child, experience both the event and the child's reaction to it (Bronfenbrenner, 1979). In Bronfenbrenner's (1979) own words "the environmental events that are the most immediate and potent in affecting a person (...) are activities that are engaged in by others with that person or in her presence." (p.6)

More specifically, two aspects of the ecological theory seem relevant to the multifactorial model presented before: the *person-process-context model* and the *microsystem*.

The *person-process-context model* takes into account the characteristics of each of the elements in the environment and the interaction among them to explain behaviour. "The ecology of human development lies at a point of convergence among the disciplines of the biological, psychological, and social sciences as they bear on the evolution of the individual in society" (Bronfenbrenner, 1979, p.13). Similarly, the multifactorial model proposed in the present thesis considers each factor in the relationship (i.e., child's developmental and individual characteristics and aspects of the hospital environment) in an attempt to explain how these contribute to the onset of distress in that specific setting. But Bronfenbrenner (1979) and Bronfenbrenner & Crouter (1983) assert that in order to get a better understanding of the interactions of the different factors, these must be considered as part of a larger environment (or system), as for example, the *microsystem*. The microsystem seems to be the system most related to the present research.

The *microsystem* refers to a pattern of activities, roles and interpersonal relations experienced by the developing child in a given setting with particular physical and material characteristics. A microsystem design considers the role of the participants. "A role is a set of activities and relations expected of a person occupying a particular position in society, and of others in relation to that person" (Bronfenbrenner, 1979, p.85). All are considered to influence the child by activating and shaping distinctive patterns of behaviour and responses that then acquire a momentum of their own. Such designs have been used mainly with a young age group (infants and preschool age children) and are relevant to the research presented in this thesis as the children studied are younger than 3 years of age. According to Bronfenbrenner (1979), considering the environment, we have a better understanding of observed behaviour because there is a functional interdependence between individuals and their surroundings. In his own words, "human abilities and their realisation depend in significant degree on the larger social and institutional context of individual activity (p.xv). Bronfenbrenner & Crouter (1983) also suggest that the study of the child's interactions with others than the parents in the microsystem should be considered. Therefore, staff behaviour was included in the research.

Relating these issues to the multifactorial model proposed here, it is possible to suggest that the child's reactions to a medical examination will be related to the way the adult, namely the hospital member of staff, approaches and interacts with the child. According to this model, staff behaviour may play a role as significant as the age, type of examination and other variables in influencing children's distress behaviour. It can be hypothesized that more interactive behaviour from the staff will be related to less distress by the child. Similarly, Izard's (1977) assumption that a distressed child requires comfort and reassurance lends support to the idea that the way in which environmental factors relate to the child will play a role in her/his distress.

Blending these suppositions, it is proposed that a young child will react negatively to a hospital medical examination or treatment not only because of the strangeness of the physical environment and the people there, but because of lack of support from the people in the examination setting.

This conclusion, in turn, highlights the limitations of Attachment Theory in accounting for young children's distress in hospital. Rather than being the result of separation or violation of the parent-child relationship, their distress is considered to be firmly located within the ecology of the hospital environment.

In summary, and in accordance with the Ecological Theory, it is proposed that the child-parent relationship is not the only or even necessarily the main issue to be considered when studying young children's distress during medical procedures. The child's interactions with other aspects of the hospital environment may play some role in the onset of distress behaviour.

1.6.1- Applying the model to young children's receiving radiological examinations

The empirical investigations reported in the remaining chapters of this thesis were set up to test the relevance of the multifactorial model in explaining distress during radiological examinations. No empirical study to date has considered systematic observations and measurements of staff behaviour, despite some suggestion that this may be an important issue to investigate (Blount *et al.*, 1989; 1990). The studies also sought to assess the relative importance of the different factors included in the model for distress behaviour in one to three year old children.

The research was carried out in the Department of Paediatric Radiology of a children's hospital in London. Diagnostic radiology is one of the most frequent and common procedures children experience in hospital either as an in- or outpatient (see section 2.3.2). Yet it is an area where attention to possible distressing factors of the examination and consequently, preparation procedure have not been effectively considered (Barrow, 1992).

Two different examinations were the core of the empirical studies: the micturating cystogram and the ultrasound scan. The major difference between these two examinations is that the micturating cystogram involves a certain degree of discomfort or pain whereas the ultrasound scan does not. The rationales for selecting these examinations instead of others, as well as the variables measured throughout the studies, are explained in the following chapters where the methodological aspects are discussed.

Overall, the main questions of the present thesis were:

i. What behaviours did children present during a radiological examination?

ii. To what extent were the behaviours presented by the children influenced by the following variables:
(a) the type of examination undertaken;
(b) the number of previous hospital examinations and admissions;
(c) the age of the child;
(d) the child's gender;
(e) the child's temperament;
(f) parent or staff behaviour; and
(g) preparation for the examination.

Chapters Two to Five attempt to provide an answer to these questions.

CHAPTER TWO

FEASIBILITY STUDY

Most of the research reviewed in Chapter One concerns children who were undertaking surgical procedures, often involving pain. There were three reasons for deciding to base the present research in a paediatric radiology department and for choosing the particular department which participated in the research. Firstly, radiological examinations vary from those involving substantial discomfort to those which involve little or none, allowing a distinction to be drawn between procedures which are physically painful and those which are merely psychologically threatening by virtue of the strangeness of their environment. On the basis of a prior descriptive study (Barrow, 1992) it was expected that even non-invasive radiological examinations would be distressing for young children and one reason for this exploratory study was to confirm that this was the case. Second, the department demonstrated both interest and willingness in co-operating in the project. The third reason was that a large number of young children attend the department for examinations, making the research feasible within the available time.

2.1- PURPOSE OF THE STUDY

Before undertaking a systematic investigation, a number of decisions had to be made, for example, about the types of examinations to be included in the study, measures of distress to be obtained, and so on. Therefore, the purpose of this first study was:

i. to obtain an overall understanding of the different examinations that young children receive in the Department of Paediatric

Radiology in a children's hospital;

ii. to determine the patterns of behaviour presented by young children observed over different examinations;

iii. to identify which examinations, associated or not to the level of invasiveness of the procedure, seemed to be more distressing for the children; and,

iv. to consider the influence of specific variables in relation to the children's behaviour during the examination.

In addition, the study served as a feasibility study, to reassure both the hospital staff and the researcher that more extensive research was warranted and practicable within the context of a busy hospital department.

2.2- MAIN QUESTIONS

i. What behaviours do children present during a radiological examination?

ii. To what extent are the behaviours presented by the children influenced by the examination length, number of previous hospital admissions or examinations, parent and staff behaviours, age of the child, illness/diagnosis and gender?

iii. Is there any link between the behaviours presented by the children and the level of invasiveness of the examination they receive?

iv. Is there any difference between the behaviours presented by inpatient and by outpatient children?

2.3- METHODOLOGY

2.3.1-The setting

The study was based at the Department of Paediatric Radiology of a children's hospital in London.

According to quantitative data provided by the Department's Manager there are over 30 thousand radiological examinations each year at this particular department. Around 50% of these examinations involve children under the age of 5 years, accounting for more than 10 thousand patients in this age group per year. On average there are 60 examinations per day.

2.3.2- Diagnosis

Over fifty percent of the young children attending the department for an examination have problems of renal/urological aetiology which were detected prenatally. Renal/urological problems refer to diagnoses involving the kidneys and the urinary tract. Between 1:450 to 1:800 of newborn children are born with renal/urological problems, which are more prevalent among boys than girls (Gonzales & Michael, 1987). Hydronephrosis (see below) is the main antenatal problem that is generally detected through an ultrasound scan. Once the child is born, infection of the urinary tract may occur due to diverse problems in these internal organs (Gonzales & Michael, 1987). The infection may affect the kidney's structure and its functioning. At birth, the baby requires immediate examination and investigation by the neonatologist and paediatric urologist so that appropriate therapy can be instituted before complications such as infections occur.

Hydronephrosis

Hydronephrosis is a condition that affects kidney drainage. It is not uncommon in children. It may be congenital or the result of partial blockage of the ureter by a calculus or cicatrix due to a previous urinary infection. It is usually observed bilaterally (i.e., affecting both kidneys) but may occur just unilaterally. The cause lies in the ureters, that are ducts by which urine passes from the kidneys to the bladder, and that may be dilated or tortuous thus making drainage of urine to the bladder difficult.

In the extreme cases of the condition, the kidney may show variable degree of cirrhosis and dilatation and deformities may be present as well. Hydronephrosis may lead to urinary tract infection.

Urinary tract infection

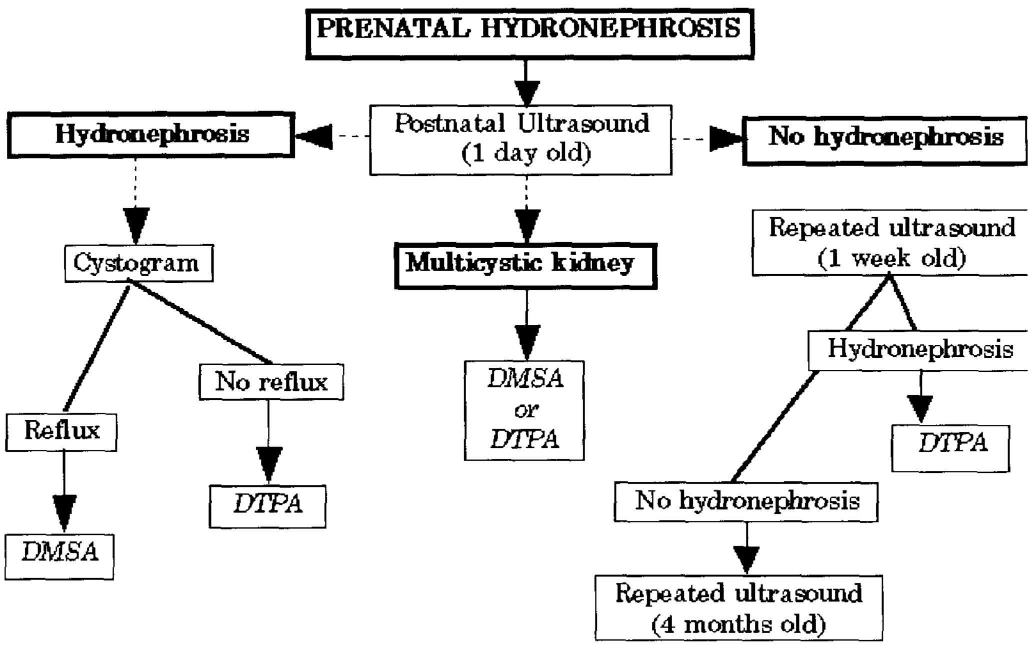
Urinary tract infections occur in 1.4:1000 newborn infants with a slight male preponderance (Gonzales & Michael, 1987). Thereafter infections are much more common in females. The symptoms, not particularly specific to this infection, involve signs of sepsis with fever, vomiting and failure to thrive. Antibiotic regimens should be used.

Among twenty to 25% of the patients present recurrent infection that requires more detailed examinations to isolate the cause of the infection. These children may be required to undertake different radiological examinations.

Imaging protocol for prenatal hydronephrosis

The imaging protocol used for infants born with antenatal diagnosis of hydronephrosis is shown in Figure 2.1 (Woodard, 1990).

Figure 2.1- IMAGING PROTOCOL FOR INFANTS BORN WITH ANTENATAL DIAGNOSIS OF HYDRONEPHROSIS **(from Woodard, 1990)**



Details of the examinations cited in the protocol are presented in the following section.

2.3.3- The examinations

Radiology is the science of radiant energy (X and gamma rays) and radiant substances (radioisotopes) used in the diagnosis and treatment of a variety of diseases. Radiography is the technique used in the making of film records (radiographs) of internal structures of the body (eg., bone, bowel, urinary tract) by exposure of film especially sensitized to X or gamma rays. The radiological/ radiographical use of new imaging techniques including radioisotope, ultrasound scan and computed tomography, with no increase in the patient's exposure to radiation, has generated better investigation procedures as well as more accurate diagnosis.

In the particular case of problems with the urinary tract, the radioisotope scan provides functional images of the urinary system facilitating a better and earlier diagnosis in young children. Diagnosis during infancy is beneficial in preventing later complications which would generate more risks for the young child.

The evaluation of the urinary tract using ultrasound scan is becoming increasingly important. It shows the renal anatomy well, even when function is diminished. It is very valuable in the diagnosis and sequential evaluation of hydronephrosis. It also can facilitate an early diagnosis, as the foetus can be evaluated as early as the sixth gestational week, although the precise diagnosis of genitourinary abnormalities usually cannot be accomplished until the second or third trimester. A number of genitourinary conditions suspected on foetal ultrasound have been confirmed at birth (Walker, 1985).

Related to the investigation presented in this chapter, twelve different examinations were observed. They are briefly described below. The figures in brackets refer to the number of children observed in each of the examinations for the present feasibility study.

Barium examinations

The *Barium Swallow* (n=5) is applied for investigation of disordered swallowing, vomiting, recurrent chest infections, failure to thrive and abdominal pain with abnormal clinical findings, among other conditions. It requires the patient to drink a thick contrast liquid - barium (which can be flavoured) in order to visualise the digestive system and then X-rays are taken. There is food restriction before examination and the contrast liquid may provoke nausea or vomiting. The patient must be co-operative. A consultant or junior radiologist, a nurse and a radiographer are the professionals involved in the procedure. One of the parents accompanies the child during the examination. The procedure takes an average of 20 minutes.

The *Barium Enema* (n=1) and the *Loopogram* (n=1) exam the function of the bowels. The contrast liquid is put directly into the large bowel via a catheter either through the rectum or colostomy. Otherwise, the patient experiences a procedure technically similar to the Barium Swallow.

Computed Tomography (n=2)

The *Computed Tomography* (CT) is the first choice for evaluation of potentially malignant masses in the central nervous system. It is used to construct a cross sectional image of the body revealing the anatomy of structures and evaluating the extent of the disease or tumour. The examination includes exposure to radiation and for younger children (under 36 months of age) the use of sedation or general anaesthesia and immobilisation are indispensable as motion disrupts the procedure. A simple scan may take 15 minutes.

Nuclear Magnetic Resonance (n=1)

The *Nuclear Magnetic Resonance* (NMR) gives a highly detailed image of the organ or area of the body examined which allows accurate localisation of mass lesions. It offers the possibility of obtaining new information about the lesion which may permit better understanding of it. The patient is placed in a 2 meters long tunnel throughout the examination. Sedation is used with younger children as the examination requires a co-operative patient who must lie still for a minimum of 40 minutes. It has no adverse effects as it does not involve radiation but magnetism.

Longitudinal studies of children's medical conditions can be undertaken using this procedure.

Micturating Cystogram (n=2)

The *Micturating Cystogram* (MCU) is the examination of the urinary bladder. "It shows the size and distensibility of the bladder and urethra during voiding and reveals the presence and amount of post voiding residual" (Darling, 1971). It involves the insertion of a catheter through the urethra until it reaches the bladder which is filled with a contrast medium in order for X-rays to be taken. "A MCU under sedation (general anaesthesia) may not produce satisfactory information about vesicoureteric reflux during micturition and should be avoided" (Gordon, 1987). The procedure takes an average of 15 minutes. Three professionals: a consultant or junior radiologist, a nurse and a radiographer are present throughout the procedure. One of the parents accompanies the child during the examination.

A detailed account of specific aspects of this examination is presented in Chapter Four (see section 4.3.1).

Radioisotope scans

Some of the radioisotope scans are named *MAG3* (n=3), *DTPA* (n=2) and *DMSA* (n=5) according to the type of isotopes used. *MAG3* is used to image the function and drainage of the kidneys. *DTPA* is a dynamic renal scan of the urinary tract and in addition to giving information about the function and drainage of the kidneys will highlight any obstruction. *DMSA* is a static renal scan used to produce high resolution images of kidney structure and morphology. All these examinations involve an injection of isotopes and the patient lying still for at least 20 minutes in order for pictures to be taken. In the specific case of DMSA, the isotopes injection is given in the morning and the main examination will take place 5 or 6 hours later. These examinations also involve collection of a blood sample. There are no restrictions on the number of family members and siblings present during the child's examination. One or two radiographers carry out most of the procedure being the consultant or junior radiologist responsible for the inoculation of isotopes as well as the collection of blood sample.

The *White Blood Cells Scan* (n=1) is an isotope based examination which involves collection of a blood sample. The white blood cells on the blood sample collected are radioactively marked. The blood is then returned to the child's blood stream. The marked white cells will concentrate on the area of the body presenting infection or inflammation, if this is the case. This procedure is used when others have failed to detect the problem. A series of pictures is taken which require stillness from the patient. The main part of the procedure (pictures) takes an average of 30 minutes. Two radiographers and a consultant or junior radiologist take part in the procedure and there is no restriction on family members and siblings accompanying the examined child.

Lung Scan (n=1)

The *Lung Scan* shows any abnormalities on both the blood and air supplies to the lungs. Scans may also be performed for suspected pulmonary embolus.

A scan requires a co-operative child who has to inhale a special gas (Krypton) and lie still for an average of 20 minutes while pictures are taken. Sedation may be required for young children. Two radiographers take part in the procedure and family members and siblings may accompany the child during the examination.

Ultrasound Scan (n=10)

The *Ultrasound Scan* (USS) provides anatomical high quality cross sectional imaging of the organ examined independent of its function. It involves passing a probe over the abdomen requiring the patient to lie in both supine and prone positions in the case of renal scans. It is a safe procedure and a suitable method for repeated follow up examinations in assessing the progress of a condition. This scan is "frequently a simple and rapid means of guiding a wide variety of invasive procedures requiring needle puncture, both diagnostic or therapeutic" (Gordon, 1987). The examination does not involve radiation, injections or contrast materials. The procedure lasts an average of 6 to 10 minutes and is performed by a radiographer, consultant or junior radiologist. Parents and siblings are free to accompany the child to be examined.

More detailed information on particular aspects of this examination is provided on Chapter Three (see section 3.3.1).

2.3.4- Procedures

The target children were those who were less than 60 months of age and attending the department for a radiological examination. As indicated during Chapter One, children of this age are particularly likely to be upset both during and subsequent to hospital admission.

There was no random selection of subjects. The time, number and type of examination the child was going to undertake were considered. The children were selected consecutively from an appointments list provided by the Department of Paediatric Radiology and, in general, the selected subjects were the ones appointed by the department for examination earlier in the day, which would give the researcher more opportunity for contacting the parents on their arrival at the waiting area. All parents asked to allow their children to be observed agreed to this.

Both out- and inpatients were contacted in the department's waiting area on the day of their examination upon their arrival at the department. A few inpatient children were contacted on the wards. The study was explained to the parents and permission for observation was obtained. If the parent presented difficulties in coping with spoken English, the child was excluded from the study. When called for the examination, the researcher accompanied the parent and child to the examination room.

Extensive notes on the child's behaviour and characteristics of the procedure were kept systematically throughout the observation period. Whenever possible, observations of the children were also made before their examination while in the department's waiting area. The length of examination, number and changes of staff in the room were recorded as well as the number of family members, siblings or relatives accompanying the child during the procedure.

At the end of each examination, both the researcher and the staff filled in independently an amended observation instrument (Bradford, 1990; see next section) and a Likert-type scale related to the children's level of distress.

The researcher did not interact with the subjects nor with their families or staff. Contact, which was brief, was limited to the period before starting the examination while in the waiting area. The researcher maintained a neutral expression during the period of observation.

When the examination was finished, if the parents asked questions or wanted more precise information about the research or to discuss it in relation to their children's behaviour during the examination, the researcher talked with them. Sometimes, where the parents' queries included medical issues, some of the staff joined the discussion and some technical and clinical aspects were explained in depth. The researcher recorded, afterwards, the main issues included in the discussions with the parents.

The researcher obtained permission to consult the medical notes of each of the children involved in this study. It was possible to gather all the relevant information available on the children's medical condition.

2.3.5- Instruments

The measurement of distress

The initial instruments used to measure children's behavioural distress were based on a Likert-type scale. Wolfer and Visintainer (1975) developed a 1-5 manifest upset scale (1= low, 3= moderate, and 5= extreme distress) used on 5 different occasions during a child's hospital stay. The aim was to get a measure of the child's emotional state at a specific point in time. Shaw & Routh (1982) used a similar Likert-type scale but defined each of its points precisely. But as such scales provided an overall distress score, it was not clearly representative of specific features of the child's behaviour.

A significant contribution to the way the level of distress in children undergoing painful medical procedures is measured was the instrument developed by Katz, Kellerman & Siegel (1980). The *Procedure Behaviour Rating Scale* - PBRS - operationally defined a set of behaviours presented by children during painful procedures; 25 behaviours were recorded as present or absent during 4 different phases of a medical procedure. Afterwards, the scale was reduced to 13 behaviours. The instrument was validated through correlational methods with nurses' rating of children's distress. This instrument was devised to measure distress as a result of both anxiety and pain. As part of a study related to anxiety and preparation procedures carried out by LeBaron & Zeltzer (1984), the original PBRS was shortened to 8 items. Correlational analysis of the results supported the validity of the original instrument.

The Observation Scale of Behavioural Distress - OSBD

Jay, Ozolins, Elliott & Caldwell (1983) improved the applicability of Katz *et al.*'s (1980) initial instrument. The predominant behaviour(s) were assessed during each 15 seconds interval across the 4 phases of the medical procedure - bone marrow aspiration. Each behaviour was also weighted according to the inferred intensity of distress. For example, the behaviour cry receives a weight 2.0 whereas scream receives 4.0.

Initially the *Observation Scale of Behavioural Distress* - OSBD - comprised 11 behaviours which was subsequently reduced to 8 behaviours. The OSBD's validity was assessed with correlational methods applied to the OSBD and to the parent's and the child's self reported measure of anxiety and distress (e.g., Spielberger, Gorsach & Lushene, 1970). The OSBD also demonstrated significant correlations with physiological measures (heart rate and blood pressure) as well as with the children's self report on fear ratings (Elliott, Jay & Woody, 1987). It also showed an acceptable inter-observer reliability (Elliott *et al.*,1987).

Sylva, Bonn & Stein (1993a) devised a more differentiated observation instrument - the OSBD-M - with calculation of separate scores for different clusters of behaviour (e.g., cry and moan is calculated separately, instead of the single overall score the OSBD provides). This procedure was claimed to reveal more about the children's responses.

In summary, the OSBD (and its variants) has been the instrument most used to measure distress in children. It has been used successfully with different medical procedures, for example, finger prick (Pretzlik, research in progress) and chest X-ray (Bradford, 1990). It has also been used with young children (Bradford, 1990). However, some concern has been expressed about the wide age range to which it has been applied. Sylva (1992) and Sylva *et al.*(1993a), have considered this issue and recommended applying the instrument to a narrow age range, i.e., 3 to 6 years old.

In the present study an amended version of the OSBD (Bradford, 1990; Appendix II) was used. It is a 3 point Likert-type scale comprising 11 behaviours related to the child's reaction during the examination. This instrument was originally used to study young children undergoing X-ray examinations (Bradford, 1990). Three different categories, related to the children's level of distress, were defined according to whether distress behaviour was absent, present occasionally or present to a large extent during the examination. Children in the *absent* category were those who did not present any observable distress behaviour during all or most of the examination. The *occasional* category comprised children who presented some level of distress observed, such as crying, refusal of position, need for restraint, etc, for some time during the examination. The *large extent* category referred to children who had an extensive and negative reaction to the procedure during all or most of it according to the individual judgement of the researcher and of the staff.

According to Bradford's design each behaviour should be scored mainly according to its frequency or extent (absent=0, occasionally=1, large extent=2). However, due to the wide diversity in the type of examinations observed and the variability in their duration, each child observed in the present study received a single score (0, 1, 2) based on the predominant behaviour recorded in the notes made during the examination. The operational definitions of the behaviours included in this OSBD instrument are the same as used by Bradford and are part of the record sheet the observer rated in this feasibility study (Appendix II). An extra item was included in the scale. It referred to parent and staff level of interaction during the child's examination and was rated similarly to the behaviours on the amended OSBD scale. Parents and staff were classified according to whether they interacted with the children throughout the examination, interacted during specific periods of the examination, or did not interact at all with the children. As an example, parent and staff attending to the child's behavioural cues or requests through talking, reassuring, distracting (play) and emotional support (comfort) were all behaviours included in the category 'interact'.

Another Likert-type scale was also used in the present study (Appendix III). Bradford used in his research a 1-9 Likert-type scale in order to assess the overall level of distress shown by the child: from not at all to highly distressed. This single item scale aimed at getting a view of the child's overall level of distress throughout the examination.

2.4- Sample

A total of 34 children under the age of 60 months took part in this study. Twenty three (67.6%) were girls and 11 (32.4%) were boys. The mean age was 30.28 months (*SD* 15.16 months). The age range for the total sample was from 3.15 to 59.11 months old. Fifty percent of the sample was between 14.23 and 40 months of age. The mean age of the girls (n=23) was 31.01 months old (*SD* 16.15 months). For the boys (n=11) the mean age was 28.04 months old (*SD* 14.18

months). The largest age group represented in the sample was between 12.01 months and 24 months old (n=11, 32.4%, 7 females and 4 males).

Considering their hospital status, nine of the children were inpatients (6 girls and 3 boys) whereas 25 were outpatients (17 girls and 8 boys). All the children had been examined at the department before. Twenty of them (58.8%) had previously undertaken the same examination in which they were observed.

Over fifty percent of the sample (n=18) had a diagnosis of renal/urological aetiology with its detection being made prenatally. In only 6 cases the children's diagnosis comprised life threatening illnesses (e.g., cystic fibrosis, cancer). The remaining children were either having their diagnosis investigated or were just undertaking the examination as part of their periodic health check-up.

In relation to the number of examination on the day these children attended the department and were observed by the researcher, over half of the sample (n=18, 52.9%) had just one examination, 12 children (35.3%) had two examinations and 4 others (11.8%) had a total of three different examinations.

2.5- RESULTS

Analysis of the data was mainly descriptive. Overall, one variable was considered at a time. One reason for this approach was because the numbers in this study were too small to apply more sophisticated statistics. But whenever applicable, correlational methods were used. Spearman's *rho* (r_s) was used on the reliability test.

2.5.1- Reliability

The overall agreement between the researcher and 4 different examiners on the rating of the amended OSBD (Bradford, 1990) reached r_s=.67. The agreement ranged from r_s=.64 to r_s=.68.

The total number of subjects included in this test was 9 (26.5% of sample) and they were all observed during the Ultrasound Scan.

The 9 point Likert-type rating scale (Appendix III) related to the overall level of distress presented by the child was filled in by the staff on three occasions, reaching agreement with the researcher's rating in two of these occasions. With such small numbers further analysis was inappropriate.

2.5.2- Child behaviour

In relation to the children's behaviour during the examination, the extensive notes taken during this period could be summarised readily using the categories on the amended OSBD (Bradford, 1990). The results showed a similar number of children in each of the three categories of distress behaviour (i.e., no distress, occasional distress, large extent of distress).

There was no significant relationship between the child's level of distress and the duration of the examination (r= -.160, p=.38, *ns*).

Table 2.1 presents the number of children presenting distress behaviour according to the examination undertaken.

Table 2.1- FREQUENCY OF CHILDREN'S DISTRESS BEHAVIOUR BY EXAMINATION

EXAMINATION	DISTRESS BEHAVIOUR ABSENT	OCCASIONAL	LARGE EXTENT
Ultrasound Scan	4	3	3
DTPA	2	0	0
DMSA	3	1	1
Barium Swallow	0	2	3
Micturating Cystogram	0	0	2
MAG3	2	1	0
Others	0	3	1
Total	11	10	10
%	35.48	32.26	32.26

The behaviours of the children having *computed tomography* and *nuclear magnetic resonance scans* were not considered here as these children were under partial effect of sedation when arriving at the examination room.

When considering the different examinations, the *ultrasound scan*, although referred to by hospital staff as a benign examination (i.e. non-invasive and short in duration), did not seem to generate markedly less distress behaviour for the children when compared with the examinations involving discomfort (e.g., micturating cystogram) or immobilisation and longer duration (e.g. radioisotope scans). In fact, 60% percent of the children receiving ultrasound scan (n=6) presented some degree of distress at some point of their examination. Examinations of longer duration such as DMSA and MAG3 had respectively 40% and 30% of the children who received these procedures as presenting some degree of distress. The sample sizes clearly do not allow these proportions to be treated conclusively, but the findings are consistent with the expectation that many children undergoing a non-invasive radiological examination will show a significant amount of distress.

The systematic observations of the different examinations were very helpful in getting a clear picture of the diversity of procedures involved and their associations (or not) to the children's reactions and their patterns of behaviours while being examined. The most frequent distress behaviours presented by the children were crying and screaming, refusal of position, clinging to the parent and need for emotional support (e.g., comfort, holding hands). Table 2.2 summarises the frequency of occurrence of each of the 11 behaviours on the OSBD in relation to the ultrasound scan. The other examinations were not included here because they varied greatly in their procedures and included very few children.

Table 2.2- NUMBER OF CHILDREN BY DISTRESS BEHAVIOUR ULTRASOUND SCAN EXAMINATION (n=10)

	DISTRESS BEHAVIOUR		
BEHAVIOUR	ABSENT	OCCASIONAL	LARGE EXTENT
Cry	3	4	3
Scream	2	6	2
Cling	2	6	2
Fear	8	2	0
Pain	9	1	0
Carry	7	1	2
Flail	4	5	1
Refuse	0	7	3
Restrain	1	6	3
Rigidity	6	4	0
Emotional Support	1	7	2

Behaviour and age

The mean age of the children who presented some degree of distress (i.e. occasional or large extent) appeared less (age mean 28.43 months old, SD 17.14 months) than for the children who did not show distress behaviour (age mean 32.72 months old, SD 13.82 months), although correlational analysis fail to show significant relationship between age and level of distress (r= -.121, p=.51).

Behaviour and gender

Overall, girls appeared to present more distress behaviour than boys as shown in table 2.3. However, correlational analysis did not show a significant relationship between these variables (r= -.235).

Table 2.3- GENDER AND DISTRESS BEHAVIOUR

	DISTRESS BEHAVIOUR			
GENDER	ABSENT	OCCASIONAL	LARGE EXTENT	ALL
GIRLS	5	7	8	20
BOYS	6	3	2	11
ALL	11	10	10	31

Behaviour and hospital status

Considering hospital status, inpatients tended to present more distress behaviour than outpatients (Table 2.4) but this relationship too was insignificant (r= -.200).

Table 2.4- HOSPITAL STATUS AND DISTRESS BEHAVIOUR

	DISTRESS BEHAVIOUR			
HOSPITAL STATUS	ABSENT	OCCASIONAL	LARGE EXTENT	ALL
INPATIENT	2	4	3	9
OUTPATIENT	9	6	7	22
ALL	11	10	10	31

Previous examinations

A significant relationship was found between the total number of examinations undertaken and the number of visits to the hospital (r=.712, p=.000), leading to the unsurprising conclusion that if the child's illness is chronic s/he is likely to have received more examinations and/or hospital visits.

The significant correlation found between the total number of ultrasound scans and the total number of examinations (r=.728, p=.000) may confirm the fact that the ultrasound is an examination frequently undertaken by the children as well as serving as a baseline screening for other examinations that these children may need as it is considered a non-invasive and safe procedure (Gordon, 1987).

2.5.3- Parental and staff behaviour

The level of interaction presented by parents and staff during the examination was classified according to its frequency during the examination into one of the three defined categories (see section 2.3.5). The results are presented in Table 2.5.

Table 2.5- PARENTAL AND STAFF INTERACTIVE BEHAVIOUR

INTERACTION	INTERACT	PERIODIC INTERACT	NON-INTERACT
PARENT	13	19	2
STAFF	4	14	16

Staff presented less interactive behaviour with the children than parents. Staff behaviour correlated .483 (p=.011) with the child's age at examination; the older the child the more the staff interacted with her/him. Similarly, parents interacted more with older children but the correlation was not statistically significant (r=.308, p=.086).The correlation between staff interaction and child distress was significant only for the girls (r=-.445, p=.038). The more the staff interacted, the less distressed behaviour the girls presented or vice-versa. No significant relationship was found between parent interaction and the gender of the child (r= .239).

2.5.3- The examinations

The examinations observed may be divided in two different types according to whether the child participated actively or passively during the procedure. Although an examination that involves an invasive procedure (needle puncture) and a long period of stillness (e.g., *DMSA* with at least 20 minutes in supine position) is considered more distressing for the child, it seems that the child is given more possibility to participate in the whole process by being invited to do something (e.g. read a book or listen to music) during the examination. It was observed, in this particular procedure, that even when the child experienced *problems* with the isotopes injection, her/his performance during the continuation of the examination was fair. The activities proposed to the child during the examination distracted the child effectively and the long time taken for the procedure seemed forgotten or almost not noticed. So, this examination may be referred to as one that conforms to an *active role* by the child. The other procedures of the same type are *MAG3, DTPA, Lung Scan* and *White Blood Cells Scan.*

The ultrasound scan, on the other hand, may be categorised as a procedure involving a *passive role* by the child. This seems an intriguing observation as this procedure does not require that degree of stillness essentially needed in most of the other procedures. The children observed (n=10) reacted almost immediately to restraint and change of position by becoming distressed. Most of the reactive behaviours were concentrated in the age from 12 to 36 months old.

Despite the ultrasound scan being an examination of relatively short duration, it seems that the strangeness of the procedure/environment plays a key role in the behaviour presented by the child. In fact 30% of the children cried during the whole examination and 40% cried at some point of the examination. The crying was always associated with refusal of position and as a result the children were restrained by the parent or member of staff.

2.6- Discussion

The moderate degree of reliability between the ratings of the researcher and the staff may be related to the level of subjectivity of the observation instrument and some missing staff ratings which made it impossible to analyse the results according to Bradford's guidelines. There were also differences in the staff and the researcher's focus of attention during the examination: some behaviours were more easily observed by the researcher (e.g., clinging, emotional support) than by the examiner.

These exploratory findings indicated the need to improve the reliability of the observation method used.

2.6.1- Distress behaviour

A significant proportion of the children presented distress behaviour, while there was substantial variation between children in the amount and degree of distress shown.

The most frequent behaviour presented by the children was crying. Associated with this was a certain amount of refusal to maintain a required position, especially if the child was being held down by her/his legs and arms which is the practice in some of the examinations observed. Restraint was frequently used particularly if the procedure involved injections or required the child being in a certain position in order for pictures to be taken.

Overall the children presented distress behaviour in examinations involving a certain level of invasiveness or/and discomfort as well as in examinations not involving discomfort.

The expression of both fear and pain was minimal among the children, which may be consistent with the type of examinations undertaken. A similar finding was observed in a study involving children receiving chest X-rays (Bradford, 1990).

Age

Descriptively, age seemed to partially influence the way the child behaved during the examination. This study supports the trend that the older the child is, the less distress behaviour s/he presents during an examination (Katz, Kellerman & Siegel, 1980). No significant relationship was found when correlational methods were applied to the variables, perhaps due to the small sample size.

Gender

Boys tended to present less distress behaviour than girls but the finding was not statistically significant. Variability in the children's degree of distress according to gender has been reported by other studies (Katz, Kellerman & Siegel, 1980; Melamed & Siegel, 1975). However, the studies by Sylva, Stein & Bonn (1993b), by Bradford (1990), and by Jay, Ozolins, Elliott & Caldwell (1983) did not find significant results for the relationship between distress behaviour and gender. The present finding may be due to the small number of boys compared with the girls and the small size of the sample as a whole especially when considering the diversity of examinations observed. The prevalence of boys in hospital is higher than for girls. However, in this sample, there was a small number of boys. This may be due to a sampling error in the selection of subjects.

Hospital Status

In this study, the outpatients presented less distress behaviour than the inpatients (Table 2.4). It seems that inpatients may be exposed to more situations that can lead to distress than outpatients, who just come to the hospital for a brief visit/examination. Another possibility is that the inpatients are typically iller than outpatients.

Previous examinations

Jay, Ozolins, Elliott & Caldwell (1983) proposed the phrase *habituation effect* to refer to the idea that less distress would occur as a result of time and experience. Considering the results obtained by this feasibility study, such an effect did not seem to be contributing to the children's behaviour. That is, the children who had had more previous examinations seemed as much distressed as the ones who had fewer examinations. Two factors may be relevant here. The first is that Jay *et al.*'s sample comprised 17 children in the age group 2-6 years while the present study has children under 24 months old (n=14) as the largest age group. That means that this sample is overall younger than that of Jay *et al.* (1983). The second consideration is that Jay *et al.*'s study has a mean of 13 previous examinations per child and the present study has a mean of 7.2 previous examinations. Furthermore, the sample size of the present study did not allow more specific statistical analysis to be applied.

2.6.2- Parental and staff behaviour

There were very few interactions between staff and children during the examination. More interaction by the parent/staff seemed associated with less distressed behaviour by the child. More interaction was observed during the radioisotope scans than any of the others examinations. A significant variable here may be the staff familiarity with the equipment used to carry out the procedure. Perhaps in trying to master the equipment, there is not much opportunity for interactions with the child. The result, from the child's point of view, is that s/he receives comparatively little supportive input from staff.

2.6.3- The examinations

It seems that the invasiveness of the procedure (mainly considered as pain and/or discomfort) and/or the duration of the examination are not the only or main factors in the generation of distress among young children. It is relevant to consider that the strangeness of the procedure/environment is part of what leads the child to present distress and cope poorly with the procedure. This statement may apply at least to the ultrasound scan.

It was observed that the participation of parents and staff was important: more active involvement of parents and staff during the examination seemed to be associated with children being less distressed or more co-operative. Mainly, parents used distraction, comfort/praise and staff used explanation in helping the child to cope with the procedure. But this finding was based on the extensive notes taken throughout the observations. A more systematic type of observation seemed necessary.

On a few occasions, it was observed that the arrival of a different member of staff in the examination room seemed to be related with the child presenting distress behaviour. Some caution must be taken with this finding as the distress behaviour could be due to the duration of the procedure as, in general, with procedures of longer duration there may be changes of staff while the examination is carried out or different staff may arrive in the room toward the end of the examination. However talking and movement involving noise out of the sight of the child seemed to play a role in the onset of distress.

2.7- Conclusions

The ultrasound scan, in addition to being a non-invasive procedure is, in general, the first examination a child may have during a day-visit. Being able to make this examination less distressing for the child, might boost the possibility of more co-operation from the child in other examinations. It would generate more satisfaction among staff if they could see a child leaving an examination room in a happy mood instead of sad or in tears. It could also benefit the play staff by providing them with strategies to help children and parents cope with the examinations.

With modifications, the methods used seemed applicable for use in a more systematic study and such a study seemed feasible and desirable.

2.8- RECOMMENDATIONS

2.8.1- Procedural

Some of the examinations are not suitable for observation in the age group considered in this study. For example, the *computed tomography* and *NMR* scans normally sedate young children. The chest X-ray and its associated procedures receive a greater number of children under 12 months of age. In addition, some of the examinations (e.g. *Lung Scan*) involve patients with chronic and complex conditions such as cystic fibrosis or, in the case of the *Barium Swallow,* children with special needs (e.g., Downs Syndrome) which would require specialist interventions. In fact, a confounding variable observed in this feasibility study was the atypical and often apparently random movements presented by children presenting cerebral palsy or associated neurological impairment. This observation led to the conclusion that children with special needs may require to be considered as a special case in further research. The instruments used were designed for normal children and would need to be modified for those with mental or physical handicaps.

Considering that the Department of Paediatric Radiology has the ultrasound scan as the first examination a child will generally undergo in a day, when perhaps other procedures will also take place for this same child, it seems relevant to take a close look at its use with young children.

The *Micturating Cystogram* and the *Ultrasound Scan* are examinations that occur with a reasonable frequency in young children. These examinations differ in the degree of discomfort they involve enabling this to be a relevant variable to be studied in relation to the onset of distress. They are also sufficiently similar in length and in number of phases to allow the use of standardized observation procedures. These examinations were suitable for a more extensive and systematic study.

Despite the small number of children in the sample, it was possible to observe more distress behaviour among the inpatients than outpatients. Although the distress involved similar behaviours, their duration and intensity was greater among the inpatients. It seemed necessary to develop and apply better strategies to contact the inpatients in order to make their involvement in the research less demanding. There was some difficulty to learn in advance when these children were going to be examined because the arrangements were often made at short notice.

2.8.2- Methodological

The amended OSBD (Bradford, 1990; Appendix II) seemed insufficiently sensitive for recording the behaviours presented by the children during the examination. It involved a certain degree of subjectivity to categorize the behaviour as absent, occurring occasionally or occurring to a large extent. An implication here is that the duration of the behaviour may vary, for example, among two children rated as presenting a certain behaviour to a *large extent* and the observation instrument used in this study did not cover this issue satisfactorily. A time sampling method of observation would be more effective.

It was not a practical nor efficient strategy to get hold of the staff after the examination in order to rate the children's behaviours. In addition to this it seemed that the staff, concentrating on the task of examining the child, may not have perceived certain behaviours which, perhaps contributed to the moderate level of agreement obtained. As stated before, the Likert-type rating scale (Appendix III) was scarcely used. It was therefore necessary to consider omitting the staff rating in further studies.

The behaviours *fear* and *pain* as defined in the OSBD manual occurred very seldom. This was almost certainly because the OSBD was designed for an older age-group then examined here. According to the OSBD operational definitions, these behaviours are only recorded following a verbal exclamation (e.g., 'it hurts'; 'I am scared'). Such verbal responses are not usual in young children, who exhibit their fear through crying or other non-vocal behaviours which are measured by other OSBD dimensions. Accordingly, it was decided to omit the *fear* and *pain* items of the OSBD in further studies.

Another consideration was to include non-distress behaviours (e.g., play, smile) to get some understanding on what non-distress behaviours young children present during the examination. This would also highlight whether the use of toys and other play activities help in lessening the child's distress. Additionally, it may be relevant to detect the behaviours involving parent and staff interaction with the child during the examination. For this purpose a more refined instrument is necessary in order to record more accurately the behaviours presented by the individuals involved in the examination.

In conclusion, it seemed that it was worthwhile to undertake a precise evaluation of the issues highlighted by this study. For this, the following must be considered:

i. random and larger sample;

ii. systematic time sampling instrument for observation;

iii. homogeneity of examinations to be observed;

iv. exclusion of physical/mental handicapped subjects; and

v. simplification of the rating scale to be used by staff.

The procedures of *Ultrasound Scan, Micturating Cystogram* and *Barium Swallow* are the ones which, despite not being the longest in duration, seemed to generate most distress behaviour. These procedures were also the ones assumed to require a more passive role by the child.

CHAPTER THREE

PILOT STUDY

Following the feasibility study, it was decided that ultrasound and micturating cystogram examinations would provide the focus for the main study of this thesis. Before undertaking the main study, a pilot study was considered necessary in order to refine the methods to be used.

The single radiological examination observed in this study was the ultrasound scan. It was chosen because it is the most frequent examination for young children and because it allowed piloting of methods which would be suitable for both ultrasound and cystogram examinations.

3.1- AIMS OF THE STUDY

The purpose of this pilot study were:

i. to ensure that it was possible to assess in a systematic way the patterns of behaviour presented by young children undergoing ultrasound scans;

ii. to identify differences in the level of distress presented by the children when considering individual phases of the examination;

iii. to consider the influence of specific variables in relation to the child's behaviour during the examination; and,

iv. to identify and refine the structure of the instruments to be used in a substantial study which would be submitted to the hospital's Research Ethics Committee.

3.2- MAIN QUESTIONS

i. How do children behave during an ultrasound scan?

ii. Which part of the examination is most distressing?

iii. To what extent are the behaviours presented by the children influenced by the procedure length, number of previous hospitalisations, age of the child, gender, and parent and staff behaviours?

iv. Is there any difference between the behaviour presented by inpatients and outpatients?

3.3- METHODOLOGY

3.3.1- The examination

Over two thousand ultrasound scans are performed at the department every year on children under 60 months of age. Around 50% of the ultrasound scans performed every day (n=15) are undertaken by children younger than 60 months of age.

The Ultrasound Scan is an non-invasive examination used extensively with young children who present renal/urological problems as well as oncological conditions. It consists of passing a probe over the part of the body to be scanned (in this case, the abdomen when in supine and the lower back when in prone positions) where a small amount of a special type of jelly is spread. It does not require a great amount of stillness from the child and does not involve pain or physical discomfort. The procedure is generally carried out by a radiographer or either a consultant or junior radiologist. In general, the examiner is the only staff member present during the examination. It is a short examination lasting an average of 6 to 10 minutes.

3.3.2- The setting

The study was carried out in the Ultrasound Scan examination room at the Department of Paediatric Radiology in the same children's hospital where the feasibility study took place.

The ultrasound scan room is spacious. It is divided by a set of curtains providing two isolated areas where examinations can be performed. The light in the room is reduced to allow the TV monitor of the ultrasound scanner to be seen.

There are mobiles hanging from the ceiling and large Disney characters decorating the walls which are painted in pale colours. There are also some children's drawings adding to the decoration.

The couch on which the child lies down for the examination is covered with white linen on top of which is placed a disposable paper tissue which is renewed at the end of each examination. Beside the couch there are two chairs so that the parents can sit closeby the child throughout the examination.

3.3.3- Procedures

The subjects were selected using random number tables from an appointment list obtained from the Department of Paediatric Radiology. All children under the age of 60 months had an equal opportunity to be included in the study, unless the parents did not want them to participate. Both out- and inpatients were contacted at the department's waiting area on the day of their examination, shortly before it took place. A number of inpatients were contacted on the wards.

The study was explained to the parents and permission for observation was obtained. If the parents had difficulties with spoken English, the child was excluded from the study. Children with special needs were not eligible for the study. All parents who were asked if their children could be observed willingly agreed. Whenever possible the children were observed for a maximum of 4 minutes before their examination while in the waiting area, using the same interval and instrument as during the examination (Appendix IV). The children's interactions with the adults and the parents were recorded.

When called for the examination the researcher accompanied the child and parent to the examination room. A receptionist called and directed the child and family from the waiting area to the examination room. When in the examination room, she asked the parents to loosen the child's clothes. In general the examiner was not in the room when the child and parents arrived.

When the examiner entered the room, the researcher started the observation of the children's behaviour using an amended version of the OSBD (Jay & Elliott, 1986). Initially a 20 second interval was used during the observations but this proved to be too long and was reduced to 15 seconds (see next section) as originally used by Jay & Elliott (1986). Parent and staff were also observed in their interaction with the child. The observation was divided into 4 periods according to the phases of the examination. These were:

i. pre-procedure phase: 1 minute of observation when the examiner entered the room;
ii. supine position phase: 2 minutes of observation starting when the examiner put the jelly on the child's abdomen or put the probe into contact with the child's skin;
iii. prone position phase: 2 minutes of observation starting when the jelly was placed in the lower back of the child or when the probe contacted the child's skin;
iv. post-procedure phase: 1 minute observation starting when the examiner said or demonstrated that the examination was finished. This coincided with the cleansing of the jelly from the child's back.

The duration of the observation for each phase of the examination was based on the analysis of the duration of these examinations (mean duration) observed during the feasibility study. The length of the examination, staff in charge of the examination, number of people in the room and eventual changes were recorded as well as the number of family members, siblings or relatives with the child during the examination.

The researcher did not interact with the subjects nor with their families or staff. Contact which was brief was limited to the period before starting the examination while in the department's waiting area. The researcher maintained a neutral expression during the period of observation.

At the end of each examination the researcher and both parent and staff rated on a 1-9 point rating scale the level of distress presented by the child - from not at all to highly distressed - (Appendix III). The scale was similar to the one used during the feasibility study.

When data collection at the examination room was finished, the researcher gathered the relevant information available on the children's medical condition from the hospital's Medical Records.

3.3.4- Instruments

An amended version of the OSBD - Observation Scale of Behaviour Distress (Jay & Elliott, 1986) including some behaviour from the PBRS - Procedure Behavioural Rating Scale (Katz *et al.*, 1980) was used (Appendix IV). The Jay *et al.*'s scale has been widely used in research involving the study and measurement of distress in young children and was based on the scale earlier developed by Katz *et al.* (1980). The OSBD assesses specific behaviours shown by children undergoing examination. Jay & Elliott's (1986) revised instrument also provides an overall measure of the distress presented by each child throughout the procedure. A total of 8 behaviours considered to be related to distress were included in the observation instrument for the child: carry, cling, flail, refusal, restraint, cry, scream and emotional support.

Additionally, four other behaviours were included in the child's observation. The behaviours were: self-comfort, smile, play and co-operative. They were included because they were identified anecdotally during the feasibility study. The reason for including these behaviours in the observation was to gather additional information on which behaviours children present in the absence of the behaviours considered to be direct evidence of distress.

Parental and staff behaviours related to interaction/non-interaction with the child were also observed. The parent/staff behaviours with the child included in the instrument were based on the feasibility study and amended from Tizard, Mortimore & Burchell (1981) and Tizard & Hughes (1984) in their research into parents' involvement in children's education and children's interactions with caretakers/parents. The results of two recent studies on the relationship between adult behaviour and child distress during bone marrow aspiration (Blount *et al.*, 1989; 1990) were also considered. The behaviours included in the observation, both for parent and staff, were: reassure, explain, comfort/praise, distract and non-interact. The operational definition of these behaviours and the ones for the observation of the child are included in Appendix IV.

Overall, the amended observation instrument comprised 12 behaviours for the child, 5 for parents and 5 for staff. As mentioned before, a continuous interval of 20 seconds was used initially during the observation but this proved too long and was reduced to 15 seconds according to the guidelines for the instrument (Jay & Elliott, 1986). Where one of the target behaviour occurred during an interval it was ticked on the observation recording sheet. In the present study, all children had their behaviours recorded on the OSBD for a total of 6 minutes during the examination, independent of the observation interval used.

The analysis was based on the frequency of the behaviours the children presented during the observation, according to the number of intervals in which each behaviour was recorded as having occurred. Considering the short time interval used during the observation, the data also present an approximate estimate of the duration of the behaviours. The data provided a percentage of occurrence of each behaviour for each phase of the examination, while an overall percentage for the whole examination was also derived. The analysis of the parent and staff behaviours was carried out in a similar way. It was possible to calculate the percentage of each parent/staff behaviour which occurred in each phase of the examination as well as an overall percentage of interaction and of non-interaction.

3.4- SAMPLE

A total of 48 children under the age of 60 months old took part in this pilot study. However, due to variations in the way the examination was carried out (e.g., if there was a change of staff examiner during the procedure) only thirty out of the total sample of 48 children observed were included in the analysis. Because the proportion of girls and boys was similar to that observed in the total sample we only refer here to information concerning the 30 children included in the analysis. Ten (33.33%) were girls and 20 (66.67%) were boys. The mean (*SD*) age was 30.69 (16.89) months. The age range was from 6.28 to 54.26 months. Fifty percent of the sample was between 12.87 and 48.10 months of age.

For the girls (n=10) the mean (*SD*) age was 34 (35) months old. The age range was from 9.20 to 54.26 months. Fifty percent of the girls were between 12.87 and 48.58 months. The boys (n=20) had a mean (*SD*) age of 28.86 (16.81) months. The age range was from 6.28 to 54.21 months. Fifty percent were between 13.03 and 47.76 months of age. The largest age group represented was 12 to 24 months (n=13, 43.3% of sample, 4 girls and 9 boys).

Considering the hospital status of the sample studied, there were more outpatients (n=25) than inpatients (n=5). The inpatient group comprised 3 girls and 2 boys.

All the children had had at least one previous ultrasound scan. More than half the children (n=17, 56.7% of the sample) had had three or more previous ultrasound scans.

A total of 22 children (73% of the sample) had a diagnosis of renal/urological aetiology. Three other children had a diagnosis of oncological aetiology. The other 5 children had no definitive diagnosis.

On the day the children attended the Department of Paediatric Radiology for their examination and were observed by the researcher, all children had the ultrasound scan as their first examination. For over half the sample (n=16, 53.3%) the ultrasound scan was the only examination they had.

3.5 Results

One aim of the analysis was to identify if there was variability in the level of distress presented by the children according to the different phases of the examination. The same was applied to parent and staff where an attempt was made to identify which behaviour(s) could be associated with children's lessening of distress during the examination.

The data were analyzed descriptively and using correlational methods. Spearman's *rho* (r_s) was applied to test the reliability of the observations by comparing the researcher's overall ratings with those made by the staff and the parents.

3.5.1- Reliability

The Likert-type rating scale (Appendix III) related to the overall level of distress presented by the child during the examination achieved .85 agreement (Spearman's *rho*) between the researcher and a male radiologist examiner, $r=.75$ between the researcher and a female radiographer examiner and $r=.80$ between the researcher and the parent's ratings ($n=13$, 27.1% of the sample).

The variability between the researcher and the examiners ratings was not more than 1 scale item (i.e., if the researcher rating was 6, the examiner rated 5 or 7; the difference was never larger than one unit). Parents tended to rate their children when distress was present as more distressed than the researcher or examiners did.

The analysis of the occurrence and frequency of the behaviours presented by the children during their examination (amended OSBD) were carried out using a descriptive approach. It was not possible to apply more refined statistical methods, or to give weight to the behaviours as included by Jay & Elliott (1986), due to the variability of the observation interval used.

3.5.2- Child behaviour

Behaviour before examination

The observation of the children's behaviour before the examination demonstrated that play was the most frequent behaviour. The children played for over 79% of the 4 minutes they were observed. There was no significant correlation between the children's behaviour before the examination and their hospital status (out- or inpatients;

r= -.057, p=.737) nor between their behaviour before and during the examination (r=.067, p=.841).

Behaviour during examination

Cry, refusal of position and need for restraint were the most frequent distress behaviours presented by the children during the examination. Table 3.1 illustrates the number of children and the percentage duration of the OSBD behaviours.

Table 3.1- FREQUENCY AND PERCENTAGE OF DURATION OF CHILD BEHAVIOURS (n= 30)

	PRE-PROCEDURE		SUPINE		PRONE		POST-PROCEDURE	
BEHAVIOUR	%C	%DUR	%C	%DUR	%C	%DUR	%C	%DUR
CARRY	17	50	3	16	0	0	0	0
CLING	23	80	10	25	20	37	47	42
FLAIL	7	50	3	16	0	0	0	0
REFUSAL	0	0	70	22	70	71	0	0
RESTRAIN	0	0	47	30	47	67	0	0
CRY	7	62	50	50	57	62	47	77
SCREAM	0	0	37	15	30	20	0	0
EM.SUPPORT	0	0	30	35	37	67	13	62
S. COMFORT	13	30	20	50	13	31	10	66
PLAY	47	60	47	50	33	71	13	25
COOPERATIVE	33	50	80	40	40	37	27	45
SMILE	47	42	13	30	13	37	30	41

%C = percentage of children who presented the behaviour during the phase observed
%DUR = percentage of duration of child behaviour considering each phase of observation

The frequency of cry among girls tended to be higher than for boys. Refusal of position and need for restraint were more frequent among boys. But these differences were not statistically significant. Cry lasted for at least 50% of the time observed. Cling behaviour was also observed but occurred more frequently on the arrival of the examiner in the room and at the end of the examination. The distress behaviour observed during the pre- and post-procedure phases seemed more emotion related (the child sought more physical contact with parent, e.g., by clinging to the adult). But during the supine/prone phases, the behaviours were more reactive (e.g., refusal of position), suggesting an attempt to avoid the situation. Play, co-operation and smile were also observed, but occurred less and less as the examination continued. It was interesting to observe that upon the arrival of the examiner 14 of the children smiled, but by the second phase of observation most of them (n=10) had stopped doing so. At the end of the examination the frequency of children presenting smiling behaviour was very low (n=3) compared with the previous phases, and especially, the initial one.

The percentage of duration of the behaviours the child presented during the examination, and based on Jay & Elliott's (1986) guidelines, was used as a figure representative of the amount of distress. As such, age at examination correlated -.364 with child's behaviour during the examination (p=.03). The older the child the less distress behaviour was observed.

Descriptively, boys presented 30% more distress behaviour than girls. There was an overall tendency for distress behaviours to increase when the child was being examined in the prone position. However, this effect was not statistically significant.

The more ultrasound scans the child had received previously the less distress behaviour was observed although the correlation was borderline in significance (r=-.348, p=.058). Similarly the more previous examinations the child had undertaken, the less distress behaviour (r=-.350, p=.057).

The relationship between the child's behaviour and the number of previous hospital admissions was also borderline in terms of statistical significance (r=-.234, p=.063). There were no major differences in the distress behaviours presented by out and inpatients (r= -.059, p=.730). All but one child in the inpatient group (n=5) presented distress behaviour during the examination (i.e., 80% of the group was distressed). In the outpatient group, 66% of the children presented distress behaviour.

No significant relationship was obtained between the child's behaviour and the duration of the examination (r=.045, p=.785). The length of the examination did not seem to contribute to the child's distress behaviour.

3.5.3- Parental behaviour

Descriptively, parents were more interactive with younger than older children but correlational methods failed to demonstrate a statistically significant relationship (r=-.040, p=.805). There was more interaction with boys than with girls but this correlation was also statistically insignificant (r=.213, p=.182).

The most frequent parental behaviour was comfort/praise which occurred during a mean of 43% of the examination period observed. Overall, during over 50% of the total examination period observed, the parents did not interact with their children.

The number of parents using distraction behaviour with their children was less than the number who used reassurance and/or explanation or comfort/praise behaviours. However, the parents as a whole used distraction during the supine and prone phases more than they used other strategies (Table 3.2). The behaviour of the child was not related to the parent's behaviour during the examination (*r*= .057, *p*=.725, *ns*).

Table 3.2-PERCENTAGE OF PARENTAL BEHAVIOURS
(30 examinations)

	PRE-PROCEDURE		SUPINE		PRONE		POST-PROCEDURE	
BEHAVIOUR	%P	%DUR	%P	%DUR	%P	%DUR	%P	%DUR
REASSURE	57	33	77	25	83	26	10	55
EXPLAIN	47	33	77	35	83	44	60	55
COMF/PRAISE	23	33	67	37	77	50	77	50
DISTRACT	0	0	47	58	40	70	0	0
NON-INTERACT	27	93	53	37	57	42	13	25

%P = percentage of parents presenting the behaviour during each phase observed
%DUR = percentage of parent-child interaction during the phase observed

3.5.4- Staff behaviours

Non-interaction was the most frequently observed category of behaviour for the staff. It is noteworthy that in 23 (77%) of the examinations, the staff did not interact at all with the children during the pre-procedure phase. Non-interaction was observed in over 70% of the examinations during the pre- and post-procedure phases. During the supine position phase, non interaction occurred in over 50% of the examinations, while in the prone position phase non-interaction occurred during 76% of the time observed.

Staff reassure and explain behaviours were observed. However, these behaviours occupied a maximum of 32% of any phase observed. Praise behaviour occurred in just 8 (27%) of the examinations observed. Table 3.3 shows the percentage of staff and the duration of the behaviours they presented.

Table 3.3- PERCENTAGE OF STAFF BEHAVIOUR

	PRE-PROCEDURE		SUPINE		PRONE		POST-PROCEDURE	
BEHAVIOUR	%S	%DUR	%S	%DUR	%S	%DUR	%S	%DUR
REASSURE	0	0	47	25	47	16	0	0
EXPLAIN	23	30	57	32	47	12	40	25
PRAISE	0	0	0	0	7	16	27	30
DISTRACT	0	0	17	16	0	0	0	0
NON-INTERACT	77	100	57	41	57	76	73	70

%S = percentage of staff presenting the behaviour during each phase observed.
%DUR = percentage of staff-child interaction during the phase observed.

There was a significant correlation between staff behaviour and the child's age at examination (r=.312, p=.047). The older the child the more time the staff spent interacting.

The amount of staff interaction with the child was not significantly related to the child's behaviour (r= -.269, p=.089) or gender (r= -.003, p=.987). However, there was a significant correlation between staff interaction and boys' behaviour (r= -.383, p= .037). More interaction from staff was associated to less distress among the boys or staff interacted less as boys became more distressed.

3.6- DISCUSSION

3.6.1- Child's distress

The finding that older children were less distressed during the examination is consistent with the feasibility study and with the related literature in this area.

Although the association was not statistically significant, 75% of the boys (*n*=15) presented distress behaviour as compared with 50% of the girls (*n*=5). This finding is inconsistent with some of the related literature and the outcomes of the feasibility study.

The proportion of inpatients presenting distress behaviour (*n*=3, 60% of inpatient group) was greater than the proportion of outpatients (*n*=11, 44%). This is consistent with the feasibility study.

The most frequent behaviour presented by the children was crying, especially when having to lie in prone position. Associated with this there was a certain amount of refusal to maintain the required position, especially if the child was being held down by her/his legs and/or arms which was a frequent practice. Restraint was frequently used in an attempt to keep the child still. Co-operation was observed but the duration of this behaviour was very short.

3.6.2- Parent and Staff interaction

Parents interacted more with the children than staff did. However, such interactions lasted less than 50% of the time observed.

The more the staff interacted with boys, the less distress behaviour the boys presented. It was not possible, however, to conclude whether this was a cause, or effect, of the boys' greater distress.

This study demonstrated that the staff rarely interacted with the child during the examination. When it occurred, the interaction was more frequent with older children than with younger ones. This may be related to the adults' general assumption that young children are not able to understand much and therefore there is no need to explain things to them. Some staff mentioned that they tended not to interact because children in this age group often react negatively to a stranger's approach. The low interaction of staff should be considered with some caution as some of the staff were not experienced with the ultrasound equipment and overcoming this may have taken up all their attention.

3.6.3- Child's distress and other variables

The children seemed to present less distress behaviours when they had experienced more ultrasound scans, while a similar finding was obtained considering child behaviour and the total number of previous examinations. This finding is consistent with the study of Jay *et al.*, (1987) but not with the feasibility study. It is, however, worth bearing in mind that the number of previous examinations is more or less confounded with the child's age, so that this finding may well be due to older children being able to cope better with the examination procedures.

The relationship between the number of hospital admissions and the child's hospital status seem directly related to the clinical condition of the child. If the child has been a chronic or recurrent case, more visits to the ward as well as an increasing number of examinations will have occurred.

The age of the child is also influential here. An older child with a chronic problem will have had more examinations, more hospital admissions and so on than a younger child with a similar medical condition.

3.6.4- The examination

The ultrasound scan (as also observed during the feasibility study) may be categorised as a procedure involving a passive role for the child. Not much opportunity was created for play or distraction neither were there requests for the child to play a more active role during the examination.

The pilot study using the ultrasound scan as the examination to be observed confirmed that the invasiveness of the procedure and/or the duration of the examination are not the main factors generating distress.

It seems possible that the strangeness of the procedure and/or environment is part of what leads the child to present distress and, consequently, cope poorly during the examination. This applies, as hypothesized in discussing the feasibility study, to the ultrasound scan in spite of its relatively benign nature. Talking and noisy movements out of the sight of the children seemed also to play a role in the onset of distress, albeit with less frequency than observed during the exploratory study.

3.6.5- The instruments to measure distress

The Likert-type rating scale presented a reasonable level of agreement between the raters. However, it proved difficult to obtain staff ratings, due to their other duties, in some cases. This issue should to be taken into consideration in planning a further study.

The amended OSBD, with added behaviours for child, parent and staff, seemed to enable a satisfactorily systematic and accurate recording of the parent/staff interactive behaviour in relation to the child's behaviour. However, rather than the short observation phases used here, the observation should continue throughout each phase, in order to provide a more complete and reliable descriptive understanding of child, parental and staff behaviours. Another relevant issue in relation to the OSBD is that it may be helpful to assign Jay & Elliott's (1986) weightings to the behaviours observed in order to derive a weighted distress score.

Despite the limited analysis of the amended observation instrument used in this pilot study, it was clear that the behaviour *carry* could be eliminated from the observation as it occurred very seldom during the examination.

3.7- Recommendations

It was striking that both staff and parents spent more time non-interactive than interacting with the children. This raises the question of whether this failure to support the children during the examination may be a factor in their distress. It might be helpful to make sure that parents receive enough information about the procedure that the child is about to undertake as well as some suggestions on how to prepare the child for it. Making the child more familiar with the procedure, perhaps by playing a game where parent and child rehearse the procedure, might help both parent and child to cope better during the examination, with consequently lowered rates of child distress. Such a strategy may be beneficial in an intervention procedure. An attempt to reduce the child's distress during an ultrasound scan examination may, at least indirectly, benefit the child's behaviour during other examinations performed after this initial scan. It might also benefit the play staff by providing them with strategies which facilitate their task of helping children and parents to cope with the examinations. Special attention must be paid to the age group below 30 months, being the larger age group represented and for presenting more distressed behaviours.

In summary, in designing a more systematic and extensive study, the following should be considered:

i. to reduce the age range as the larger group of children is under 30 months of age and seems the most vulnerable to distress behaviour;

ii. to extend the observation to include the total period of the examination;

iii. to calculate a weighted distress score as well as measures of the amount of time the children spent exhibiting each type of distress behaviour.

iv. to include an intervention condition involving rehearsal of the examination procedure and with a more active role for parent and child during the examination;

v. to omit staff ratings of the children's overall behaviour.

CHAPTER FOUR

THE MAIN STUDY

4.1- AIMS OF THE STUDY

This study was designed to investigate the theoretical model presented in Chapter One. Specifically, the aims were (i) to show whether the type of examination, parent or staff behaviour, or the age, gender or temperament of the child were associated with children's distress behaviour and (ii) to assess whether an approach which involved prior rehearsal of the examination and an active, structured role for the parent and child was more effective than the Department's routine preparation, or no preparation, in minimising children's distress behaviour. This comparison would provide additional evidence about the importance of parent-child interaction as a factor in the children's distress.

4.2- MAIN QUESTIONS

i. Was there any relationship between the type of examination and children's distress behaviour?

ii. To what extent was the children's distress behaviour influenced by their age, temperament or gender, or by parent or staff behaviour?

iii. Was the routine preparation for examinations given by the Department more effective than no-preparation in minimising the children's distress behaviour?

iv. Was an intervention involving prior rehearsal and an active role for parent and child more effective than the Department's routine preparation, or no-preparation, in minimising the children's distress behaviour?

4.3- METHODOLOGY

4.3.1- The examinations

The micturating cystogram and the ultrasound scan were the examinations included in this study.

These examinations are similar in their duration, number of phases during the procedure, and in the maximum level of restraint the child experiences during the procedure. The difference between them is the degree of invasiveness, with the micturating cystogram involving a certain degree of discomfort during the initial phase of the procedure whereas the ultrasound scan involved no pain or physical discomfort.

The micturating cystogram examination

The micturating cystogram consists of the introduction of a thin catheter tube through the urethra until it reaches the bladder. Through this catheter some special dye is inserted into the bladder so that the bladder will show up on the X-ray and pictures are taken immediately afterwards. The full description of this examination is presented in Figure 4.1 (page 158). The procedure is carried out by a consultant or junior radiologist. A nurse and a radiographer are also in the room for procedural and technical help, as required. This examination lasts for an average of 9 minutes (*SD* 3 minutes).

The ultrasound scan examination

The ultrasound scan consists of passing a probe over the abdomen (when in supine position) and the lower back (when in prone position) where a small amount of a special type of jelly is spread. The procedure is generally carried out by a radiographer or either a consultant or junior radiologist. In general the examiner is the only staff member present during the examination. This procedure has a mean duration of 7 minutes (*SD* 3 minutes).

The examiners

A total of 25 different staff carried out the examinations of the children in this study. Four were radiographers, 4 were consultant radiologists and 17 were junior radiologists. Fifteen of the examiners were females and 10 were males.

4.3.2- The setting

The study was carried out in the Micturating Cystogram or Ultrasound Scan examination room at the Department of Paediatric Radiology in a children's hospital in London.

The micturating cystogram examination room

The room where the micturating cystogram examination is performed is a spacious one. There are mobiles hanging from the ceiling as well as pictures and posters of children's cartoons on the walls which are painted in a grey colour. The X-ray equipment takes up half of the space in the room and consists of an examination table, a camera overhead and the film for the pictures underneath the table. The table moves smoothly back and forth and from side to side. This moves the child into the right position under the camera. There is also a TV monitor on which the child's bladder can be seen. In general, just one parent is allowed to accompany the child to the examination room. No siblings are allowed in the examination room.

The ultrasound scan examination room

The ultrasound scan examination room was the same as in the feasibility and pilot studies (see Chapter Three, section 3.3.2).

4.3.3- Procedures

The sample was selected from the radiology department's appointment list for micturating cystograms and ultrasound scans using random number tables. Children with special needs according to their medical notes, and families who did not understand spoken English or did not have a telephone were excluded from the study.

Scrutiny of the appointments list revealed that approximately 490 children aged 12-41 months would be available over an eight month period. According to Cohen (1977) "the power of a statistical test is the probability that it will yield statistically significant results" (p.21).

The power test can be calculated in different ways. For the present study, the equation used was

$$n = 16SD^2/D^2$$

Given the standard deviation (SD) of the OSBD it is possible to calculate the number of subjects (n) needed in a sample to detect a pre-decided difference (D) of interest. Power analysis calculations indicated that sample sizes of 30 children would provide 80% power in detecting group differences at the p=.05 level of statistical significance. In relation to the ultrasound examination, this target could readily be met within eight months. However, the number of cystogram cases of the required age available within this period was likely to be less than was desirable. Given the need to minimise the effect of the study on the Radiology Department, it was decided to recruit as many cases as possible and to take the sample sizes into account when analysing and interpreting the data. Similarly, it was decided to restrict the number of cystogram conditions/groups included in the study.

With these provisos, within each type of examination, random number tables were used to assign children at random to one of the following conditions:

(i) Non-briefing condition

Children assigned to this condition undertook the radiological examination (cystogram or ultrasound scan) without any preparation by hospital staff or the researcher. Cases included in this condition were contacted by the researcher two weeks before their hospital appointment and invited to participate in a study of children's response to radiological examinations.

This control condition aimed at comparing the behaviour of children who were not prepared by the play specialist for the examination with the behaviour of the children who received the play specialist or the intervention preparation.

(ii) Briefing condition

The briefing condition aimed to verify if children who received the conventional play specialist preparation presented less distress behaviour during their examination as compared to children who received no preparation. A play specialist was employed by the Department to introduce parent and child to the examination they were about to undertake. This preparation, carried out in the waiting area immediately before the examination, involved talking about the examination and looking at some picture books about the procedure and equipment to be used. Because of staffing constraints, not all families would receive this preparation under normal circumstances, so that both the play specialist and Department agreed to accept random assignment to this condition during the study.

(iii) Waiting area condition (ultrasound scan only)

This condition was included in the study because of a concern raised by the Department where the study was to be carried out. The Department queried if contacting parents before the examination would make them more anxious and perhaps such behaviour would reflect in more distress by the children during the examination. The aim was, then, to verify if the distress behaviour of the children whose families were approached solely on the day of their children's appointment was different from the distress behaviour of cases who were contacted before attending the Department (i.e., through post and telephone calls).

(iv) Intervention condition

The aim of this condition was to verify if an approach which involved prior rehearsal of the examination and an active role for the parent and child during the examination was effective in reducing children's distress behaviour as compared to the behaviour of the children in the other experimental conditions.

Evidence that younger children are more prone to distress behaviour in hospital (e.g., Goldberger, 1988a; b), that their developmental limitations make it difficult to prepare them using similar strategies to those used with older children, and that play is the best medium to interact and get rapport with young children was considered when the approach used for this intervention was developed. An interactive game related to the examination was conceived to be used by the parent as a preparation for the child as explained below.

The Intervention Leaflet

The leaflet (Figures 4.1 and 4.2) used with the intervention group contained information on the examination the child was about to undertake and suggested how the child could be prepared for the examination.

Figure 4.1- MICTURATING CYSTOGRAM LEAFLET INFORMATION

CYSTOGRAM:

What is it?
And how can you and your child prepare for it?

CYSTOGRAM

Your child has been asked to attend the Department of Paediatric Radiology for a Cystogram. As young children can find hospital examinations alarming, our aim here is to explain what is involved and to help you and your child to prepare for it.

**** What actually is a Cystogram?***
A Cystogram is a X-ray examination of the urinary bladder. A special camera (with an image intensifier) can see the bladder when it is filled with a special dye.

**** What does the Cystogram machine look like?***
The Cystogram uses a machine that is also used for other X-ray examinations. It consists of an examination table, a camera overhead and the film for the pictures underneath the table. The machine produces some sounds while the table moves smoothly back and forth and to the sides. This happens to move the child into the right position under the camera. There is also a television screen where pictures of your child's bladder can be seen.

**** How is the Cystogram performed?***
Your child will be asked to lie on an examination table without nappies or underwear. You will be asked to hold your child's hands above her/his head. Then the Radiologist will clean your child's genital area to avoid the risk of infection. After this, a thin catheter tube will be introduced through the urethra until it reaches your child's bladder. Inserting the catheter may sometimes be uncomfortable but some anaesthetic (numbing) cream will be used to prevent it from hurting. The Radiologist fills the bladder through the catheter with a special dye that shows up the bladder. Some pictures are taken and the table may move a bit. During the examination your child may be asked to lie on her/his side for a short time. Finally the catheter is removed and some more pictures are taken as your child is passing water while lying down on the table.

The Cystogram Examination

**** How long will the Cystogram examination take?***
Usually twenty minutes but sometimes a bit more, depending upon the complexity of the examination.

Unless you are pregnant, you will be able to stay with your child the whole time. If you suspect you are pregnant, another member of your family or a friend can take your place.

**** Can my child eat and drink before the Cystogram examination?***
Yes. In general, there is no restriction of food and drink for a child undergoing this examination.

**** When will I be able to obtain the result of the scan?***
If your child is an Out Patient and has a clinic appointment on the same day as the cystogram, the result will be typed and given to you to take to the clinic, or sent to the clinic by us.
If not, the result will be sent onto the clinic for you, ready for your next attendance.
If your child is an In Patient, the result of the cystogram will normally be sent to the ward on the same day as the examination.

PREPARING YOUR CHILD FOR A CYSTOGRAM

Young children may react to the strangeness of the hospital and to medical equipment by becoming upset. We are all less alarmed if we know what to expect and, although we can not explain this to young children, it is possible to show them what to do.

With a bit of practice beforehand, you and your child can turn the examination into a familiar game, which will help to reduce the strangeness and make the examination easier.

(Please, turn over)

PLAY THE 'CYSTOGRAM GAME'

The best time to play is when your child is undressing anyway - when changing clothes, or a bathtime is ideal.

Say that you are going to play the 'Cystogram Game', just like you will do when you visit hospital.

Take off all your child's clothes except a vest or top of some kind - you can explain that this is what will happen in the hospital. Help your child to lie flat on her/his back - on a bed or table covered with a towel is ideal. You will need to be able to stand closeby and to move the towel a little from side to side.

Say that a doctor will come to the examination with a special camera - you will stay there all the time. Move the towel slowly to one side and then to the other, making little clicking and chirping noises.

Talking, asking questions and joking is fine - it will help to keep your child occupied.

Next, get your child to raise her/his hands so that they are above her/his head and keep stroking and holding them (the reason for this is that children will sometimes dislodge the tube by accident - you can help to prevent this by holding onto your child's hands).

After a few minutes, it is time to lie on the side. Help your child to move and carry on stroking and holding her/his hands. Continue joking and talking - say just a few more minutes and the cystogram will be over.

A few more moments is enough. Say it is over now and time to get dressed.

If you like, the 'Cystogram Game' can also be played with a favourite teddy or doll. By all means bring this along to the hospital too if you like.

WHEN SHOULD I PREPARE MY CHILD FOR A CYSTOGRAM EXAMINATION?

Ideally, the first time to play the game would be 2 or 3 days before visiting the hospital for the Cystogram. If possible, repeat it on the day of the visit or evening before - twice in total should be enough to make it familiar, without becoming boring.

During your child's examination, you will be able to stand closeby and repeat the game just like at home. You will be able to see the cystogram picture on the TV screen and show it to your child.

Even if you think that your child will cope well with being examined, you may still find that playing the 'Cystogram Game' at home is a way of having a happy moment with your child.

I look forward to meeting you and to learning what you think about it.

***

If you have any queries, please contact Eneida on (071) 833-0644. Evenings before 9pm are often a good time.

CYSTOGRAM:

What Is It?
And how can you and your child prepare for It?

Figure 4.2- ULTRASOUND SCAN LEAFLET INFORMATION

ULTRASOUND:

What Is It?
And how can you and your child prepare for It?

ULTRASOUND SCAN

Your child has been asked to attend the Department of Paediatric Radiology for an Ultrasound Scan. The scan is quick, safe and painless. However, young children can find hospital examinations alarming, so that our aim here is to explain what's involved and to help you and your child to prepare for it.

**** What actually Is Ultrasound?***
Ultrasound is a form of sound waves. It is higher than the frequency of audible sound, which is why we are unable to hear it. Dolphins communicate with each other using similar sound waves to those used in medical ultrasound examinations.

**** Does Ultrasound use X-rays?***
This is not an X-ray examination and does not use X-rays, which is why it is particularly safe. For the same reason most women will have had an ultrasound scan while pregnant to assess the wellbeing of the developing baby.

**** What does the Ultrasound machine look like?***
There are lots of different ultrasound machines. They all have a television screen (which shows us the part of the body we are looking at) and some sort of instrument (a probe) which is moved over the skin.

**** How Is the Ultrasound scan performed?***
Your child will be asked to lie on an examination couch and loosen his/her clothing, so that the abdomen is exposed. A small amount of jelly will be spread onto the skin and an ultrasound probe will be moved over the skin. This does not cause any pain or discomfort -but it may tickle!!

The Ultrasound Probe

The Ultrasound Examination

**** Why do you put jelly onto the skin before the Ultrasound scan?***
The ultrasound jelly allows the sound waves to show us the part of the body that we want to look at. Without the jelly, the sounds waves would be reflected from the skin and we would not get a clear picture.

**** Can my child eat and drink before the Ultrasound scan?***
Usually, yes.
A few children need special preparation, but we will inform you if this is your child's case.

**** How long will the scan take?***
Usually, fifteen to thirty minutes, but occasionally this may vary, depending upon the complexity of the scan.

**** When will I be able to obtain the result of the scan?***
If your child is an Out Patient and has a clinic appointment on the same day as the scan, the result will be given to you, or sent to the clinic.
If not, the result will be sent onto the clinic, ready for your next attendance.
If your child is an in patient, the result will normally be sent to the ward on the same day as the scan.

PREPARING YOUR CHILD FOR AN ULTRASOUND SCAN

Young children may react to the strangeness of the hospital and to medical equipment by becoming upset. We are all less alarmed if we know what to expect and, although we cannot explain this to young children, it is possible to show them what to do. With a bit of practice beforehand, you and your child can turn the examination into a familiar game, which will help to reduce the strangeness and to make the examination fun.

(Please, turn over)

PLAY THE 'ULTRASOUND GAME'

The best time to play is when your child is undressing anyway - when changing clothes, or a bathtime is ideal.

Say that you are going to play the 'Ultrasound Game', just like you will do when you visit hospital.

If the room is brightly lit, darken it a little - for instance by drawing the curtains, or just leaving one light on. It should not be dark, just dimly lit (the light in the ultrasound room is reduced, to help to see the TV screen).

Help your child to lie flat - on the bed or a sofa is ideal, or the floor is fine. You will need to be able to sit closeby.

Put some babycream on your child's tummy and move it over the skin with your finger or a toy. Say that it is like the ultrasound machine in hospital - does it tickle? The game should be as much fun as possible - giggling is definitely allowed.

After a moment or two, your child may become bored and start to wriggle. Say that s/he must lie as still as possible, so that the machine can see inside. You can see everything inside the tummy. What did s/he have for dinner - maybe the machine can see it?

Talking and asking questions will keep your child occupied. Holding hands can sometimes help to reduce wriggling and is comforting too.

After a few minutes, say it is the back's turn. Help your child to turn over and repeat the cream/bubbles, massaging it gently over the lower back.

A few moments more is enough. Say that the game is over and it's time to get dressed. Was it fun?

If you like, the 'Ultrasound Game' can also be played with a favourite teddy or doll.

WHEN SHOULD I PREPARE MY CHILD FOR AN ULTRASOUND SCAN?

Ideally, the first time to play the game would be 2 or 3 days before visiting the hospital for the Ultrasound. If possible, repeat it on the day of the visit or evening before - twice in total should be enough to make it familiar, without becoming boring.

During your child's examination, you will be able to sit at her/his side and repeat the game just like at home. You will be able to see the ultrasound picture on the TV screen and show it to your child.

Even if you think that your child will cope well with being examined, you may still find that playing the 'Ultrasound Game' at home is a way of having a happy moment with your child.

We look forward to meeting you and to learning what you think about it.

***

If you have any queries, please contact Eneida on (071) 833-0644. Evenings before 9pm are often a good time.

ULTRASOUND:

What Is It?
And how can you and your child prepare for it?

The leaflet attempted to give the child the opportunity to experience for her/himself the examination procedure in a more joyful, interactive and active way with participation by the parent. As a result, it was intended the child might present less distress behaviour during the examination. In its design aspects of child development theory were considered, including that young children enjoy being engaged in play (Goldberger, 1988a). Therefore, the leaflet involved as its preparation a cystogram/ultrasound game where the parent would pretend playing the examination with the child.

Broadly speaking, this intervention is compatible with the *stress inoculation model* described by Turk (1978). That model involves three phases: education, skill acquisition, and rehearsal of coping skills.

In keeping with this model, Johnson (1972) and Johnson Kirchoff & Endress (1975) prepared children for cast removal by rehearsing beforehand the sensations they were likely to experience. The success of this rehearsal in reducing distress in the children in Johnson *et al*'s studies was a central consideration in planning the intervention method used here.

The leaflet proposed a behavioural rehearsal where the parent played the game with the child, reassuring the child and going through the different steps a real examination would involve: room with reduced light, lying in supine and prone positions, a sort of cream spread in the abdomen, etc. During the examination the parent could remind the child of what they had been playing at home previously (the cystogram or ultrasound game) reinforcing the fun and pleasure it involved, so that the child could enjoy it once more while playing it again at the hospital with the parent. It was intended that the cystogram or ultrasound game would serve as a positive distraction which would minimise the effects of the examination by providing both parent and child with pleasant and active coping strategies. One consideration in planning the use of this intervention is that many of the children would have had previous ultrasound examinations, so that their experiences might conflict with the intervention rehearsal. In such cases, the rehearsal of a shared strategy with their mother should provide them both with a means of coping with what might previously have seemed a threatening environment.

The leaflet was piloted for the adequacy and clarity of its content with a group of mothers of young children (n=13). The mothers were contacted at a play group where they attended with their children. The researcher explained the aim of the leaflet, asked the parents to read and give their impressions about it. The researcher answered any questions the mothers had.

Additionally, there were extensive discussions on the contents of the leaflet with staff from the Department where it was going to be used. Consultant and junior radiologists, as well as some of the radiographers contributed to the section on the leaflet where the procedure is explained.

(v) <u>Intervention-Control condition</u> (ultrasound scan only)

This condition was necessary because the data collection for the intervention condition was not started concurrently with the other conditions. This delay occurred because the intervention to be used had to be submitted for approval by the hospital's Research Ethics Committee before its implementation and this led to some delay. The aim of this control group was to control for any possible historical effects due to the fact that data from the intervention condition were collected three months later than the data from the other conditions.

As well as these five, randomly assigned, conditions two additional groups of children were also recruited:

(i) Inpatient group

The aim here was to verify if hospital inpatient children presented more distress behaviour, as compared to outpatient children included in this study. These children received no prior contact from the researcher or preparation for their examination, other than that provided by the regular nursing staff.

(ii) Longitudinal group (ultrasound scan only)

Here, the aim was to throw some light on the stability of the children's distress behaviour. This group included children from the non-briefing condition who were observed again during a second visit to the Department.

Two weeks before their appointment at the Department of Paediatric Radiology, the families assigned to the non-briefing, briefing, intervention and control conditions were sent by post an information letter explaining the study and inviting them to take part in the research (Appendix V), a consent form (Appendix VI) and a Short Temperament Scale (Prior, Sanson & Oberklaid, 1989) (Appendix VII) to be returned in a stamped addressed envelope provided, if they decided to participate in the research.

The Short Temperament Scale for toddlers aged 12 to 41 months old (Appendix VII) used in the present study was originally developed as part of the Australian Temperament Project - ATP, an infancy-middle childhood large-scale longitudinal study (Prior *et al.*, 1989) comprising an original sample of 2443 infants selected by a stratified random sampling framework. The Short Temperament Scale for Toddlers was adapted from the Toddler Temperament Scale (Fullard, McDevitt & Carey, 1984) by using factor analysis of the original 97 items. The Australian temperament scale for toddlers has a total of 30 items. Only those items from the Fullard *et al.* instrument which showed high loading on one and only one of the 6 continuous factors were considered for the short version of the scale.

As a result of their factor analysis, Prior *et al.* identified 6 factors which they considered to represent the main temperament dimensions of toddlers: approach/adaptability, co-operation/ manageability, distractibility, persistence, reactivity and rhythmicity. A continuous scale of easy-difficult temperament was also developed from the short scale according to the children's temperamental profile on approach/adaptability, co-operation/manageability, and reactivity.

The Prior *et al.'s* scale was used in the study presented here because of its psychometric soundness and because it was derived from a large scale study based on previous relevant instruments and studies in the area. These considerations lend support to its reliability and validity. This instrument was also appropriate to the age group involved in the study reported here. Additionally, this temperament scale has been used in other studies (e.g., Lancaster, Prior & Adler, 1989). Since the scale comprised just 30 items to be filled in by the parent, this should increase the likelihood that parents would complete it.

The instructions for the scoring and calculation of the temperament scores are included on Appendix VIII.

Children assigned to the intervention condition were also sent a leaflet which contained information about the examination (i.e., micturating cystogram or ultrasound scan) the child was about to undertake and which suggested how the child could be prepared for the examination (Figures 4.1 and 4.2).

The families were then telephoned 3 days prior to their appointment to ask about the child's previous examinations and, in the case of the intervention condition, to confirm the use of the leaflet and the rehearsal for the examination. Families in the intervention condition were also telephoned the day prior to the examination to ask about their impressions of the intervention leaflet (Appendix IX).

On the day of the appointment, after reporting their arrival to the reception desk of the Department of Paediatric Radiology, the parents were approached by the researcher who introduced herself and thanked them for the co-operation in the research. The parents were informed that the researcher would follow them when the child was called for examination. Permission to video the child's examination was requested so that the reliability of the researcher's observations could be confirmed later. Upon agreement, the parent filled in the relevant consent form (Appendix X). A video camera fixed in a strategic position in the examination room (so that the examiner, the parent and the child were clearly framed) was set to record the examination as soon as the child entered the room, for analysis by independent observers afterwards.

If the child was assigned to the briefing condition, the researcher reported the child's arrival to the play specialist and the play specialist was introduced to the parent and child.

The children were then observed before their examination (baseline behaviour) while in the waiting area. The aim was to obtain a sample of the children's behaviour in a different situation and setting from the one where the examination would take place. The instrument used was the amended version of the Observation Scale of Behavioural Distress - OSBD, (Jay & Elliott, 1986; Katz *et al.*, 1980) (Appendix XI), as described in Chapter Three.

The children were also observed throughout their examination using the OSBD, while parent and staff were also observed in their interaction with the children. The observation was carried out using a continuous interval of 15 seconds. To provide measures for each phase of the examination, the observation was divided into 4 phases. For the micturating cystogram these phases were:

i. pre-procedure phase - when the examiner entered the examination room;
ii. phase 1 examination - cleansing of genital area and catheter inserted into the bladder;
iii. phase 2 examination - filling and examination of the bladder; and,
iv. post-procedure phase - after the examiner finished the examination.

For the ultrasound scan, the phases were:
i. pre-procedure phase - when examiner entered the examination room;
ii. supine position phase - when the examination of the abdomen started;

iii. prone position phase - when the examination of the lower back started; and,

iv. post-procedure phase - after the examiner finished the examination.

The observer maintained a neutral expression during the observation.

At the end of the examination the parent was asked to fill in a Likert-type rating scale on how bothered or upset s/he thought the child was during the examination (Bradford, 1990) (Appendix III). The aim was to obtain the parent's view on the distress behaviour of their children. Such ratings would also be useful as a measure of validity when compared to the OSBD.

The families, with the exception of the ones assigned to the waiting area and the inpatients, were telephoned again one week after the examination when they were interviewed using an amended version of the Behaviour Screening Questionnaire (Richman & Graham, 1971) (Appendix XII).

The original Behaviour Screening Questionnaire is a semi-structured interview involving the description of 12 types of behaviours: sleeping, eating, bowel control, attention seeking and dependency, relationships with other children, activity, concentration, ease of control, tempers, moods, worries and fears. This scale is well established as a reliable and valid screening measure for behaviour problems in young children (Richman & Graham, 1971).

In the present study, the aim in using the amended version of the Behaviour Screening Questionnaire was to verify if the parent had perceived any change in the children's behaviour during the week after attending the hospital appointment and that could be considered as a result of the examination and if so what was the change and its duration. As the parents were asked to report their children's behavioural changes as related to the medical examination undertaken, a baseline measure was not considered worthwhile or justifiable in view of the extra work it would involve for parents. The behaviours of the children during the week after the examination took place were coded as occurring or not, based on the parent's report through a telephone interview (Appendix XII).

Table 4.1 summarises the procedures and instruments used for this study and that were explained in this section. All relevant information on the children's medical condition was gathered from the hospital's Medical Records.

4.4- SAMPLE

For this study, a total of 213 children were observed while examined during their visit to the Department of Paediatric Radiology (selected using random number tables). Table 4.2 shows the number of subjects excluded from the study and the reasons.

Table 4.2- SAMPLE AND EXCLUSIONS

	N	%
Random sample	293	
Refusal to participate	10	3
Attrition (appointment cancelled or missed)	34	12
Children with special needs	27	9
Families with no telephone number for contact	9	3
Sample studied	213	73

Table 4.1- PROCEDURES AND INSTRUMENTS FOR THE MICTURATING CYSTOGRAM AND ULTRASOUND SCAN

CONDITION	NON-* BRIEFING	BRIEFING*	WAITING AREA	INTERVENTION*	CONTROL	LONGITUDINAL	INPATIENT*
Information letter posted	✓	✓		✓	✓	✓	
Information letter received at hospital			✓				✓
Consent form posted	✓	✓		✓	✓	✓	
Consent form filled in at hospital			✓				✓
Temperament scale posted	✓	✓		✓	✓	✓	
Temperament scale filled in at hospital			✓				
Leaflet preparation posted				✓	✓	✓	✓
Telephoned 3 days prior examination	✓	✓		✓	✓	✓	
Telephoned 1 day prior examination				✓			
Preparation by play specialist		✓					
Observation prior examination	✓	✓	✓	✓	✓	✓	✓
Observation during examination	✓	✓	✓	✓	✓	✓	✓
Parent fill in Likert scale	✓	✓	✓	✓	✓	✓	✓
Telephoned 1 week after exam	✓	✓		✓	✓	✓	✓

* = conditions that were applicable to the micturating cystogram examination

The reasons given for refusing to participate in the study were lack of time (n=7) and no interest in the study (n=3). Table 4.3 shows the number of subjects involved in each of the examinations and conditions/groups.

Table 4.3- SUBJECTS BY EXAMINATIONS AND CONDITIONS

	EXAMINATION	
CONDITION	MICTURATING CYSTOGRAM	ULTRASOUND SCAN
Non-briefing	9	34
Briefing	8	31
Waiting area	*	36
Intervention	8	33
Control	*	29
Longitudinal	*	15
Inpatient	4	6
ALL	29	184

* not applicable to this examination

The proportion of girls and boys in the present sample was similar to the total population attending the department for examinations. There were no major differences regarding age distribution, diagnosis or number of previous examinations undertaken between the children who were excluded or refused to participate and the ones who took part in the study. No significant differences were found between the age or gender of the children according to the condition assigned and the examination undertaken.

The age range of the recruited children was 12 to 41 months old. Sixty eight were girls and 145 were boys. The mean age of the sample was 24.65 months old (*SD* 9.17 months). Fifty percent of the sample was in the age range from 16 to 32 months old. There was no major difference in the age of girls and boys in the total sample or receiving the two different examinations.

The majority of the children (*n*=187, 87.8%) were from European ethnic background. Twenty children (9.4%) were from an Asian/West Indian origin. Only four children (1.9%) were from an African origin. Two children (0.9%) were ethnically mixed, one of the parents being from an European background.

Most of the children in the ultrasound scan group had experienced the examination before (*n*=178, 97%). However, for the micturating cystogram, 15 children (51.7%) were having the examination for the first time.

Over 85% of the children (*n*=183) had a provisional and broad diagnosis of renal/urological etiology which was made during their foetal life (20-25 weeks of gestation). When born, 50.7% of the children (*n*=108) presented a diagnosis of hydronephrosis and 7.0% of vesicoureteric reflux (*n*=15). Urinary tract infection was the diagnosis of 9 of the children (4.2%) and seven other children had the diagnosis of cystic kidney (3.3%). The remaining 74 children (34.8%) between them represented over 15 different diagnoses, the majority related to renal/urological problems. Thirty percent of the sample (*n*=66) had had surgery on at least one previous occasion.

Because of missing information in the medical notes no report is made of the parents' social class. Therefore the findings may be generalised only with caution to the general population.

4.5- Results

4.5.1- Reliability and validity

To confirm the reliability of the researcher's observations 35 examinations (16.4%) were videotaped and subsequently coded independently by two trained researchers using the OSBD. Kappa (κ) was used to estimate the reliability of the observations. Kappa (κ) is a measure of agreement. Cohen (1968) states that "... κ provides a conceptually simple measure of reliability" (p.214). In other words, "the coefficient κ is the proportion of agreement after chance agreement is removed from consideration" (Cohen, 1960, p.40).

Kappa was calculated comparing the live observations of the children's behaviours (using the OSBD) by the researcher with the measure obtained from the videos of the children's examinations by two independent observers. Kappa values were .92 for researcher and observer A, κ=.92 for researcher and observer B, and κ=.90 for observer A and observer B.

Additionally, the parents' ratings (Likert-type scale) of the children's level of distress were correlated with the researcher's overall ratings using the OSBD. The parents' ratings correlated .785 (p=.000) with the researcher's ratings of the children's overall distress.

The independent observers also rated the children's level of distress on the Likert-type scale. Their ratings correlated significantly with both the parents' ratings (r=.657, p=.001) and the researcher's ratings (r= .717, p=.001). These findings attest to the reliability and validity of the researcher's OSBD measures.

4.5.2- Data analysis

Jay & Elliott (1986) recommended the use of a standard observation period and based their method of scoring on a sample of two minutes of behaviour. Scrutiny of the examination lengths in the pilot and present study indicated that these were fairly uniform, such that phases 2 and 3 of the examination lasted a little over 2 minutes, while phases 1 and 4 lasted one minute each. Inspection of the OSBD data from this study showed that only small amounts of distress occurred outside these limits. To keep as close as possible to Jay & Elliott's recommended method, the first minute of phases 1 and 4, and first 2 minutes of phases 2 and 3, were therefore used for data analysis. The procedures used for the OSBD scoring and calculation are included in Appendix XIII.

Following the method used in the feasibility and pilot studies, the number of minutes and percentage of each phase so defined which each child spent showing each behaviour was first calculated. This measure - called *percentage duration of behaviour* - was also used to assess parental and staff behaviour.

According to Jay and Elliott's (1986) guidelines, it is also possible to calculate *weighted* distress behaviour scores for each child. To obtain these measures, weightings are assigned to each behaviour such that, for instance, emotional support is assigned a weight of 2 and cry a weight of 2.5. Following the assignment of the weightings, a totalled distress measure - called a *distress score* throughout this thesis - can be calculated for each child and phase of the examination by totalling the weighted values.

Because the weighted *distress score* provides a more simple, robust and widely used assessment of distress than the *percentage duration* index, it is the main measure employed here for comparative purposes. The *percentage duration of behaviour measure* is used descriptively. It should be noted that the two measures correlate highly. For example, for the overall sample of children in this study, the correlation was r=.631, p<.001.

The additional behaviours for the child, parent and staff, added to the OSBD by this study were not weighted. The analyses were based on the *percentage duration* of each behaviour calculated within each phase of the examination and overall.

With the aim of verifying possible differences in the children's behaviours as related to the level of invasiveness of the procedure, the analysis of the data was carried out firstly considering the two different examinations involved in the study.

In a second stage the data were analyzed considering the different experimental conditions involved in the research. An important aim was to evaluate the influence of the two types of preparation for examination on the children's behaviour during the examination.

Following these initial analyses the results are presented considering the sample as a whole in relation to the children's behaviour overall and in each phase of examination. The influence of parent and staff interactive behaviour and of child temperament, as well as the examinations' effect on behaviour during the week after the examination are also examined later in this section.

The aim of the analysis was both to identify significant relationships between the variables and to determine if any of the independent variables were particularly related to reduced distress among the children. Therefore, the statistical analysis of the empirical data in this chapter involved correlational and multiple regression methods, while analysis of variance (ANOVA) was used to detect significant differences in mean group scores where appropriate. The statistical analyses were carried out using the *MINITAB* statistical software (1993) where all data were entered following a coding protocol.

Correlation was used as the first stage of the analysis to identify some of the main relationships between the variables under study (Rowntree, 1981). Multiple regression analysis was applied in a second stage of analysis. According to Cohen & Cohen (1975) multiple regression

> ... yields measures of the magnitude of the whole relationship of a factor to the dependent variable, as well as of its partial (unique, net) relationship, i.e., its relationship over and above that of other research factors (proportions of variance and coefficients of correlation and regression). It also comes fully equipped with the necessary apparatus for statistical hypothesis testing, estimation, and power analysis. (p.3-4)

The contribution of each explanatory variable to the response variable (children's distress) can then be calculated, taking into account the influence of the other explanatory variables. In this way, the relative importance of each explanatory variable in accounting for the outcome variable can be estimated.

4.5.3- Relationship between the child's distress behaviour and the type of examination

Overall, a mean OSBD score of 9.19, *SD* 8.07 was obtained. Descriptively, children in the micturating cystogram group presented a higher OSBD score (mean 15.69, *SD* 6.93) than those who had an ultrasound scan (mean 9.03, *SD* 8.47). The minimal distress score as measured by the OSBD for the cystogram group was 8.5 as all the children in this group presented some distress behaviour. However, in the ultrasound scan group, there was a boy who presented a distress score (OSBD=35.43) higher than the maximum distress score presented by children in the cystogram group (OSBD = 25.00).

In spite of this apparent difference in the mean distress scores obtained from the cystogram and ultrasound examinations, correlational analyses, regression and analysis of variance failed to identify a significant link between distress behaviour and examination type. The correlation between the OSBD score and examination type was 0.136, while regression analysis showed that the examination undertaken by the child accounted for 5.7% of the variability in the total OSBD score (p=.059). Analysis of variance, likewise confirmed the lack of a significant difference in mean OSBD scores between ultrasound and cystogram groups (F, 1df= 3.77; p=.059).

In view of the borderline significance of this finding and possible importance of outlier scores from the ultrasound examination, the distribution of the scores was examined and 7 children who appeared to score atypically on this examination were eliminated from the analysis. The analyses were then repeated. Elimination of these cases did not affect the findings (examination type versus distress score: r=.143; p=.056; R-sq (adj)=6.3%; F, 1df= 3.23; n=206). It is possible that the relatively small number of cystogram cases (n=29) contributed to this failure to find an effect of examination type and this possibility will be kept in mind in interpreting the findings. However, this result suggests that any effect of examination type is not large or robust, so that the data will be collapsed over the two examinations for some analyses.

4.5.4- Relationship between the child's distress behaviour and the experimental conditions

Table 4.4 shows the mean OSBD scores for the different conditions for each of the two examinations included in this study. Note that not all conditions were included within the cystogram examination. As can be seen, the tendency for the mean cystogram OSBD scores to be higher than the ultrasound scores remained true within each of the conditions where a comparison was possible. However, as with the overall findings, analysis of variance results, included in the table, failed to confirm a significant difference in cystogram and ultrasound OSBD scores between any comparable conditions. Note, however, that the ANOVA results were again borderline in statistical significance, suggesting that differences might well be found with larger sample sizes.

Table 4.4- OSBD SCORE BY EXPERIMENTAL CONDITION

	MEAN OSBD SCORE BY EXAMINATION TYPE					
	MICTURATING CYSTOGRAM	*SD*	ULTRASOUND SCAN	*SD*	*F*, 1df	*p*
Non-briefing	19.41	3.65	12.02	10.22	4.49	0.055
Briefing	15.80	4.03	8.07	7.59	4.64	0.059
Waiting area	*	*	9.65	6.73	*	*
Intervention	14.20	3.28	6.18	8.04	4.55	0.059
Control	*	*	4.99	4.42	*	*
Longitudinal	*	*	5.05	6.54	*	*
Inpatient	16.58	6.38	7.84	8.08	3.27	0.108

* not applicable to this examination

As indicated by Table 4.4, within each examination type, there was little or no difference in the children's OSBD scores according to the condition they were assigned to. In particular, the intervention condition within the ultrasound scan failed to lower the children's OSBD distress scores below those in the control group for this condition (ANOVA: F,1df=0.050; p=0.483). A Mann-Whitney test gave the same result (W=1041.0, p=0.989), corroborating the results using analysis of variance. In short, the intervention condition failed to demonstrate that parent-child rehearsal of the ultrasound examination at home (as a game activity) lowered distress behaviour during the examination as compared to the control condition for this examination.

To explore this issue further, multivariate regression analysis was used to confirm the impression that the membership of one or another condition had little impact on the OSBD scores. Within the cystogram examination, the outcome equation was:

$$\begin{aligned} \text{OSBD (Cystogram)} = 15.6 &+ 2.84\ \text{(Non-briefing)} \\ &+ 0.77\ \text{(Briefing)} \\ &+ 2.37\ \text{(Intervention)} \end{aligned}$$

The inpatient condition was removed from this analysis because of small numbers and the different nature of this group. The results demonstrate that just 3.4% (*R-sq*, adj) of the total variance in the OSBD scores was accounted for by membership of the non-briefing, briefing and intervention conditions, within the cystogram examination, while none of these conditions contributed significantly (p=0.759, 0.259 and 0.352, respectively). Analysis of variance, confirmed the lack of significant difference in OSBD scores between the conditions within the cystogram examination (F,2df=2.44; p=0.088).

Within the ultrasound scan examination, the outcome equation was:

$$\begin{aligned} \textit{OSBD (Ultrasound scan)} = 7.84 &+ 4.17\ \textit{(Non-briefing)} \\ &+ 0.11\ \textit{(Briefing)} \\ &+ 0.56\ \textit{(intervention)} \\ &+ 0.45\ \textit{(Waiting area)} \\ &+ 0.57\ \textit{(Control)} \\ &+ 0.46\ \textit{(Longitudinal)} \end{aligned}$$

The inpatient condition was again removed from the equation. Here, just 7% (*R-sq*, adj) of the total variance in the OSBD score was explained by the different conditions within the ultrasound scan examination. Analysis of variance within this examination group produced similar results (*F*, 5df=3.29; *p*=0.064). None of the conditions contributed significantly to the OSBD score variance or came close to doing so.

Considering again the figures in Table 4.4, they appear to suggest that children in the intervention condition presented lower OSBD scores than children in the briefing, non-briefing or waiting area conditions within the ultrasound scan examination. However, it is noteworthy that the OSBD score for the control group is lower than the OSBD for the intervention group, while the OSBD scores for both these groups are relatively low when compared to the other conditions. One way of explaining these findings is in terms of a historical or seasonal effect. Since the data for the briefing, non-briefing and waiting area conditions were collected mainly over the period October-December, while the intervention condition and its control group were collected from March to May, a seasonal or historical effect of some sort might be contributing to the OSBD findings.

However, this rather puzzling historical/seasonal effect can also be interpreted in another way, that is, as being a function of the staff conducting the examination. Compared to the spring period, winter was a time where there was a substantial changeover in staff carrying out the examinations. This could result in less experienced staff, who would have to spend more time mastering the equipment and examination procedures, and so spend less time interacting with the children, leading perhaps to increases in their distress.

4.5.5- Relationship between the child's distress behaviour and staff and parental interaction.

The design of this study does not permit seasonal and staff effects to be satisfactorily distinguished. However, in order to throw further light onto a possible effect of staff, and parental, behaviour, the three ultrasound conditions which produced the highest OSBD scores (non-briefing, briefing and waiting area) were pooled together, as were the four conditions which elicited the lowest OSBD scores (Intervention, control, longitudinal and inpatient). Analysis of variance confirmed that the mean OSBD scores for these two pooled sets of conditions were significantly different (F, 1df=15.37, $p<0.001$).

Table 4.5 shows the proportion of staff, and parental, interaction which occurred in each of these two pooled condition groups, together with the associated OSBD scores, correlations between interaction and OSBD measures, and associated significance levels. It can be noted that staff were more interactive during the Pool 2, Spring conditions, which were associated with lower OSBD scores. In contrast, parents interacted most during the Pool 1 conditions, which met with higher OSBD scores. Parental interaction is significantly, and positively, associated with child distress in both pooled conditions. The more the children were distressed, the more parents interacted with them, or vice versa.

Table 4.5- CORRELATION OF POOLED OSBD BY PARENT/STAFF INTERACTION

CONDITIONS POOLED		% INTERACTION	OSBD	*r*	*p*
POOL 1:					
Non-briefing	Parent	80		.448	.000
Briefing			11.1		
Waiting area	Staff	35		-.170	.065
POOL 2:					
Intervention	Parent	73		.290	.004
Control			5.35		
Longitudinal	Staff	45		-.283	.005
Inpatient					

As intended, parents in the intervention condition were the most interactive, spending 81% of the examination interacting with their children, on average. However, parents in the briefing condition, which produced the highest OSBD score, interacted 80% of the time. Parental interaction levels were generally high (they spent 76% of the examination interacting, averaged across the examination conditions).

Although these findings cannot unravel the direction of effects, it seems possible that much parental interaction is a result of child distress. This would explain both the positive nature of the correlation found between child distress and parental interaction and the quite limited difference in amounts of parental interaction between the intervention and other conditions.

In contrast, the relationship between staff interaction and child distress was negative: child distress reduced as staff interaction increased or vice versa. Moreover, staff interaction was greater for the intervention, control, longitudinal and inpatient groups, which also exhibited a lower OSBD score (Table 4.5). This relationship reached statistical significance, suggesting that staff behaviour may contribute to lowered levels of child distress.

Parents were more interactive with the children than were staff as presented in the figure 4.3. Parents tended to be slightly more interactive with boys, but this difference was not statistically significant.

Fig. 4.3- Parent/Staff Interaction
(by child's gender)

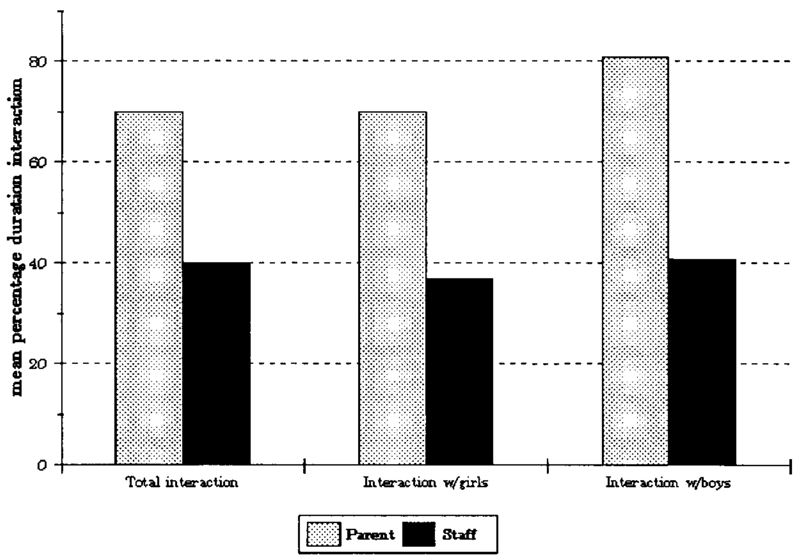


Table 4.6 presents the results of multiple regression analysis for the relationship between staff interaction, parental interaction and the

child's OSBD score in each condition.

Table 4.6- MULTIPLE REGRESSION ANALYSIS FOR OSBD, PARENT AND STAFF INTERACTION BY EXPERIMENTAL CONDITION

Condition	Predictor	Coef.	*t*-ratio	R-sq (adj)	*p*
NON-BRIEFING	Parent	22.11	3.49	22.9%	.001
	Staff	-14.13	-2.20	10.6%	.034
BRIEFING	Parent	19.42	3.71	27.2%	.001
	Staff	-7.86	-1.00	5.8%	.141
INTERVENTION	Parent	8.25	1.49	5.4%	.144
	Staff	-10.88	-1.91	8.6%	.063
WAITING AREA	Parent	11.29	2.11	11.6%	.042
	Staff	-4.52	-0.93	2.5%	.360
CONTROL	Parent	1.08	0.32	0.4%	.754
	Staff	-12.66	-3.36	25.6%	.005
LONGITUDINAL	Parent	12.34	3.07	42.0%	.009
	Staff	-.085	-0.15	0.2%	.887

These findings confirm the consistency of the positive relationship between parental interaction and child distress and the negative relationship between staff interaction and child distress. For two of the conditions (non-briefing and control) this relationship between staff and child behaviour is statistically significant. For the non-briefing condition, staff interaction accounted for 10.6% of the variance in the children's distress scores, while in the control group it accounted for 25.6% of the OSBD variance (p=.005).

Except for the post-examination phase (phase 4) both parents and staff were most interactive during phase 2 of the cystogram examination (i.e., when the catheter is being inserted into the bladder). For the ultrasound scan, both parents and staff were most interactive during phase 1 of the examination (i.e., examiner enters the room).

The percentage of each phase during which interaction occurred is presented in Table 4.7.

Table 4.7- PERCENTAGE OF INTERACTION PARENT-CHILD AND STAFF-CHILD

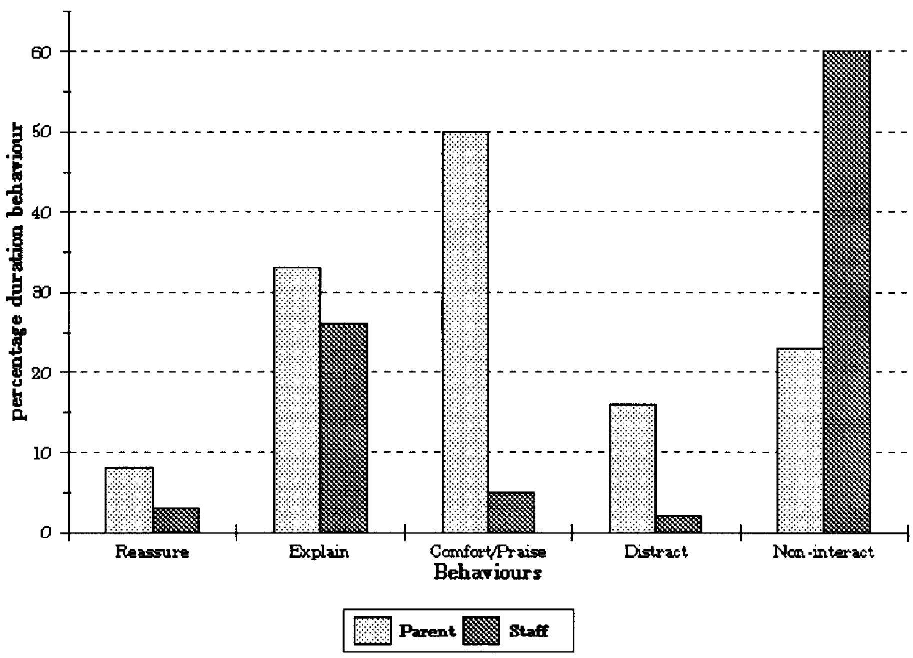
	PERCENTAGE OF INTERACTION					
	TOTAL SAMPLE		CYSTOGRAM		ULTRASOUND	
	PARENT	STAFF	PARENT	STAFF	PARENT	STAFF
BASELINE	55	-	47	-	56	-
PHASE 1	78	50	79	29	77	55
PHASE 2	75	37	90	38	73	37
PHASE 3	77	30	83	29	76	29
PHASE 4	90	57	92	23	89	69
TOTAL INT.	78	40	87	34	76	41

There was no significant correlation between the parent's behaviour before the examination (baseline) and during the examination (r=.085, p=.313, *ns*).

The most frequent behaviour among parents was *comfort/praise* which explained 29.2% of the variance in the total OSBD score (p=.000). Among the staff, *explain* was the behaviour that occurred the most, accounting for 2.7% (p=.017) of the variance in the OSBD score.

For the combined cystogram and ultrasound examinations, Figure 4.4 shows how much of the total examination was taken up with each type of parental and staff behaviour.

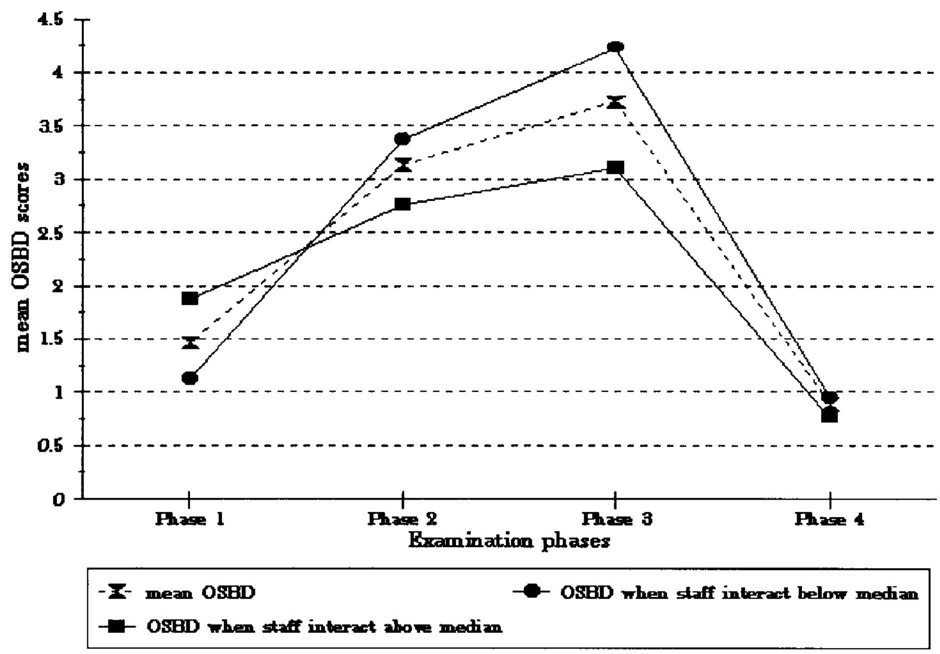
Fig. 4.4- Parent/Staff Behaviours
(total sample)



In order to explore the possible effect of staff interaction on child distress over the four phases of the examination, Figure 4.5 uses the median level of staff interaction during phase 1 of the examination to predict child OSBD in the subsequent examination phases. For reference purposes, the mean level of staff interaction in each phase is also shown.

The --■-- line in the graph presents the OSBD scores of children who were examined by staff who interacted with them more than the median staff amount during the first phase of the examination. The graph then follows this group of children over the subsequent examination phases.

Fig.4.5- Child OSBD scores
(mean, below and above median staff)



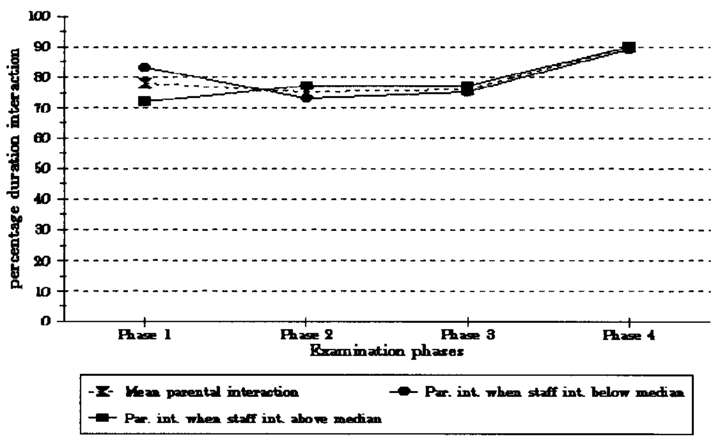
The chief interest in these figures lies in following the pattern of findings across the four phases of the examination. If staff interaction does influence child distress, there should be little difference in the children's distress score during phase 1. However, where staff were highly interactive (i.e., above the median staff level) in phase 1, the child's OSBD score should reduce in subsequent phases of the examination.

Figure 4.5 provides some evidence that this is the case. Children with OSBD scores in phase 1 who were examined by staff who interacted little have relatively high OSBD scores in phases 2 and 3 of the examination. In contrast, children who were examined by staff who interacted a lot in phase 1 show a relatively low OSBD score in phases 2 and 3.

The graphical analyses presented refer only to the ultrasound scan, since the cystogram did not present any significant correlations between the OSBD score and parental/staff interaction.

Figure 4.6 dichotomises parental behaviour in the same way to show whether a high amount of staff interaction in phase 1 of the examination had any effect on parental behaviour. As this figure shows, the amount of parental interaction appears to be affected little if at all by the amount of staff interaction.

Fig.4.6- Parent interactive behaviour
(mean, below and above staff median)



4.5.6- The children's behaviour before the examination (baseline)

The observation of the children before their examination was carried out at the department's waiting area where a play specialist organises and provides toys and activities for the children. The behaviour most frequently presented by the children was *play*, occurring 82% of the observation period. *Smile* occurred 17% of the time.

The parent's most interactive behaviour was *explain* (30%) where, in general, the parent talked to the child about how to play with a particular toy (e.g., a puzzle) or how to use art materials (e.g., paints or glue). However, during 45% of the observation time the parent did not interact with the child (i.e., was doing something else like reading or talking with an adult or older child who also accompanied the parent to the hospital). The child's behaviour before the examination did not correlate significantly with the experimental condition s/he was assigned to (r= -.022, p=.798). A similar result was obtained when correlating the child's OSBD score before and during the examination (r=-.009, p=.913).

4.5.7- The children's specific behaviours during the examination

Need for *restraint* was the most frequent distress behaviour observed during the children's examination and occurred a mean of 34% of the time. *Cry* was the second most frequent behaviour (29%). Correlational methods showed a significant relationship between the total OSBD score and both the need for restraint (r=.820, p=.000) and cry (r=.631, p=.000) behaviours presented by the children. Multiple regression analysis demonstrated that need for *restraint* contributed 67.3% of the variance observed in the total OSBD score whereas *cry* explained 39.8% of the total distress presented by the child (the figures total more than 100% since both behaviours can occur concurrently).

Figure 4.7 shows the mean observed percentage of the OSBD behaviours for the total sample as well as for the two examination groups.

Fig.4.7- Mean duration OSBD behaviours

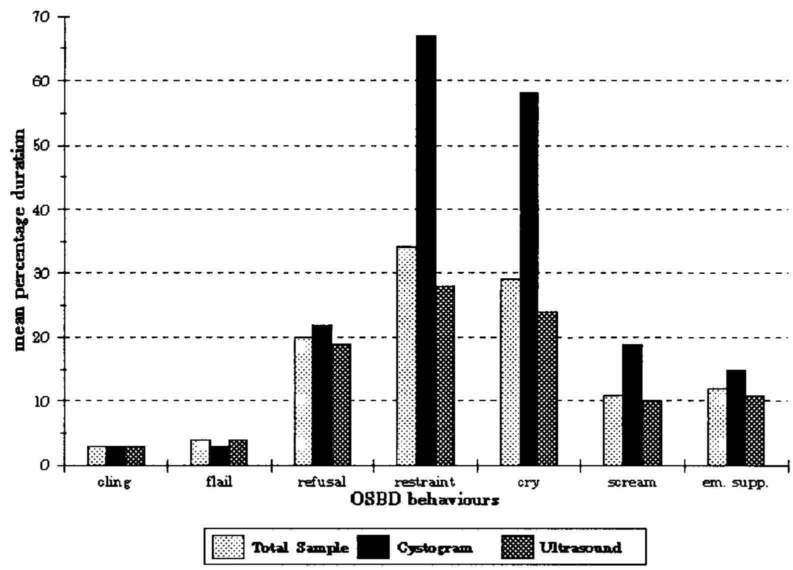


Table 4.8 summarises the behaviours most frequently presented by the children, according to the phase and type of examination undertaken.

Table 4.8- PERCENTAGE OF MOST FREQUENT BEHAVIOURS

	TOTAL SAMPLE		CYSTOGRAM		ULTRASOUND	
PHASE 1	Cry	26	Cry	41	Cry	22
PHASE 2	Restraint	38	Restraint	82	Restraint	31
PHASE 3	Restraint	46	Restraint	83	Restraint	40
PHASE 4	Cry	37	Cry	71	Cry	25
TOTAL EXAMIN.	Restraint	34	Restraint	67	Restraint	28

Descriptively, the frequency of distress behaviour was consistently higher for the children receiving the micturating cystogram than for those in the ultrasound group.

Considering the different behaviours in the OSBD individually, the ones most related to age were *refusal of position* (r=.265, p<.01), *restraint* (r= -.350, p<.01), *cry* (r= -.175, p<.05) and *emotional support* (r=.227, p<.01). The older the child the more likely behaviours such as refusal and emotional support were to occur, whereas behaviours such as restraint and cry were more likely to occur among the younger children. *Co-operative* behaviour tended to be more frequent among older children (r=.294, p<.01).

Age, when regressed against the OSBD score, did not contribute significantly. Age contributed only 1.9% of the variance in the OSBD score.

Children who had had a higher total number of previous examinations tended to have higher distress scores than those who had had fewer total examinations. However, multiple regression analysis showed that the number of previous examinations explained only 3.1% of the variance in the distress behaviour observed during the ultrasound scan. Unsurprisingly, the number of examinations also correlated significantly with age; older children tended to have had more examinations than younger ones (r=.216, p=.002).

<u>The children's distress behaviour by phase of examination</u>

Phase 3 was the most distressing for the children. For the cystogram group this refers to the phase of the examination following the catheter insertion into the bladder. For the ultrasound scan it is the phase of the examination where the child is examined in prone position. The summary of the children's OSBD score for each phase of the examination is presented in table 4.9.

Table 4.9- MEAN OSBD SCORE BY PHASE OF EXAMINATION

	TOTAL SAMPLE	CYSTOGRAM	ULTRASOUND
PHASE 1	1.464	2.231	1.343
PHASE 2	3.129	5.827	2.704
PHASE 3	3.724	6.731	3.250
PHASE 4	.879	1.783	.737
OVERALL OSBD	9.194	16.589	8.029

Phase 1: CYSTOGRAM/ULTRASOUND= examiner enters room
Phase 2: CYSTOGRAM= cleansing and catheter inserted into the bladder
ULTRASOUND= examination in supine position
Phase 3: CYSTOGRAM= filling and examination of the bladder
ULTRASOUND= examination in prone position
Phase 4: CYSTOGRAM/ULTRASOUND= examination is finished

The children's OSBD scores for the different phases of the examination correlated significantly with each other and with the overall OSBD score (from r= .727 to r= .888, p=.000).

There was no significant relationship between the child's distress behaviour and the duration of the examination (r=.054, p=.436, *ns*). Regression analysis demonstrated that only .03% of the variance of distress behaviour was explained by the duration of the examination.

The correlation between the children's distress and number of previous hospital admissions or operations was also insignificant (r=.127, p=.111). Only 1.6% of the variance in distress was explained by the number of previous admissions/operations the children had undertaken.

Children who did not display any distress behaviour

Thirty five of the children (16.4% of the total sample) did not present any distress behaviour; that is, they scored *zero* on the OSBD during their examination. All these children had had an ultrasound scan previously. Their mean (*SD*) age was 30.49 (7.08) months old, which is somewhat older than children in the sample who presented distress behaviour (mean age 23.50, *SD* 9.11).

As the researcher included four extra behaviours in the OSBD observation instrument it was possible to get some insight into the pattern of these children's co-operative behaviours. Child *play* during the examination, despite toys being always on offer, occurred during a mean of only 10% of the time the examination lasted. Apart from *co-operative*, the behaviour *self-comfort* (e.g., thumbsucking, cuddling self, request for pacifier) was the most frequent (mean of 11% of the time).

Comparing descriptively these specific behaviours between the children who scored *zero* in their OSBD and the rest of the sample, children in the zero score group presented more *self-comfort* behaviour (11% of examination duration) than the other children (6% of examination duration).

Not surprisingly, a significant negative correlation was obtained for the relationship between the *co-operative* behaviour and the OSBD total score. For the total sample, cooperation correlated -.796 (p=.000) with the OSBD, contributing 63.4% of the variance in the total OSBD score.

4.5.8- Longitudinal and inpatient groups

The OSBD score presented by the inpatient group (n=10) did not differ significantly from the score of the children who were assigned to the different experimental conditions. Children in the inpatient group were not more distressed than the children in the other conditions.

The longitudinal condition (n=15) demonstrated a significant correlation between the children's OSBD scores in the two observed occasions (r=.771, p<.01). This indicates that behavioural stability can be expected in young children across two ultrasound examinations over time. However, this finding should be treated with caution as the size of the sample was small.

4.5.9- Child temperament

The children's temperament difficultness score, as rated by the parents prior to the children's examination (mean 3.3768 and SD 0.6123) did not correlate significantly with their OSBD score (r=.035, p=.658).

However, three of the specific temperament scale scores correlated significantly with the children's OSBD scores, as presented in table 4.10.

Table 4.10- CORRELATIONS TEMPERAMENT WITH OSBD

TEMPERAMENT FACTOR	OSBD TOTAL SAMPLE n=163	CYSTOGRAM n=27	ULTRASOUND n=136
APPROACH	-.068	.017	.017
CO-OPERATION	.157	.439*	.135
PERSISTENCE	.167*	.173	.151
RHYTHMICITY	.056	.172	.109
DISTRACTIBILITY	-.144	-.039	-.173*
REACTIVITY	-.007	.077	-.028
TEMPERAMENT TOTAL	.035	.268	.070

* $p<.05$

Considering the total sample, the children's *persistence* scores correlated significantly with their OSBD scores (r=.167, p=.033). Persistent children tended to have a lower OSBD distress score. However, regression analysis showed that persistence explained only 2.8% of the variance in the total OSBD score.

For children in the micturating cystogram group, regression analysis demonstrated that the children's *co-operation* scores explained 16.1% (p=.020, F=5.97) of the variance in the children's distress. The more uncooperative the child during the examination, the higher the OSBD score. For the ultrasound scan group, the OSBD scores correlated negatively with their *distractibilty scores* (p=.043). That is, more distractible children had a lower OSBD score. However, the relationship was a weak one (table 4.10).

Descriptively, girls presented higher difficultiness scores (n=45, mean 3.50, SD .61) than boys (n=118, mean 3.33, SD .61) but the difference was slight. The only temperament dimension in which boys showed a higher score when compared with girls was in *distractibility* (mean 3.94, SD .78 for boys and mean 3.84, SD .66 for girls). Girls had a mean score of 3.82, SD .68 and boys a mean score of 3.59, SD .70 on *reactivity*. However, none of these differences was statistically significant. Table 4.11 shows the mean values for the different temperament dimensions by gender.

Table 4.11- MEAN TEMPERAMENT FACTORS BY GENDER

TEMPERAMENT FACTOR	GIRLS	BOYS
APPROACH	3.354	3.101
CO-OPERATION	3.343	3.286
PERSISTENCE	3.176	3.000
RHYTHMICITY	2.644	2.606
DISTRACTIBILITY	3.844	3.939
REACTIVITY	3.821	3.591
OVERALL TEMPERAMENT	3.498	3.330

4.5.10- The children's behaviour after the examination

As part of the research design, parents of children in the non-briefing, briefing, intervention and control conditions were contacted one week after the examination (n=167). During a telephone interview lasting around 10 minutes, (based on an instrument devised by Richman & Graham, 1971), the parents were asked questions in relation to changes in their children's behaviour during the week after the examination. Most of the parents (79.6%) reported ***no*** changes in their children's behaviour during the week after the examination. However 34 parents (20.4%) observed changes. Six of these children were girls (mean age 23.92 months, *SD* 9.81 months) and 28 were boys (mean age 26.08 months, *SD* 9.42 months).

Seven of these children (2 girls and 5 boys, mean age 23.14 months, *SD* 12.96 months) who presented perceived changes in their behaviour had had a micturating cystogram (OSBD mean 15.73, *SD* 4.10). That is, 24.1% of the children in the micturating cystogram group were reported to have showed changes in their behaviour. The other 27 children (4 girls and 23 boys, mean age 26.36 months, *SD* 8.40 months) were from the ultrasound scan group (OSBD mean 11.42, *SD* 8.72). However, no significant difference was found in the likelihood that cystogram versus ultrasound children would be observed to display changes in behaviour during the week after the examination.

Thirty of the parents who reported changes in their children's behaviour stated that it lasted for a maximum of 3 days after the examination. The other 4 children were still presenting the behavioural changes when the families were telephoned.

The most prominent change observed by the parents was related to the children's *mood* where 21 of them were referred to as being more clinging *'as needing much closer contact'* using the parents' own words.

For the micturating cystogram group, the main behavioural change was in relation to *mood* (n=5). Mood was also the most frequent behavioural change observed among the children in the ultrasound scan group (n=16), although sleeping problems (n=10) as well as difficulties on the child-parent relationship (n=8) were also reported.

When considering the total sample, there was no significant correlation between child distress during the examination and child behaviour change after the examination (r=.060, p=.402, *ns*).

4.6- Discussion

This study's main findings can be summarised as follows:

i. The cystogram examination, which was considered to involve more discomfort and stress than the ultrasound examination, was not associated with a significantly greater amount of child distress behaviour, as measured by the OSBD. This failure to find an effect of the type of examination does not appear to have been due to the limitations of the OSBD, since other studies have confirmed its validity as a measure of young children's distress (Jay et al., 1987; Jay & Elliott, 1986) and it proved to be reliable and effective in distinguishing individual differences in child distress here. Two other factors are probably responsible. Firstly, there was very great variability in the children's distress scores within both examinations so that, for example, the child who achieved the highest distress score was an ultrasound patient. Outlier scores were not entirely responsible for the failure to detect an examination-type effect, but were probably part of the more general phenomenon of distress score variance within each examination. Secondly, because of the limited time and resources available to the study, it was possible to include only a limited number of cystogram examinations. The resulting sample size constraints would have compromised the power of the statistical tests used to detect a group difference. In view of the consistency with which cystogram children presented higher OSBD distress scores than ultrasound children, it seems highly likely that a larger sample size would have revealed a significant examination type effect. Nonetheless, the lack of this effect in the present study emphasises the importance of influences on children's distress other than the discomfort of the examination. That an apparently benign examination such as the ultrasound was associated with such high levels of distress in many children is itself a remarkable and important finding.

ii. A parent-child game, based on Turk's (1978) Stress Inoculation model, which was designed to familiarise the children with the examination and so to prevent distress, proved to be ineffective. Nor was any evidence obtained that the methods routinely used by the Department of Paediatric Radiology to prepare children for their examinations were any more effective. Indeed, none of the conditions investigated proved very much better or worse than a complete absence of preparation in preventing the children's distress during their examination.

This finding is disappointing both for this study and for the Department of Paediatric Radiology, which has invested considerable expense in setting up play specialist program and other services to help children and their families to cope with their examinations. It is possible that the type of preparation used is at issue, so that an approach which prepared children in other ways would work better. For example, Gaynard, Goldberger & Laidley's (1992) used stuffed body outlined dolls to explore hospitalised children's fears and understanding of procedures. However, it is also possible that the context of the examinations and the young age of the children studied combine to make preparation more or less impracticable.

The Department of Paediatric Radiology is a busy and hectic place, with limited resources. It follows that any changes designed to improve the examination from the patients' point of view have to be weighed against their disruptive effects on the basic purposes of the examination. For example, techniques which involve a more active role for the child or specialised play equipment were considered in planning this study, but were ruled out on practical grounds. Although other ways of preparing the children for their examinations, or changing the children's or parents' role in it, may be more effective, the problem of compatibility with the basic purpose and requirements of the examination is likely to remain. This problem is exacerbated with young children, because of the inherent difficulties involved in communicating with and preparing them directly. This issue will be returned to later in the main discussion (Chapter Six) of this thesis, but it seems reasonable to query whether preparation for radiological examinations will provide an effective means of helping young children to cope with what they appear to perceive as a threatening environment.

iii. A significant positive relationship was found between parent behaviour and child distress, while regression analyses confirmed that the relationship was substantial enough to be of interest. A more difficult question is whether the direction of effects is from child to parent or parent to child. That is, does a high level of parental interaction lead to child distress, or is a high level of parent interaction the result of a high level of child distress. It is intuitively appealing to conclude that child distress increases parental interaction and the findings were consistent with this interpretation. However, it is necessary to bear in mind that early research on children's distress in hospital found that staff considered parental presence during hospital procedures to be problematic (Hickmolt *et al.*, 1986; Hannallah & Rosales, 1983). It is at least possible that parents' own anxiety and distress because of their children's illness and hospital examination was communicated to the children, leading in some cases to increased distress. The present study was not designed to address this issue satisfactorily, so that further research which addresses this issue more directly would be helpful.

iv. The child variables of age, sex and temperament, which were expected to contribute to individual differences in the children's distress, did not prove to be very powerful predictors. Some evidence of a link between temperament and the children's OSBD scores was found, such that children who were rated as co-operative by their parents scored lower on distress during the cystogram examination. Similarly, children who were considered hard to distract had higher OSBD scores during the ultrasound examinations, and children who were persistent were more distressed in general. These results provide some support for the idea that children's temperamental characteristics, rated by their parents before their radiological examinations, predict how distressed the children will be. However, the findings were patchy and the level of predictiveness was low, so that temperament measures are unlikely to be of use for clinical purposes in this area. This conclusion is at odds with Carey's (1989) claim that temperament measures are useful for paediatric purposes.

These temperament findings can be explained in a number of ways. Firstly, it is possible that the instrument used to measure temperament - the Short Temperament Scale for Children - is suspect in its psychometric properties. It is true that this scale has not been used before in published research with English children, or with children selected for radiological examinations. However, it is based on the Carey temperament scales, which have been very widely used, and the STSC itself has been exhaustively evaluated for reliability and validity in large Australian samples (Prior, 1992; Prior *et al.*, 1989). A second possibility is that the findings are less the result of the STSC itself than of the more general problems involved in measuring children's temperaments via parental ratings. There is a substantial literature raising this concern about the validity of parent reports as temperament measures (Bates, 1989; 1989a). Nonetheless, previous studies have found that parental ratings of temperament using Carey's scales do predict children's distress during surgical procedures (Huttunen & Nyman, 1982; Sylva *et al.*, 1993a), suggesting that measurement problems alone are unlikely to be the only reason for the present findings. A more likely explanation is that the findings are due to the young age of the children in this study. Possibly, temperament is not sufficiently formed as an individual characteristic at this early age, so that other child attributes, such as experience and level of understanding, play a more important role when children are faced with radiological examinations. This possibility raises more general questions about the factors which underlie distress in this context, which will be returned to in Chapter Six.

The failure to find age or sex effects is surprising, in view of previous studies which have found these characteristics to mediate children's responses to stressful situations (Jay *et al.*, 1987). However, the findings for sex are patchy and inconsistent in the literature, particularly at a young age (Hutt, 1978; Hutt & Bhavnani, 1972), so that sex does not appear to be a very reliable predictor of distress, at least in young children. The failure to find an effect of the children's age is probably due to the limited age-range, and generally young age, of children in this study. Most research which has found age to be important has included much older children than those observed here (e.g., Jay *et al.*, 1983; Hyson, 1983).

v. This study's most provocative and interesting finding is that staff behaviour may have exerted significant and, potentially, clinically important effect on the children's distress during their ultrasound examinations. A similar relationship was not found when analysing the cystogram group alone, perhaps because of the sample size and the nature of the procedure, which involves a certain amount of discomfort/pain. Unlike the positive correlation found between child distress and parental behaviour, the relationship with staff behaviour was negative: lower child distress was linked with higher amounts of staff interaction. Moreover, high amounts of staff interaction early in the examination appeared to lead to lower child distress later in the examination. The methods of observation used were based on the amount, rather than quality, of staff interaction, so that it is not possible to conclude what type of staff behaviour was most effective. In practice, however, informal observations made during the OSBD procedure suggest that the quality and quantity of staff behaviour were closely interlinked. Many staff interacted little at all, other than to instruct children in the necessary movements. Others kept up a stream of conversation, mixing jokes with explanations and involving child and parents closely in the procedures. As an example, one of the staff carrying out the ultrasound examinations routinely told children that the probe she was using would allow her to see what the child had had for breakfast. This captured the child's interest and led to a dialogue which involved and distracted the child throughout the examination. This finding is potentially of importance because of the possibility that awareness of and instruction in these sorts of skills could be incorporated into staff training. If effective, such skills might also prove worthwhile from the staff's point of view, since many staff found the children's distress hard to deal with, while it also sometimes had the effect of lengthening the examinations.

Although the findings from this study do indicate that staff interaction was an important source of variation in the children's distress, the study was not designed specifically to address this issue and so leaves a number of questions open. Firstly, it is possible that undetected variations in the children's behaviours in the first phase of the examination were responsible for the variations in staff behaviour, rather than the influence being the other way around. Secondly, the period when the data were collected coincided with a major change of staffing: altogether, 20 different staff were involved in the ultrasound and 15 in the cystogram examinations observed, querying the generalisability of the findings. Thirdly, it is important to know whether the examinations which involved staff interaction lasted longer than other examinations. Even if a high level of interaction is shown to reduce child distress, this alone might not be sufficient to ensure that the finding is considered clinically meaningful, in view of the time and other pressures which the staff work under. Evidence that examinations involving staff interaction took no longer, but were effective in reducing child distress, would be more likely to influence clinical practice. For these reasons, it was decided to conduct a further study to replicate these findings and look at staff behaviour during ultrasound examinations in more detail. This study would also allow the role of parental behaviour to be reviewed.

vi. Lastly, although almost 80% of the children's parents reported no change in the children's behaviour during the week after the examination, some 20% of the children were reported to show a variety of minor disturbances, most of which had disappeared a week after the examination. There was some evidence that the disturbances were more likely to occur in children who had received cystogram examinations, but it was not possible to predict which children would be most likely to exhibit such disturbances with any great accuracy. It is not really meaningful to compare these findings with the early studies reviewed in Chapter One, which showed more severe and protracted distress following hospital admission and parent-child separation. However, the present findings encourage the view that the distressing effects of contemporary ultrasound and cystogram examinations are probably short-lived.

CHAPTER FIVE

STUDY OF STAFF BEHAVIOUR

5.1- AIMS OF THE STUDY

Because of the limited number of cystogram examinations and time available, it was decided to limit this study to children receiving ultrasound scans.

The purpose of this study was: (i) to verify whether the behaviour of the staff contributed to a reduced level of child distress during the examination, (ii) to confirm whether staff interaction during early phases of the ultrasound scan was related to low distress behaviour by the children during that specific phase of examination or during subsequent phases of the examination, (iii) to review the part played by parent behaviour, and (iv) to assess the effect of staff interaction on the length of the examination.

5.2- MAIN QUESTIONS

i. Could the relationship between staff interaction and reduced child distress behaviour found in the main study be replicated?

ii. Did staff interaction contribute to a reduction in child distress behaviour?

iii. Was there a phase of the examination where staff interaction contributed more to a reduced level of distress by the child?

iv. Did specific staff behaviours contribute to reduced child distress during the examination?

v. What was the relationship between staff interaction and the duration of the examination?

vi. What was the relationship between parental interaction and child distress?

5.3- METHODOLOGY

5.3.1- The examination

The children were observed while having an ultrasound scan at the Department of Paediatric Radiology as described in section 4.3.1.

A total of 7 different examiners carried out the ultrasound scans on the children in this sample. Three were radiographers and the other 4 were junior radiologists.

5.3.2- Procedures and Instruments

A total of 107 children in the age range 12 to 41 months were scheduled to have an ultrasound scan in the department (as outpatients) during July and August, 1994. Children with mental or physical handicap and families presenting difficulties in understanding spoken English were excluded. From the 106 remaining children, 74 were randomly selected to be included in the study. A random numbers statistical table was used. However, 31 children were eliminated because their appointments were cancelled, they did not attend the appointment, or the researcher missed them when they were called for their examination.

From the 44 children who were observed during the examination, 3 were eliminated. Two were, on the day of their examination, older than the age required by the researcher and the other one slept throughout the examination.

The final sample comprised 41 children. There was no refusal from parents to take part in the study.

The families were approached at the Department of Paediatric Radiology waiting area. The study was explained and permission to observe the children was requested. Upon agreement, the parents filled in the consent forms for observation (Appendix VI) and for videoing (Appendix X) the child's examination.

The children were observed before and during the examination using an amended version of the OSBD (Appendix XI), as reported in the previous chapter. At the end of the examination, the parent was asked to fill in a Likert-type scale (Appendix III) where s/he rated how distressed s/he thought the child was during the examination.

All but one child was observed in the morning. There was no major difference regarding age distribution, diagnosis or number of previous examinations between this sample and the others drawn for the main study.

All relevant information on the children's medical condition was gathered from the hospital Medical Records Department.

5.4- SAMPLE

The sample comprised 41 children, 10 girls and 31 boys. The mean age was 24.86 months, *SD* 9.17 months. Fifty percent of the sample was within the age range 16-34 months old. The mean (*SD*) age for girls was 24.32 (9.17) months. For boys the mean (*SD*) age was 25.03 (9.32) months.

No major difference was observed between the proportion of girls and boys in this sample when comparing it with the samples included in the main study presented in Chapter Four.

The majority of the children were from a European ethnic background (n=35, 85.4%). The other 6 children (14.6%) were from Asian/West Indian parentage. The ethnicity was also similar to that in the previous studies.

All but 10 children had a diagnosis of hydronephrosis (*n*=12, 29.3%) or other renal/urological related aetiology (*n*=19, 46.3%). The remaining 10 children (24.4%) in the sample had an oncological or orthopaedic diagnosis, although most of them related to renal/urological problems such as Wills tumour (a tumour on the kidney) or bone disease with prospect of compressing the renal area. Nearly half of the sample (*n*=19, 46.3%) were initially diagnosed prenatally. Most of the other children were diagnosed sometime during their first year of life. Fifteen of the children (36.6%) had never been a hospital inpatient. Of the remaining 26 children, twenty had been in the hospital wards between once and a maximum of 5 times. One child had been in the wards 8 times, another 9 times and a third 10 times. One child had been in the wards 19 times in total.

All but 3 children had experienced an ultrasound scan before. Seven children were having their second examination, 12 their third examination, five their fourth examination and 6 their fifth examination, two their sixth examination and 4 their seventh examination. Two children had each had a total of 8 ultrasound scans before. On the day the children attended the department for their examination, 24 children (58.5%) were having just the ultrasound scan. Thirteen children (31.7%) were having one more examination in addition to the ultrasound scan and the remaining 4 children (9.8%) were having a total of 3 examinations at the department including the ultrasound scan.

5.4.1- Family accompanying the child

On the day the children attended the department for their ultrasound scan, 18 children (43.9%) were accompanied by their mothers during the examination. Seventeen children (41.5%) were accompanied by both their parents. Of the other 6 children (14.6%), half were accompanied by their fathers and half by their mothers and grandmothers.

5.5- RESULTS

The main aim of the analysis was to verify whether staff behaviour contributed to a lowering of children's distress. Additionally, the study attempted to identify which phase of the examination and which staff behaviour was more effective in reducing the children's distress.

The OSBD data were analyzed as in the study reported in the previous chapter. Likewise, two different measures, the OSBD score or *distress score* and the *percentage of duration of distress,* were calculated.

The data were analyzed using correlational methods, multiple regression and analysis of variance, as in the study in the previous chapter. As the findings using these three statistical methods were equivalent, regression analysis is used in reporting most of the results

Kappa (K) was used for the reliability test using the videos that were rated by two independent observers and compared with the researcher's live ratings.

5.5.1- Reliability

The examinations of fifteen children were recorded on video. The children's distress behaviour was rated by 2 independent observers. The Kappa value for the researcher and observer A was K=.93, for the researcher and observer B K=.95, and for observer A and observer B K=.94. For staff behaviour a reliability of K=.98 was obtained between the researcher's and independent observers' ratings. This means that there was a very high level of agreement between the researcher's and other measures of both child distress and staff behaviour.

At the end of the examination, the parents rated on a Likert-type scale their perception of the children's level of distress. The parents' ratings correlated .872 (p<.001) with the researcher's observation of the child's distress, as measured by the OSBD. The overall correlation between the ratings of parents and independent observers was .708 (p=.002).

5.5.2- Relations between child variables and the OSBD distress score

The mean OSBD distress score was 6.27, *SD* 6.37. Fifty percent of the children observed presented a distress score between 0.53 and 12.45.

The girls' mean distress score was 5.90, *SD* 5.43 (n=10). The highest distress score for girls was 14.83. For boys, the mean distress score was 6.38, *SD* 6.73 with the highest distress score reaching 20.75 (n=31). Boys tended to present higher OSBD scores than girls (table 5.1). Similarly, boys were more distressed during phases 1 and 2 of the examination while girls presented higher distress scores during phases 3 and 4. However, none of these relationships was statistically significant.

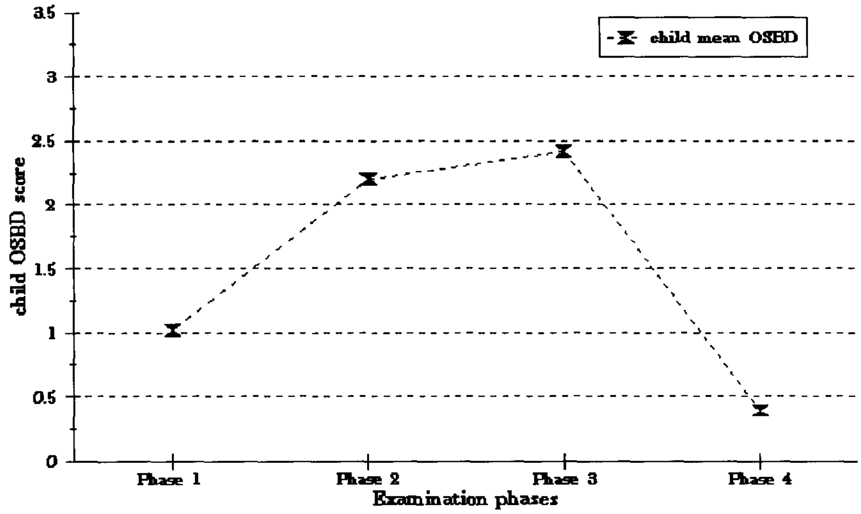
Table 5.1- OSBD AND GENDER

	GIRLS	BOYS	ALL SAMPLE
OSBD			
PHASE 1	.795	1.094	1.021
PHASE 2	1.806	2.325	2.198
PHASE 3	2.660	2.344	2.422
PHASE 4	.512	.356	.394
OVERALL OSBD	5.900	6.380	6.267

Figure 5.1 presents the OSBD score for the sample as a whole considering each phase of the examination.

As both Table 5.1 and Figure 5.1 show, the children presented their highest distress scores during phase 3 of the examination (OSBD mean 2.42).

Fig.5.1- Child OSBD score
(mean)



Age correlated .348 (p=.026) with the occurrence of the behaviour *refusal of position* by the child. Significant correlations were also obtained between age and the following behaviours: emotional support (r=.407, p=.008) and co-operative (r=.389, p=.012). The older the child the more of these behaviours occurred. However, the younger the child the more need for restraint (r= -.300, p=.056) although this finding was borderline in statistical significance.

The children's overall distress score during the examination did not correlate significantly with their age (r=-.120, p=.456), while regression analysis showed that age explained only 1.4% of the variation in the children's distress score. Child age and the parents' rating of their child's level of distress also failed to correlate significantly (r=-.278, p=.078).

There was no significant relationship between the child's distress score and the total number of previous ultrasound scans (r=.167,

p=.297) or the total number of all previous examinations undertaken at the department (r=-.121, p=.453).

Only 9 children in this study obtained a zero OSBD score. There was no significant difference between these children's age (mean 26.83, SD 7.80) and the age of the other children who presented an OSBD score above zero (mean 24.30, SD 9.56).

5.5.3- Parent-child interaction

Mothers were more interactive with their children during the examination than other members of the family accompanying the children. Overall, parents were similarly interactive with boys (mean 86% duration of examination) or with girls (mean 87% duration).

Parents tended to interact less with older children, but this relationship was not statistically significant (r= -.159, p=.320). Table 5.2 summarises the correlations between parental interaction (during each examination phase and overall) and the child's OSBD (during each examination phase and overall).

Table 5.2- CORRELATION BETWEEN PARENTAL INTERACTION AND CHILD'S OSBD

	PARENTAL INTERACTION			
	PHASE 1	PHASE 2	PHASE 3	PHASE 4
OSBD				
PHASE 1	.140			
PHASE 2	.201	-.015		
PHASE 3	.407**	.034	.281	
PHASE 4	.516**	.018	.052	.098
OVERALL OSBD	.310*	.054	.107	.151

** = p<.01 * = p<.05

Table 5.3 summarises the percentage of parent interaction per phase of examination and the most frequent behaviour in each of the examination phases.

Table 5.3- PERCENTAGE OF PARENT INTERACTION

	PARENT % INTERACTION	MOST FREQUENT BEHAVIOUR	%
PHASE 1	77	Explain	37
PHASE 2	85	Comfort/Praise	44
PHASE 3	88	Distract	44
PHASE 4	96	Comfort/Praise	75
OVERALL INTERACTION	86	Comfort/Praise	42

Table 5.4 presents the correlation values between the parents' most frequent behaviour (as summarised in the previous table) and the child's OSBD score.

Table 5.4- CORRELATIONS BETWEEN PARENTAL BEHAVIOUR AND THE CHILD'S OSBD SCORE

	PARENT MOST FREQUENT BEHAVIOUR	
OSBD		
PHASE 1	Explain	.257
PHASE 2	Comfort/Praise	.431**
PHASE 3	Distract	.298
PHASE 4	Comfort/Praise	-.259
OVERALL	Comfort/Praise	.333*

** = $p<.01$ *= $p<.05$

Multiple regression analysis between the OSBD and the parent's behaviour *comfort/praise* provided the following equation:

Child distress (OSBD) = 3.43 + 6.92 (parent comfort/praise)
(total examination)

Parent *comfort/praise* behaviour accounted for 11% (p=.033) of the distress behaviour the child presented during the examination. As indicated earlier, it could be speculated that parental behaviour was a response to the child's distress.

As Table 5.3 indicates, the proportion of parental interaction was high throughout the examination and particularly high in phase 4, when 96% of the examination, on average, included parental interaction. As in the main study, the relationship was mainly positive: high parental interaction was usually related to high child distress. The high level of parental interaction generally makes it difficult to disentangle the causal relationship between parental and child behaviour.

However, following the method used to examine staff behaviour in the main study (section 4.5.5) the amounts of parental interaction during phase 1 were dichotomised as above or below the median level of interaction for the parents as a whole. Parental interaction in phase 1 was employed for this purpose to allow comparability with the staff interaction measures.

The findings are summarised in Table 5.5.

Table 5.5- CORRELATIONS BETWEEN PARENTAL INTERACTION DURING PHASE 1 AND THE CHILD'S OSBD SCORE
(using median parental interaction as the cut off point)

	PARENTAL INTERACTION PHASE 1
OSBD PHASE 1	.154
OSBD PHASE 2	.179
OSBD PHASE 3	.346
OSBD PHASE 4	.479**
OVERALL OSBD	.257

** = p<.01

Multiple regression analysis showed a statistically significant relationship only between parental interaction during phase 1 of the examination and the child's distress during phase 4 of examination. The regression equation was:

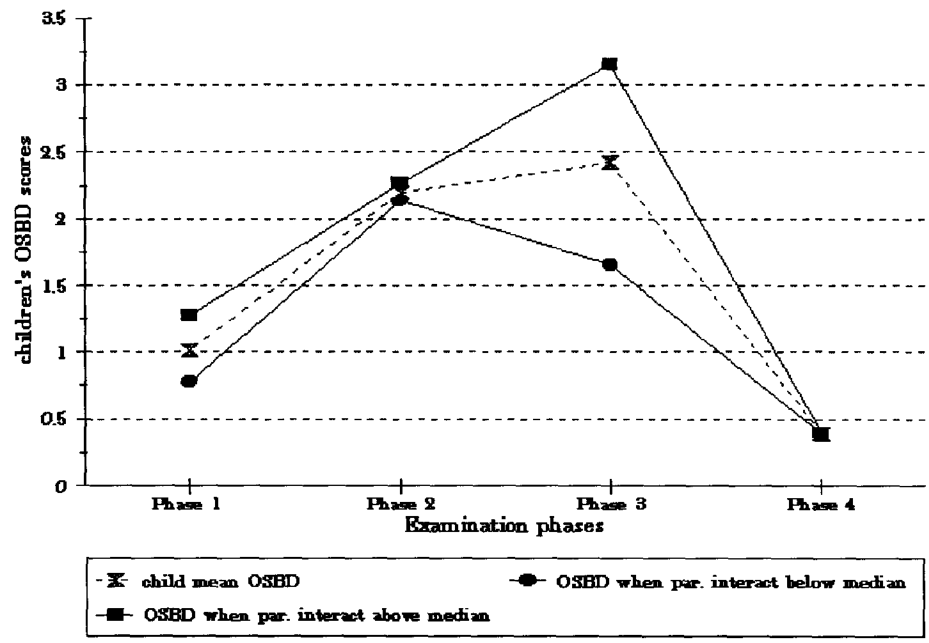
OSBD Phase 4 = 1.14 + 0.572 (parental interaction)
(during phase 1 examination)

Parental interaction accounted for 22.9% (F= 5.06, p=.038) of the children's phase 4 distress. However, the relationship was again positive: high parental interaction during phase 1 of the examination was linked to high child distress in phase 4.

Although this analysis makes it very unlikely that parental behaviour contributed in any way to lowering child distress, it does not entirely answer the question of whether or not parental interaction is a response to child distress behaviour. To address this question additional analyses were carried out.

Figure 5.2 dichotomises the children's OSBD scores according to the amount parents' interacted with them in phase 1 of the examination. This analysis is the same one used to examine staff interaction in Chapter Four (Figure 4.5). That is, parental interaction is dichotomised as above, or below, the median level of parent interaction in phase 1 of the examination. The OSBD scores of the children in question are then followed across the examination phases.

Fig. 5.2- Child OSBD
(as predicted by parental interaction)



As Figure 5.2 indicates, children whose parents interacted a lot with them in the first phase of the examination retained a high level of distress throughout phases 1, 2 and 3 of the examination.

5.5.4- Staff-child interaction

It was interesting to observe that staff interacted more with children accompanied by their mothers (interaction mean 43% duration of examination) than when the children were accompanied by their fathers (interaction mean 18% of duration examination), but since there were only three children in the latter group it is not possible to assess the significance of this difference.

The staff tended to interact more with older children (r=.262, p=.098). The staff's overall amount of interactive behaviour failed to correlate significantly with the OSBD score presented by the child during the examination (r= -.104, p=.516). However, staff interaction during phase 1 of the examination did correlate significantly and substantially with the child's level of distress during the examination as a whole (r= -.519, p=.023). The more interactive behaviour from the staff during the phase 1 of the examination, the less distress behaviour presented by the child during the examination.

Table 5.6 summarises the correlation values between staff interaction (during each examination phase) and the child's OSBD score (during each examination phase and overall). Except in phase 4, the correlations are consistently negative.

Table 5.6- CORRELATION BETWEEN STAFF INTERACTION AND CHILD'S OSBD SCORE

	STAFF INTERACTION			
	PHASE 1	PHASE 2	PHASE 3	PHASE 4
OSBD				
PHASE 1	-.093			
PHASE 2	-.352*	-.113		
PHASE 3	-.322*	-.204	-.103	
PHASE 4	-.419*	-.047	-.052	.095
OVERALL OSBD	-.519*	-.183	-.117	.127

* = p<.05

Table 5.7 presents the percentage of staff interaction with the child during each phase of the examination as well as the most common staff behaviours.

Table 5.7- PERCENTAGE OF STAFF INTERACTION

	STAFF % INTERACTION	MOST FREQUENT BEHAVIOUR	%
PHASE 1	53	Explain	50
PHASE 2	34	Explain	30
PHASE 3	28	Explain	24
PHASE 4	47	Praise	25
OVERALL INTERACTION	37	Explain	27

Except for phase 4 *explain* was the most common staff behaviour throughout the examination. Staff tended to praise the children once the examination was completed.

To explore the hypothesis generated in the main study - that amount of staff interaction might have an effect on child distress - staff interaction during phase 1 of the examination was used as the predictor variable in a multivariate regression analysis, with the children's OSBD scores in each phase of the examination as the outcome measures. The results are in Table 5.8. It is striking in this table that staff interaction in phase 1 of the examination was not significantly related to the children's OSBD scores during this same, initial, phase of the examination. In contrast, there is a significant negative relationship between staff interaction in phase 1 of the examination and the children's OSBD scores during phases 2 and 3 and overall. Where staff interacted a lot, the children were substantially less distressed in phases 2 and 3 (the most distressing phases - see Figure 5.1, Page 211) and overall.

Table 5.8- REGRESSION ANALYSIS FOR OSBD AND STAFF INTERACTION (phase 1)

	PREDICTOR (STAFF INTERACTION PHASE 1)	Coef.	t-ratio	F-ratio	R-sq (adj)	p
OSBD PHASE 1	Staff	-.063	-1.32	1.74	9.3%	.205
OSBD PHASE 2	Staff	-2.31	-2.29	5.26	23.6%	.035
OSBD PHASE 3	Staff	-3.40	-2.58	6.66	28.2%	.019
OSBD PHASE 4	Staff	-0.47	-1.70	2.89	14.5%	.107
OSBD TOTAL	Staff	-6.53	-2.74	7.50	30.6%	.014

The staff *explain* behaviour during phase 1 of the examination correlated -.549 (p=.015) with the total OSBD score presented by the child. The more the staff explained to the child during the initial phase of the examination, the less distress behaviour the child presented during the subsequent phases of the examination. Multiple regression analysis produced the following equation:

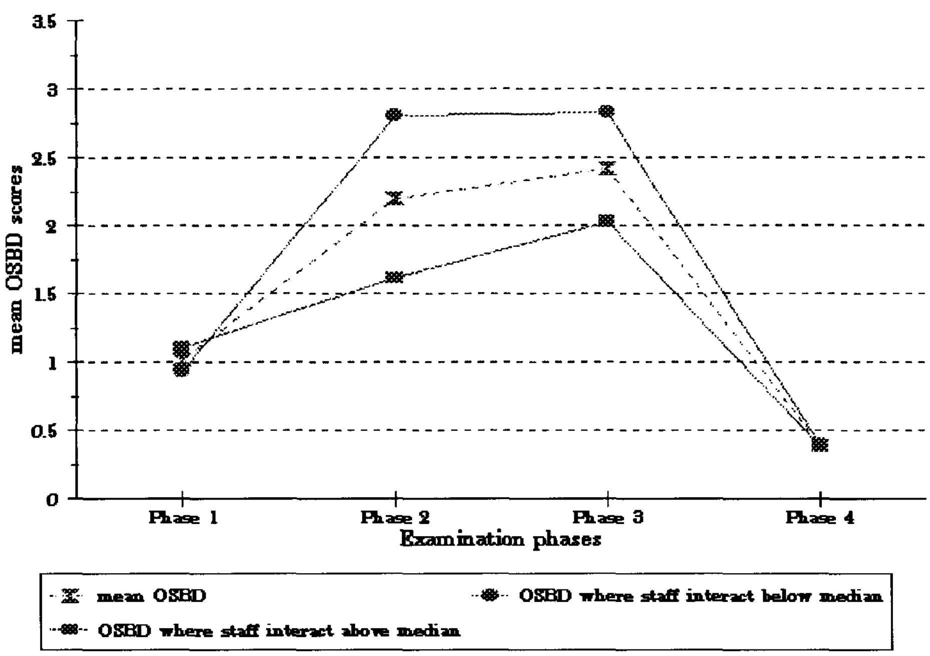
Child distress (OSBD) = 9.54 - 9.39 (staff explain behaviour)
(phase 1 of examination)

Staff *explain* behaviour during phase 1 of the examination accounted for 30.1% of the variance in the children's overall distress (p=.015).

The other behaviours (*reassure, praise* and *distract*) failed to show a significant relationship. Staff explain behaviour during phase 1 of the examination was not significantly correlated with the OSBD the child presented in that phase (r=-.040, p=.872).

Following the method used in the main study, Figure 5.3 dichotomises the child's OSBD as predicted by staff interaction above or below the median staff level in phase 1.

Fig.5.3- Child OSBD scores
(mean, below and above median staff)

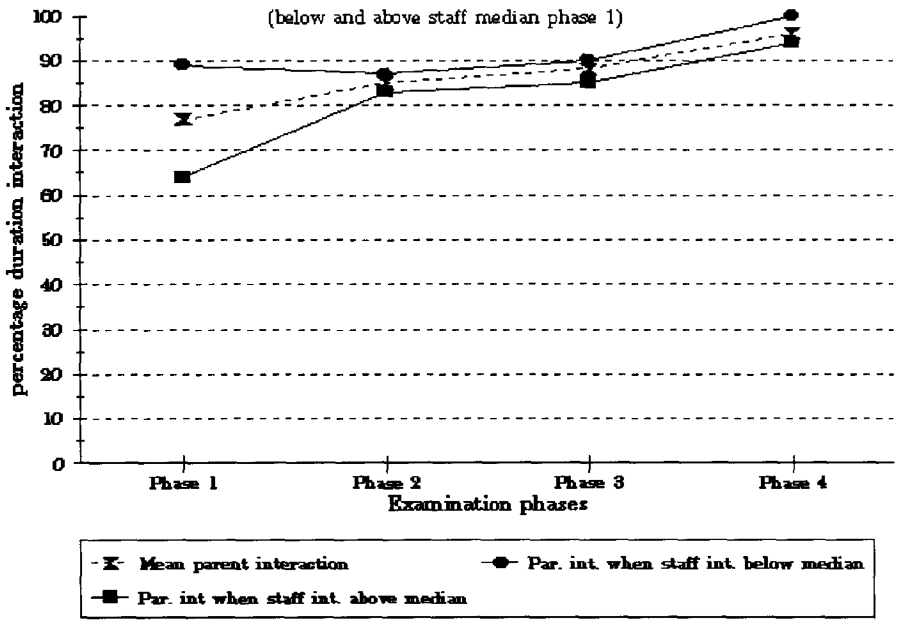


As before, the line ---▪--- in the graph shows the level of child distress for children examined by staff whose level of interaction with them was above the median staff level in phase 1. The graph then follows those children over the subsequent phases of the examination. The line ---•--- shows the OSBD results for those children whose examiner interacted with them below the median level during phase 1. Again, the chief interest lies in following the pattern of findings across the four phases of the examination. Strikingly, in this sample there is virtually no difference at all in the distress scores of children where staff interacted a lot, versus a little, with them in phase 1. This finding virtually rules out the possibility that staff interaction during phase 1 was a reaction to child distress. During phases 2 and 3 of the examination, children examined by staff who were highly interactive during phase 1 became much less distressed than children examined by staff who were initially low on interaction. By phase 4, when the examination was over, all the children's distress levels declined markedly, and the differences between children whose examiners were initially high versus low in interaction disappeared.

These analyses clearly indicate that staff interaction during phase 1 of the examination reduced the children's distress during their subsequent examination to a considerable degree. However, since this is not a randomised and controlled experimental study (which would have been inadmissible on ethical grounds), it is difficult to be sure that staff behaviour is the causal factor. Since children were assigned to staff unselectively, it is unlikely that confounding of child with staff characteristics occurred and, indeed, the lack of significant correlations between staff interaction and the children's OSBD scores in phase 1 of the examination supports this interpretation. Another possibility is that staff behaviour affected parent behaviour in some way (or vice versa), so that the children's OSBD scores were the result of confounding of staff with parental behaviour.

Figure 5.4 examines parental interaction according to dichotomised staff interaction, that is, employing the same method used to examine the children's distress scores. Parental interaction levels did not vary as a function of the differences in staff interaction in phase 1 of the examinations.

Fig.5.4- Parent Interactive Behaviour



Multiple regression, using both staff and parent interaction during phase 1 of the examination as predictor variables, was used to explore their relative contributions to the children's overall OSBD scores. Together, the two predictor variables accounted for 35% of the OSBD variance (F=5.85, p=0.012). While staff interaction continued to make a significant negative contribution to the OSBD scores (t=-3.38, p=0.004), parental interaction made an insignificant positive contribution (t=0.06, p=0.952).

In sum, in the absence of experimental proof, these findings add to those presented earlier to make a strong case for the argument that staff behaviour in the first stage of the examination was the critical factor in accounting for lower OSBD scores.

5.5.5- Effects of staff interaction on the length of the examination

It could be that more interaction from staff was associated with a longer examination.

Using the overall staff interaction below, versus above the median as a cut off point, the mean duration of examination was 9.8 minutes for staff interaction below the median, whereas the mean examination duration was 6.1 minutes where staff interacted above the median.

Correlational methods confirmed the negative relationship between staff overall interaction and the duration of the examination (r= -.499, p=.001). Where staff interacted a lot, the examination was shorter. Multiple regression analysis between these variables resulted in the following equation:

Duration of examination= 11 minutes - 8 minutes (staff interaction)

Staff interaction accounted for 24.9% (F= 12.92) of the variance in the duration of the examination.

5.6- DISCUSSION

Children's observed distress behaviour (as measured by the OSBD score) was not related to their age or to the duration of examination.

In contrast, this study demonstrated that staff behaviour played an important role in reducing children's distress during the examination confirming and elaborating on the results of the main study. The staff explain behaviour was more effective than any of the other behaviours presented by the staff during the examination. Explain was defined as verbal interaction related to the examination where an examiner would talk to the child about the procedure and about what the child should do. As in the main study, informal observation showed that high amounts of staff interaction involving explain included both information and humour capturing the child's interest and involvement (e.g., '*I am just going to put some jelly onto your tummy; do you like it warm or cold?*', '*Is it tickling?*').

Distraction behaviour (which could involve showing a toy or pointing to a picture on the wall) was not related to reduced child distress. In fact, distraction behaviour from the staff during phase 1 and phase 2 of the examination tended to increase the child's distress. It may be that the children felt suspicious that they were about to be hurt.

An important result of this study it that a high amount of interactive behaviour from the staff was not related to a longer examination duration. On the contrary, the opposite was the case: interactive examinations involving explain were substantially shorter and approximately a quarter of the variation in the length of examinations was explained by staff interaction.

The researcher's informal observations indicated that, in general, good staff interaction referred to an examiner who introduced her/himself to the child when entering the examination room, calling the child by her/his own name. From entering the room, the staff directed the conversation to the child (e.g. '*What a lovely sweater you have got!*' or '*You know that I just want to know what you had for breakfast this morning and you do not have to tell me as I can see it with this little thing here*'). The examiner tended to include the parent in the conversation (e.g., '*Is that your granny?*' or '*Is that your teddy your mum is holding?*'). These staff were the ones who explained the procedure to the child and gave the child the opportunity to take the initiative to lie down or pull her/his vest up, or suggested that the parent could help the child. They showed to the child the equipment as well as the jelly to be used and indicated where the apparatus would touch the child's body.

In comparison, parental interaction was again positively correlated with child distress and analyses which tracked the effects of high versus low parental interaction across the phases of the examination failed to find any evidence of a contingent relationship between parental interaction and lowered child distress. In addition, no evidence was found that high amounts of staff interaction had an effect on parental behaviour.

Altogether, these findings and those from the main study strongly support the conclusion that high amounts of staff interaction of the sort observed here have a strong and independent effect on children's distress during ultrasound examinations. Parental interaction, in contrast, may be contingent on child distress and no evidence has been found that parental interaction is effective in preventing or reducing child distress. These findings are clear, robust and persuasive. However, naturalistic designs of the sort used in mounting this study always leave open the possibility that some third uncontrolled or unmeasured variable has contributed to the results.

The findings' immediate implication, therefore, is to provide a strong case for the need for a controlled, blinded, intervention study which permits experimental manipulations of examiner interaction, both in ultrasound and, ideally, other examinations, so that the generalisability of these findings can be established. Related to this, a further issue is whether the methods of interaction used so effectively by some examiners in this study can be taught to other examiners, and what sort of training is required. In clinical work, a distinction is sometimes drawn between the effects of a therapy and its therapist: at least in some contexts, a gifted therapist can be effective, where the therapy apparently employed is not. In relation to radiological examinations, it is clearly necessary to establish that the methods of interaction found to be effective here can be taught and shown to be effective when used by others.

If the promise offered by the present findings is borne out, the way should then be open to introduce changes in staff training which incorporate the lessons learned into routine professional practice.

CHAPTER SIX

GENERAL DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

The research in this thesis set out to study the factors responsible for distress in young children undergoing radiological examinations. The thesis grew out of a striking, but puzzling, observation: that young children exhibit distress even during radiological examinations which are neither painful nor, to an adult, particularly stressful. A related aim was to provide information which would be helpful in practice for the hospital staff who carry out such examinations.

The discussion of the findings is divided in three sections. The first concerns the veracity of the findings. The second considers possible explanations of the findings. The third, and final section, discusses the implications of the findings for research and professional practice.

6.1- The veracity of the findings

Whenever research is carried out, the reliability and validity of the findings and the adequacy of the analysis used are important considerations. Two such issues are of particular significance here. One concerns the validity of the methods used to measure children's distress behaviour. The second is whether it is legitimate to infer distress from the behavioural measures obtained.

The first of these issues arises particularly from the fact that the main instrument used to measure distress behaviour - the OSBD - was developed and has been frequently used for studying distress in older children than the ones involved in the present thesis. As far as the researcher is aware, this is the first time the OSBD has been used extensively to quantify distress behaviour in so young an age group. In addition, it is the first time it has been applied to cystogram and ultrasound examinations.

There are several reasons for concluding that the OSBD was effective in measuring variations in the children's distress behaviour. Evidence of the OSBD's reliability and validity in this regard was obtained by comparing the researcher's measures with those made by independent researchers who viewed videorecordings of the examinations. Further, the researcher's observations were compared to those made by the children's parents and by staff carrying out the examinations. In all cases, there was a high degree of agreement both about the type of behaviour shown by the children and about individual differences between them in amount of distress behaviour.

Additional evidence of the OSBD's stability as a measure of distress behaviour also came from the consistency of the findings across the four studies in which it was used.

Evidence of the external validity of the OSBD measures obtained here can be provided by matching the behaviours measured to those assessed in other studies. These comparisons, too, give grounds for confidence that distress behaviour has been successfully measured. For example, The core distress behaviours which emerged here - crying, refusal, need for restraint, and screaming - have emerged in many other studies, both using the OSBD and other instruments with older children, and using methods other than the OSBD within this age-range (e.g., Gonzalez *et al.*, 1993; Hyson, 1983).

The OSBD summary score developed by Jay & Elliott (1986) as an overall measure of distress behaviour was also found to correlate highly with measures of time spent in particular distress behaviours and worked well in practice in distinguishing within-child variability in distress (between the examination phases) as well as between child differences. In sum, it is possible to be confident in the measures of distress behaviour obtained.

The issue of whether distress itself was truly measured, and of whether the measured individual differences in distress behaviour can be taken as evidence of individual differences of distress, is less amenable to an empirical answer. For instance, it could be argued that children who do not show distress behaviour are equally distressed: they simply do not show it overtly. If this line is taken, it is not possible to conclude from the present study whether staff behaviour, found to lessen distress behaviour, really reduced distress. Similarly, it is necessary to query whether other variables found to be associated with distress behaviour provide any clues to distress.

This thorny problem of the relationship between psychological and behavioural variables is endemic to psychological research and is shared, more or less, by all other studies in this area. One way to buttress the findings, common in studies of older children and adults, is to supplement the behaviour measures with other indices believed to tap distress. For example, self-report of feeling distressed, or psychophysiological measures, such as heart-rate and skin conductance, have been used to support the conclusion that distress has been measured (e.g., Spielberger *et al.*, 1970; Elliott *et al.*, 1987). None of these measures is foolproof - for instance, there is a debate about how reliably physiological indices can distinguish between psychological states such as distress, anxiety and excitement. Nonetheless, a combination of the measures provides the best strategy available for answering this general criticism.

In the present case, practical considerations ruled out the use of such additional measures. Specifically, the young age of the children prevented the use of self-reports, while both the researcher's limited resources and the need to avoid interfering with the children's examinations precluded physiological recordings. Indeed, additional technology might well have added to the children's distress.

Although it is not possible to answer this criticism completely, there are a number of reasons for confidence in the conclusion that distress was measured with a sufficient degree of veracity.

First, there is evidence from other studies using the OSBD and similar instruments that the behaviours measured do correlated with physiological and self-report measures of distress (e.g., Sylva *et al.*, 1993; Elliott *et al.*, 1987).

Secondly, the research literature on emotion in children has established that distress is one of the most basic hedonic states, that it is present at an early age, and that it is displayed more or less directly in behaviour in young children (Gunnar, 1980; Kagan, 1974; 1983). Indeed, this finding is fundamental to Differential Emotions Theory (Izard, 1977). Although other theories take a somewhat different view of emotional development, they too more or less concur with the conclusion that a *basic state of negative affect* exists in young children and is reflected fairly directly in behaviour (Lazarus, 1991; Campos *et al.*, 1989).

Lastly, the crying and other behaviours assessed here as distress are central to both everyday and academic notions of distress, while the inferences about the children's distress made by the researcher were clearly shared by their parents and by radiologists and radiographers alike.

6.2- Explaining the findings

The multifactorial model of distress outlined in Chapter One of this thesis proposed that three main factors were likely to be responsible for variations in children's distress: the child's developmental characteristics (represented by age), the child's individual characteristics (temperament and gender) and the nature of the hospital environment.

6.2.1- The relationship between distress and age

The research presented here did not find a significant relationship between age and distress behaviour. Moreover, when the sample was divided in narrow age groups (i.e., 12-24 months old; 24-36 months old; 36-41 months old), the standard deviation (*SD*) of the children's OSBD scores (a measure of variability around the mean) was very similar in the three groups. Multiple regression analysis demonstrated that age contributed very little to the distress behaviour the child presented.

This finding of no age difference in children's distress is consistent with an earlier study of children, aged 1-4 years, receiving radiological examinations (Bradford, 1990). A study of children's distress upon hospital admission (Rodriguez & Boggs, 1994) reached a similar conclusion: child age showed a weak association with amount of distress behaviour. These authors' conclusion was that "younger children may show more distress upon hospitalisation, although this relationship does not appear strong" (p.322). Non-significant relationships between distress and age have also been reported for children's responses to dental treatment (Johnson & Baldwin, 1968; 1969; Nocella & Kaplan, 1982) and in medical settings (Torrance, 1968). Additionally, two other studies have failed to find age effects in distress in the post hospital period (Wolfer & Visintainer, 1975; Burstein & Meichenbaum, 1979).

Nonetheless some studies have found a significant, if modest relationship between age and distress (e.g., Hyson, 1983; Hyson *et al.*, 1982; Katz *et al.*, 1980). It is interesting to consider what the likely reasons are for these differences. The most likely reason is that the age range involved here was both younger and narrower than in these other studies. That is, the clearest evidence of age-differentiation of distress comes from studies which have compared young children with those who are several years older (e.g., Katz *et al.*, 1980).

A second factor underlying the discrepancy in the studies' findings may well be the type of examination or treatment involved. It was expected that the type of examination observed here would contribute to variations in distress and it seems plausible that such variations would be most obvious when older children are compared with younger children. That is, it is reasonable to expect that older children's greater understanding would lessen their response, for example, to painful stimulation, such as bone marrow aspiration (Katz *et al.*, 1980; Jay *et al.*, 1983). That no such effect was observed here is probably due to the limited age-range and size of sample included in the cystogram condition.

Lastly, although age is often used as a proxy measurement of development because of its convenience, it is possible that developmental differences in distress might be found if more direct measures of children's intellectual development level had been obtained. This goal is, though, hampered by the vagueness of the concept of *developmental level* and by the lack of reliable, generally agreed measures of cognitive abilities which are applicable to this age-range. Measures such as the Bayley (1969) scales, for example have recently been criticised as indices of motoric, more than cognitive development and there is a lively debate in the literature about the meaningfulness of a single dimension of developmental level at this age. This lack of a clear consensus about how to measure individual differences in development at this age, together with the need to avoid burdening the children studied with additional assessments, prompted the decision to represent development only via age. In sum, so far as it was possible to measure development in this study, individual differences in development do not appear to have contributed substantially to the findings.

6.2.2- Distress and the child's temperament

Although significant relationships between children's amount of distress behaviour and some aspects of temperament were found, temperament proved to be a weak predictor of the children's behaviour during the examination. Most notably, the children's difficult temperament summary score as measured by Prior *et al.'s*, (1989) Short Temperament Scale for toddlers, failed to demonstrate a significant relationship with the distress behaviour observed during the examination.

Broadly speaking, this finding too is consistent with the results of previous studies, where temperament has not proved a strong or reliable predictor of distress (e.g. Bernheimer, 1981). The only temperament factor found by Bernheimer (1981) to be related to child's distress in a way which is consistent with the present thesis was *co-operation*.

The study carried out by Schechter *et al.*, (1991) did, however find a relationship between temperamental *adaptability* and children's level of distress during their examination. Sylva *et al.*, (1993a) also found a relationship between the temperament factor of *adaptability* and distressed behaviour in children undergoing surgery. In addition, Sylva *et al.*, found that distress behaviour and the temperamental dimensions of *mood* and *approach/withdrawal* were related.

Wallace (1989) reported a significant relationship between the children's temperamental *intensity* and their need for more analgesic medication. Nyman (1987) found that children's overall temperamental scores were not directly related to increased probability of hospital admission. However, when temperament factors were looked at individually, significant relationships were observed between child's behaviour and *mood, intensity, persistence* and *activity level.*

Part of the explanation for this variability may be attributed to the different instruments used to measure temperament. Some researchers used Carey's (1970) rating scales and others used Thomas & Chess' (1977) methods. However, most of these instruments are derived from Thomas & Chess' (1977) initial temperament studies as well as from Carey's (1970) psychometric work. The Short Temperament Scale used here also reflects this pedigree. It should, then, be the case that method differences between the study are only a minor source of variance.

One factor that might be considered a source of between-study variability is the nature of the environment in which distress is measured. For instance, the stresses experienced by Sylva *et al.*'s (1993a) children were quite different from those the children were exposed to here. A second possibility is that age differences between the studies are important. Although temperament has often been thought of as the biological basis for personality, with its onset in early infancy, recent temperament studies have found, on the contrary, that temperamental differences between children are more clearly seen and stable at an older age (Plomin & Dunn, 1986).

A further point is that neither the concept of temperament itself nor its measurement are unproblematic. In the last ten years, this area of study has witnessed a lively debate about the meaning of the most widely used temperament measures - maternal rating scale reports - which were also used here (e.g., Bates, 1989; Carey, 1970). Although ostensibly about measurement error, this discussion in fact goes deeper to challenge many of the assumptions of temperament theory about the origins of individual differences. It remains plausible that the variations in behaviour sometimes attributed to temperament are due less to biological dispositions than to individual differences in social learning experience (e.g., Wertlieb, Weigel, Springer & Feldstein, 1987; Dunn, 1980; Erickson *et al.*, 1985; McCall, 1986; Plomin & Dunn, 1986).

It is then possible to attribute the inconsistencies in the findings of temperament studies to the different backgrounds and experiences of the children studied. Although Carey (1970; 1981; 1989) remains committed to the view that temperament is a clinically useful construct, in practice the evidence in support of this viewpoint is limited.

The present study can be seen as adding to this debate about the usefulness of temperament as an explanatory variable, at least so far as distress in young children undergoing radiological examinations is concerned.

6.2.3- Distress and gender

The research reported here found no significant relationship between distress and gender. Studies of gender differences account for variability in behaviour as a result of socio-cultural (Maccoby & Jacklin, 1974; Thorne, 1986), biological (Hutt, 1972a; b) or structural (Archer, 1992; House, 1981) influences. These factors are said to contribute to the way an individual behaves as well as being factors in her/his gender stereotyping. Adopting a predominantly socio-cultural framework, Maccoby & Jacklin (1974) have argued that, as they grow older, boys are socialised to believe that *boys are brave and so do not cry.* Following this argument, it seems possible that boys in this study were too young to have acquired this stereotype, and so exhibited spontaneous distress behaviour which was not distinguishable from girls'. This interpretation is consistent with the claim of Differential Emotions Theory that distress is displayed more or less directly in young children's behaviour (Izard, 1978; 1979; Izard *et al.*, 1980; 1983; 1987).

The finding of a non-significant relationship between gender and distress in young children is compatible with Bradford's (1990) study involving children receiving radiological examinations which did not find gender differences in the distress observed. Most other studies are similarly consistent with Bradford's and the present findings (e.g., Johnson *et al.*, 1975; Rodriguez & Boggs, 1994; Schwartz, Albino & Tedesco, 1983; Sylva *et al.*, 1993a; b; Vernon *et al.*, 1966; Wolfer & Visintainer, 1975). However, a few studies have reported girls to be more distressed than boys (Katz *et al.*, 1980; Schechter *et al.*, 1991; Torrance, 1968). This difference seems most likely to be due to age range, as these studies had an older as well as wider age range.

Another consideration may be the type of examination. It may be that gender differences are not observed when the medical procedure involves discomfort or pain. In fact, the children who had micturating cystogram presented very little variability in their behaviour distress when considered by gender.

During the ultrasound scan the difference between the OSBD scores of boys and girls was larger, although not significant. It may be that gender does not contribute to significant difference in distress during an invasive procedure, since in such circumstances children's immediate reaction will be a direct response to the discomfort or pain. However, during non-invasive procedures, either boys or girls reactions could be more differentiated as a result either of biological or social influences.

It was also hypothesised that the variability in the children's distress score would be related to boys presenting a more difficult temperament. However, as noted above, temperamental difficultness, as measured by the Short Temperament Scale, failed to vary according to gender.

In sum, the findings on gender seem plausible and broadly in line with what would be expected from theoretical accounts such as that of Maccoby & Jacklin (1974). Like temperament, gender seems most likely to be a mitigating factor which influences distress in particular age-groups and circumstances, rather than a pervasive influence.

6.2.4- Distress and the environment

Why, then, are children of this age-range so distressed by cystogram and ultrasound examinations - and what precisely are they distressed by?

Following Bowlby (1960, 1961, 1988), Izard (1977, 1991) and others, it seems impossible to explain this phenomenon without recourse to a biological, evolutionary, explanation which posits that distress or fear is an unlearned response to strange environments which has its onset in children of this age-range. As Bowlby emphasised, both the existence of this emotional response and its onset in the second half of the first year of age can be explained in terms of evolutionary adaptiveness. It is when the infant becomes mobile that a mechanism is needed to maintain proximity to the caregiver, to avoid unfamiliar or unpredictable environments, and to allow the infant to signal his concerns to a protective adult. Although Bowlby (1973) is best known for his work on separation, it is important to note that he posited the existence of at least four *natural clues to danger* which would more or less automatically give rise to child distress: pain, being left alone, sudden changes in stimulation and rapid approach.

Somewhat similarly, Kagan *et al.*, (1978) proposed the existence of four innate causes of human distress: unassimilated discrepancy, anticipation of an undesirable event, unpredictability and recognition of inconsistency between belief and behaviour. Izard (1991) adds fear of *strangeness* to this list of *natural clues to danger.* From the point of view of a young child, medical examinations in a radiology department certainly qualify as strange, discrepant, unpredictable and as involving sudden changes of stimulation. In addition, although prior experience of the examinations did not prove to be a reliable predictor of the children's distress, it may be that anticipation of painful or unpleasant procedures was a factor in some cases.

This writer is well aware of the difficulties which arise when one theoretical construct - fear - is used to explain another - distress. She is also familiar with the pitfalls associated with evolutionary theorizing and the presumption that certain mental states are *innate*. The history of emotion research has been bedeviled with controversies about the notion of *basic* emotions - see for example, Ortony & Turner's (1990) recent scathing review. Nor is there any word it is possible to choose to label an inferred mental state - fear, distress, threat, which does not give rise to critical discussion about the precise nature of this state, how it differs from others, whether the term used refers to stimulus characteristics or to subjective evaluation, and so on.

As Lamb and Bornstein (1987) point out, ecological theorizing is better at coming up with grand explanations about the *why* of behaviour than it is at dealing with nitty gritty questions about the *how*. We still do not fully understand the mechanisms which give rise to, shape and delimit the complex states of emotion we infer to exist in young children.

In spite of these provisos, there seem to be a number of compelling reasons for arguing that young children do *naturally* display distress response to strange environments, and for proposing that this view is useful in the context of this thesis. Firstly, there is strong evidence that wariness or fear in response to strange people and environment has it onset during the second half of the first year of age - see Izard (1991) for a review.

Bowlby (1960, 1961, 1973) based most of his theory on one aspect of this phenomenon: the presence, or absence, of an attachment figure as a mediator of fear and hence of distress. However, from approximately nine months of age onwards, infants display fearful or distressed behaviour in response to a variety of events beyond separation from a familiar caregiver. For example, strange people, masks, jack-in-the-boxes and heights have all being found to give rise to distressed and apparently fearful behaviour from around this age (Izard, 1991). This does not mean that the response is invariant, undifferentiated or instantaneous in onset. For instance, there is evidence that *wariness* of strangers can be observed at an earlier age than full-blown distress, while the child's response depends somewhat on prior experience and on the precise characteristics of the stimulus. Tall male strangers who approach children rapidly, for example, are more likely to elicit distress than an approaching unfamiliar child (Izard, 1991).

Nonetheless, the generality of these findings across samples and cultures supports the view that they represent a maturationally influenced *universal* in young children's development of fearfulness. Indeed, a massive, multicultural, research endeavour has grow up around the phenomenon of young children's fear in response to the archetypal *Strange Situation* which Mary Ainsworth and her colleagues have devised to measure distress and attachment (e.g., Ainsworth *et al.*',1971; 1978).

As Kagan and colleagues (1978) noted, the second point to make about the phenomenon of fear of strangeness is that it represents a stage in perceptual and cognitive, as well as emotion development. In order to identify people or environments as strange or unfamiliar, the infant needs to have a memory (or schema) of what is familiar and to be able to distinguish between this and what is unfamiliar. That infants before about nine months are not fearful of strangers is taken by Kagan *et al.* as evidence of cognitive, as well as emotional, immaturity. This insight of Kagan *et al.*, (1978) is especially important because it provides a clue to how the phenomenon of *appraisal* can be integrated into an understanding of young children's distress. That is, although it is proposed that Bowlby, Izard and others are correct in believing that fear or something like it has an onset at this stage in development, the existence of this emotional capacity alone is not sufficient to predict an infant's response. The response will depend both on objective properties of the stimulus (whether it has been seen before, its size and appearance) and on whether it is appraised as a threat.

This evaluation will reflect the young child's experience, and the social clues provided by caregivers and the others in the environment, as well as other factors. The importance of appraisal processes in mediating emotional responses has been extensively researched and is generally recognised in relation to older children and adults (Mussen, Conger & Kagan, 1975). Except for the phenomenon of *social referencing,* whereby infants take clues from parents about appropriate responses (see section 1.3.2) it is less well studied in young children. However, in combination the phenomena of fear of strangeness and appraisal can provide a plausible, parsimonious and useful explanation of the findings obtained during the research reported here.

Because fear of strangeness is a central part of normal development at this age, this can account for the generality of the distress response observed in the children, that is, that it was observed in most children in both examinations and irrespective of individual difference factors such as gender and temperament. That radiology examinations are perceived as strange and threatening is largely due to the children's limited experience and understanding. With age, both the availability of cognitive processes which enable coping (Lazarus & Folkman, 1984) and the child's experience of hospital and similar environments will increase, leading in both cases to changes in how the environment is appraised. It may also be true that hospital environments are inherently somewhat threatening places, even for older children and adults. Indeed, even adults become distressed in sufficiently novel or unfamiliar environments, emphasising that what changes with age is probably not the capacity to become fearful so much as the individual's knowledge and understanding, which influence how the environment is appraised.

This theoretical framework, then, predicts that responses to hospital environments will vary according to age and experience, which is what the empirical literature shows.

The central part played by the appraisal process is also indicated by two other findings: the lack of clear differences in distress between cystogram and ultrasound examinations and the changes in distress which took place as both examinations progressed. As indicated previously, the more painful and uncomfortable cystogram examination was expected to be associated with greater distress. That this did not happen is probably partly a reflection of the limited number of cystogram cases observed, since objectively painful stimulation would certainly be expected to give rise to greater distress. Equally, however, the distress found during the more benign ultrasound examination emphasised that it is perceived threat as well as objective stimulation, which predicts the onset of distress.

Somewhat analogously, the children's distress was found to increase more or less progressively over the first three phases of both examinations. In the case of the cystogram, the third phase coincided with the must uncomfortable or painful part of the examination. However, in the ultrasound the third phase coincided with the instruction to lie prone and, often, with physical restraint. It is not difficult to understand why a child would feel particularly threatened and helpless in this position. In the ultrasound examination, this was also the stage of the examination where staff behaviour was most influential in reducing distress, presumably because the child was then less wary about the examiner's intentions.

Lastly, the process of appraisal also holds the key to an understanding of why staff behaviour proved the critical variable in mediating variability in distress. Just as infants obtain social clues from parents about how to interpret unfamiliar conditions (section 1.5.3), so staff behaviour provides the young child with information which helps the child to appraise the degree of threat posed by an examination. Explanation and guidance, even if not fully comprehended, will reduce the perceived threat. In contrast, parental unfamiliarity with and helplessness during the examination means that parents are not in a position to provide this support. As Sexton (1960) put it:

> to a child under two years of age, words may mean little; but if these words are directed to the child rather than to the parent and are said in an honest and sincere way, the child will get an idea that something is going to happen that may not be pleasant, but has to happen, and that everything will be done to make it as easy as possible. ... As early as two years, or even earlier, they [the children] can get a feeling of reassurance from the way they are handled and talked to. (p.422)

In short, this explanation attributes the success of staff interaction in reducing distress to its effect as a social support, which changed the child's appraisal of the degree of threat posed by the environment. If this account is accepted, it has implications for professional practice, some of which will be discussed in the next section.

For the moment, it is worthwhile to make the general point that this explanation is inconsistent with the view of many staff in the radiology department that it is impracticable to communicate effectively with young children in such a way as to prevent their distress. It clearly is the case that young children's capacity for linguistic communication is limited. Nonetheless, their capacity for appraisal of the environment is exquisitely sensitive, and open to social influence even at this early age.

6.3- THE IMPLICATIONS OF THE FINDINGS

6.3.1- The implications for future research

Although early research on children in hospitals concentrated on parent-child separation, the findings here add to growing evidence that an understanding of children's distress and behaviour disturbances calls for a focus on environmental factors, and children's perception of them, more generally (e.g., Blount *et al.*, 1989; 1990). This is not to downplay the importance of parent-child relationships but, rather, to say that the critical issue is to understand the physical and social environmental needs of young children more comprehensively.

In keeping with this change of emphasis, some studies stemming from attachment theory have been concerned less with the effects of separation and strange situations on young children than with the question of how such effects can be minimised. For example, Monahan (1975) studied the interaction between infant and strangers in the infants' homes. The stranger was sensitive to the reactions of the infants and deliberately set out to establish a sympathetic relationship. Under these conditions, Monahan found that a friendly relationship was established quite rapidly. When the stranger was somewhat more active than the child's mother, the child smiled more and showed higher levels of interaction with the stranger. Monahan found that the more like the mother the strange behaved, the less stressful was the initial stage of interchange between child and strange and the more rapid was the adjustment of the child to this new person.

Along similar lines, Eckerman & Whatley (1975) reported that young children's visual exploration of the stranger and the subsequent smiling provide an occasion for re-structuring both of the child's and the other's reaction to the demands of a new relationship. They add that the closer the fit between mutual reactions, the more rapidly the pair settled down in the new relationship. Morris (1980) was also supportive of the view that reciprocity between the players in an interaction is an essential feature for effective relationship and communication.

Rheingold & Eckerman (1973) convincingly showed that nearly all eight, ten and twelve months old infants in their study would look at, smile at and play happily in the presence of a stranger. Most also allowed the stranger to pick them up and hold them while their mothers left the room. They added that the children's reactions and behaviours happened in the virtual absence of any apparent signs of distress. Ross (1975) studied 64 children at the age of twelve months. Thirty two were exposed to an active stranger and the other 32 to a non-active stranger. The results supported the hypothesis that when the stranger was passive rather than active, the child spent more time near her/his mother, approached the stranger later and spent less time near the stranger. Children in this group very seldom touched the stranger, took longer to touch toys in the room and, when they did so, played less with the toys. In relation to distress behaviour, these children began to fuss or cry earlier and spent more time doing so. Ross concluded that the infants were more friendly when the stranger was more friendly and more interested in the children.

These studies as a whole suggest that far more complexity exists in child-stranger interactions than traditional attachment formulations allow. This is not to deny the phenomenon of fear of strangeness in young children, so much as to emphasise the importance of the young child's appraisal of environment threat and of the importance of adult social partners in influencing this appraisal.

The findings from the present study provide some insights into the types of social-environmental supports which seem must successful in influencing the appraisal process, at least during the hospital examination studied. It appears that social interactions which involve the child directly, are sensitive to children's abilities at this age, capture her/his attention, interest and trust, and provide guidance in how to cope with the demands of the situation, are particularly effective. An important rider to this conclusion, however, is that no direct evidence of appraisal has been obtained. For example, it should be possible to measure children's perceptions of the examiner's and the examination's strangeness using measures other than assessment of distress. In this way, future research can begin to provide more direct evidence that cognitive processes of appraisal are centrally involved.

A related point is that the list in the paragraph above includes both affectionate/interpersonal and cognitive elements. For instance, the word *trust* like the word *reciprocity* appears to refer to warm, affectionate and affiliative aspects of social relationships rather than to features of social interactions which encourage cognitive re-appraisal. It is informative to compare these features with those which have been found by Lazarus (1991) and others to be successful in helping older children and adults to cope with distress. In Lazarus's studies, it is not warmth or affection, as such, which have proved effective so much as cognitive strategies which enable older children to re-structure how they think about the environment.

It is quite plausible that this difference is fitting in view of the different age-ranges involved in these studies. However, the assumption that affection and trust are more important than cognitive strategies as aids to coping in young children is exactly that - an assumption. It could well be argued, for instance, that the examiner strategy found here to be most effective in reducing distress - explanation - involves young children's cognitive rather than affective capacities. Perhaps, then, the most important implication of these findings for research is to highlight how little we still know about the precise nature of the environmental features which, on one hand, elicit emotional responses and, on the other, mediate their effects in young children. In other words, our understanding of how perceptual, emotional, cognitive and social systems work together to regulate distress is still at a rudimentary stage. Future studies which disentangle these relationships seem particularly likely to advance our understanding of emotional development and to bear direct on clinical practice.

6.3.2- Implications for professional practice

At the outset of this study, some staff in the paediatric radiology department were sceptical about the possibility of reducing young children's distress, and worried about the possible intrusive effects of the research itself on the participating children and their examinations. Fortunately, no support for this understandable anxiety was obtained in practice. Indeed, the research has provided a number of suggestions about the way in which the examinations could be improved in the future. Coupled with these findings are queries about the roles of particular staff which will be aired in the hope that they will generate discussions about the need for change.

i. The most important finding of this research was that staff interaction with the children during the examination was reliably associated with a substantial reduction in amount of distress, at least during the ultrasound examination. Further, this interaction led to shortened, not lengthened, examination time. Broadly speaking, staff explanation, guidance, humour and a child-focused approach to the examination during the first phase of the examination were the critical factors in accounting for these effects.

The staff who were successful in achieving this results were not trained to do so and the focus of training in the radiology department appears to be on medical procedure, rather than doctor-patient communication. This finding recalls the substantial literature which now exists in other areas documenting the importance of doctor-patient communication in influencing both the duration and success of medical treatment (e.g., Korsch, Gozzi & Francis, 1988).

Staff who were effective in reducing distress were, then, intuitively attuned to young children's needs and abilities rather than trained in these communicative skills. As previously noted, one resulting proviso is that it is important to establish whether the skills and methods used by these staff can be taught to others. Indeed, as noted in the preceding section, further research into the most effective methods of communication, and the generalisability of these findings is also needed. At the same time, it appears worthwhile, and hopefully practicable, to consider whether some training in children's emotional and cognitive development, and in the associated applied issue of examiner-child communication, would be worthwhile. The writer is aware of the demands made on health service training and the shortage of resources. However, the findings here provide a clear indication that a small amount of additional time spent on these matters might be of substantial benefit to both patients and staff.

ii. The second implication concerns the methods currently used to prepare children for their examinations in the department of paediatric radiology. Neither these methods, nor the particular parent-child focused methods tried by the researcher, were better than no preparation at all in reducing child distress. It needs to be emphasised that this conclusion applies only to child distress. It may well be that other advantages result from these methods of preparation which were not measured here. However, so far as child distress is concerned, the findings suggest that preparation which is given via parents, or prior to the examination, is unlikely to be of much value.

Although they may well have been wary before their examinations began, the children were found to show very little overt evidence of distress before the examination, that is, when observed in the waiting area. The distress became apparent once the examination began and increased over the first three phases of both types of examination observed. If the explanation of these findings given in the preceding section is correct, they reflect the child's appraisal of the degree of discomfort and threat posed by the environment at that point in time. It follows that general preparations and those remote in time are unlikely to be very effective in lowering distress during the examination. Instead, the focus needs to be on the examination itself and on the social communication and support the staff provide during this time.

This finding, then, has implications both for the staff who carry out the examination and for the ancillary staff employed to support parents and children undertaking radiological examinations. It is hoped that discussions will be possible about the future roles of these different staff and their co-ordination in order to enhance the effectiveness of their work.

iii. Thirdly, the findings throw some light onto the controversy about whether and in what way it is helpful, or harmful, to involve parents in children's medical examinations. No evidence was found to support the claim that parents added to their children's distress. Indeed, it should be born in mind that this study did not include a condition which excluded parents from the examination. Hence, it remains possible that the children would have been even more distressed and less co-operative under these conditions. It was, however found that parents were able to do little to prevent distress, although they clearly helped both their children and the staff to contain the situation.

The parents' reports obtained a week after the examination confirmed their sensitivity to and concern about the effect of the examinations on their children. Although their participation in the examination did not prevent distress, it did give them a shared and insightful knowledge about the examinations' effects on the child's behaviour, as well as raising their awareness of the need to provide support in the ensuing period. Consequently, the continued involvement of parents can be justified on these grounds, as well as on the basis of humanitarian and ethical considerations.

In conclusion, this study has drawn attention to the need for a better understanding of how children appraise strange physical and social environments, and of the relationships between appraisal and distress. The findings have clarified and, to some extent, reconceptualised the factors which give rise to distress in young children being examined in a radiology department. The findings have theoretical implications, but it is hoped that the most immediate result will be a review of the way in which the examinations are carried out in the light of these findings.

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APPENDIX I

PREPARATION STRATEGIES USED WITH CHILDREN IN HOSPITAL

PREPARING CHILDREN FOR A HOSPITAL EXPERIENCE

A variety of strategies have been employed to help reduce children's distress during examinations, including providing information, film modelling, puppets, distraction and even hypnosis. Some of the main studies are reported below with the intention of highlighting the theories on which the techniques are based, their main findings and the implications of the evidence for hospital practice.

1- PROVIDING PARENTS AND/OR CHILDREN WITH INFORMATION

Booklets or leaflets have been widely employed, both to prepare parents and children prior to an examination and as an extra source of information after an initial consultation takes place (Skipper & Leonard, 1968). Information is also sent to parents via mail, where the reason for the medical appointment or the examination the child is to undertake is briefly explained.

Information booklets are probably the most widely used method of conveying specific knowledge about medical issues in general. This documentation typically uses simple language and provides concise explanations. Most of this type of material also includes references for additional reading, addresses from which to get more specific advice and support, or a telephone helpline number for confidential contact. There are also publications where different medical conditions are explained through the use of pictures and content appropriately designed for use with children.

A striking feature of most of this literature, however, is that it does not seem directly relevant to the needs of very young children. Parents may read the literature on offer and understand the different aspects of their child's medical condition and the examination s/he will have. But parents may still feel apprehensive as they would like to be able to do something more concrete to help their child during the medical procedure, since information given to parents, alone, may not render itself into much help for a youngster.

Wolfer & Visintainer (1975) used information as an instrument to facilitate children's and their parents' adjustment to hospital (experimental condition). The study involved 80 children in the age group between 3 and 14 years old. The children had no previous medical hospitalisation and were submitted to elective surgery (for example, tonsillectomy, adenoidectomy, myringotomy, polyethylene tubes - and any combination of these - or inguinal or umbilical herniorrhaphy). A random assignment to a control (n=35) or an experimental (n=45) condition was applied.

Children in the control condition received limited attention. The medical staff were friendly in their attitudes and concerned in their interactions with parents and children, but no formal preparation nor systematic attempt to determine parents' and children's concerns or emotional needs was made.

The experimental condition received a combination of psychologic preparation and supportive care provided to both child and parent at six specific stress points: upon admission, before the blood sample test, late in the afternoon on the day before the surgery, before the pre-operative medication, at the transportation to the theatre, and on returning from the recovery room. Extensive information was provided about the specific stress point shortly before it happened. Encouragement to express feelings and thoughts was given and it was also explained how the parent could help to care for the child.

The results demonstrated that the parents showed more co-operation, and children less distress behaviour, when receiving adequate information, support and reassurance throughout the hospitalisation period. Fewer adjustment problems after discharge among the children in the experimental condition than in the control condition were also found.

A few years later, Wolfer & Visintainer (1979) carried out another study involving four different experimental groups according to the type and occasion when the information was provided (i.e., prior to hospitalisation, shortly before the surgical procedure, through a booklet, or from a home visit of a health professional).

Although the difference between the groups were small, the results were similar to the ones obtained by their previous study: systematic information was more effective in reducing children's distress than standard care. This finding also suggests that unknown events may generate more distress and threat than procedures which are explained and properly understood by the ones involved in a hospital situation.

As well as preparation based on information, a variety of other techniques have been used to help children to cope with hospital procedures (Peterson & Ridley-Johnson, 1980). These are summarised next.

2- BREATHING EXERCISES

Breathing exercises (based on studies by Elliott & Ozolins, 1983) are used as an active attention-distraction technique and have also been used as part of an *intervention package* including other techniques.

The child is asked to concentrate attention on her/his respiratory system, trying to breath in different rhythms, as if blowing bubbles, feathers or other very light materials. This has the possibility of leading to some relaxation depending on the child's age and level of involvement with the exercise.

3- IMAGERY

The emotive imagery technique has been used to help the child to inhibit the anxiety provoked by a medical procedure involving pain (Elliott & Ozolins, 1983; Meichenbaum & Butler, 1979; Lazarus & Abramovitz, 1962). The implicit aim of this technique is to give the child the possibility of thinking about something else during the examination (generally something nice such as, e.g., to be on a sunny island with lots of ice cream). Alternatively, the child is asked to focus on his own sensations and emotions, in such a way that s/he become consciously aware of, and gains some control over them. This way the child enabled her/himself to, at least, attempt to master rather than avoid the distress or pain of the examination.

Elliott & Olson (1983) used emotive imagery as one of the techniques included in a *stress-management package*. It proved effective in reducing pain related behaviours in children who suffered burn injuries (e.g.,Turk, 1978). The study also demonstrated that this technique is likely to work better with mild or moderate pain than with strong and constant pain.

4- HYPNOSIS

Hypnosis (Gardner & Olness, 1981; Zimbardo, Melasch & Marshall, 1972; Hilgard, 1965) is another technique used to help children to cope with hospital procedures (Zeltzer & LeBaron, 1982). The hypnotic state is considered to be an altered state of consciousness that is induced by special techniques of suggestion and leads to varying degrees of responsiveness to directions for changes in perceptions, memory and behaviour. The child is guided to detach her/himself from the actual situation. Relaxation and distraction can act as associated components of this technique.

There is, however, some confusion regarding the efficacy of this method. Hypnosis has been considered more effective with older rather than young age children (Hilgard & LeBaron, 1982, 1984). As an example contrary to the exposed above, Kuttner, Bowman & Teasdale (1988) carried out a study involving 3 to 10 year old children suffering from leukaemia. The aim was to compare the efficacy of a hypnotic imaginative involvement, behavioural distraction and standard medical practice for the reduction of pain, distress and anxiety during bone marrow aspiration. "The emphasis in the hypnotic imaginative involvement treatment condition was to absorb the child's attention through an involving story or fantasy which would modify the internal experience, thereby providing a different interpretation of the experience and some relief from pain and anxiety" (p.376). The findings showed that hypnotic imaginative involvement emerged, on the average, as the only helpful intervention for 3 to 6 years old children. Despite some problems, the studies have found that hypnosis can be helpful with the management of situations involving distress.

5- BEHAVIOURAL REHEARSAL

Behavioural rehearsal (Jay, Elliott, Katz & Siegel, 1987) encourages the child, while using the real medical equipment that the examination may involve, to play doctor and patient. It intends to give the child the possibility to experience, at her/his own pace, the different phases of the medical procedure through the use of play. The child is also guided, by considering the associated distress that the actual event might involve, to try to figure out possible strategies for coping with the examination.

Puppets (Cassell, 1965) have been used not solely as subjects of a medical procedure but as active participants in discussion and information exchanges connected to the examination and the emotions, fears and overall feelings attached to it.

Empirical studies using puppet therapy with children undergoing cardiac catheterisation (Cassell, 1965; Cassell & Paul, 1967) demonstrated less distress among the children receiving the experimental intervention using puppets than the distress observed in a control group who did not experience such treatment.

6- MODELLING

Modelling has been applied mainly through the use of specially devised films.

Film modelling is a technique where the hospitalised child has the chance to watch a video or a short film where someone else (in general another child in a corresponding age group) is undergoing a similar examination to the one the hospitalised child is about to have. The aim is to give the child the opportunity to experience, as an outsider, the procedure s/he will have so as to empower, reassure or build up her/his coping strategies.

Melamed & Siegel (1975) studied the reduction of anxiety in 4 to 12 years old children having elective surgery (hernia, tonsils or urinary-genital tract) through the use of film modelling. They wanted to verify the extent to which the film facilitated the children's emotional reactions during hospitalisation and their adjustment post-operatively. The studied children had no prior history of hospitalisation. The experimental group was shown a film related to hospital, where a male 7 year old was hospitalised for hernia surgery. The control group was exposed to a non-hospital related film. The results demonstrated that the experimental group presented less fear arousal during their anaesthesia induction than the control group. As reported by the parents, the control group presented more behaviour disorders after discharge than was observed in the experimental group. The film modelling technique proved effective, supporting the findings of a study by Vernon & Bailey (1974) concerning the use of an examination-related film in the preparation of children for anaesthesia induction. Melamed, Hawes, Heiby & Glick (1975) applied filmed modelling to children having dental treatment and obtained similar results.

Ferguson (1979) carried out a study involving a hospital related and a non-hospital related film with children who were having tonsil/adeno surgery. The results showed that children who watched the hospital related film presented less distress than the children who watched the non-hospital related film. In another similar study, Peterson & Shigetomi (1981) demonstrated that if the child had, in addition to direct information about the procedure (as provided by the film), the possibility to participate in a kind of training for the examination, even less distress was observed. The conclusion was that information received either through film or teaching of skills provided additional benefits in reducing the distress of a hospitalised child.

Gilbert, Johnson, Spillar, McCallum, Silverstein & Rosenbloom (1982) studied the effects of a peer-modelling film on diabetic children learning to self-inject insulin. In a comparable study carried out by Melamed, Meyer, Gee & Soule (1976), the film modelling proved useful in reducing children's anxiety, especially if the child pictured on the film was similar in age, gender and race to the one watching it. But it was observed that younger children benefited more when receiving the preparation immediately before the procedure. Corresponding results were obtained by studies involving day surgery and in-hospital paediatric patients (Faust & Melamed, 1983).

Previous studies carried out by Rosenthal & Bandura (1978) and Schachter & Singer (1962) in the use of film modelling that was provided to children the day before their surgery, concluded that a controlled level of physiological and emotional arousal helped the child to imitate the model's behaviour pictured during the film. The results confirmed that a moderate level of arousal may enhance the modelling effect, increasing the child's attention and compliance to the instructions given or the demonstrations provided by the hospital staff during the examination itself. This finding seems in accordance with Katz *et al.*, (1977) study of adult females' responses to a biopsy examination; they observed that the amount of distress/stress was beneficial to an adequate handling of a difficult situation. The child seems more inclined to imitate, during her/his actual medical examination, the model's behaviour pictured during the film. Janis (1983) using film modelling together with direct information given to the children reached similar results.

Another finding related to the use of film modelling was obtained by Meichenbaum (1971), who observed that children presented less distress behaviour when exposed to a film picturing a coping model (a child referring to the feelings and fears felt during the examination and how s/he was able to deal with them) than when exposed to a mastery model (a child demonstrating being at ease throughout the examination). Later studies carried out by Kazdin (1974) and Kornhaber & Schroeder (1975) reached similar results in relation to the apparent superiority of a coping model in reducing children's distress during medical procedures rather than a mastery one.

Jay, Elliott, Ozolins, Olson & Pruitt (1985), reported a psychological intervention pilot study involving an array of techniques (i.e., reinforcement, imagery, film modelling, rehearsal of behaviours and breathing exercises). It was applied to 5 children, aged 3-7 years old, with a diagnosis of cancer and who presented high distress in response to bone marrow aspiration or lumbar puncture. The results demonstrated that the association of techniques were efficient in reducing the children's distress reaction to pain during their bone marrow aspiration or lumbar puncture.

In a larger scale study, Jay, Elliott, Katz & Siegel (1987) included a pharmacological intervention (Valium) as an extra condition alongside a minimal treatment-attention condition (children who watched cartoons before the procedure and received routine support and reassurance) and a cognitive behavioural condition (filmed modelling, breathing exercises, imagery/distraction, behavioural rehearsal and positive incentive - a trophy). The study was carried out in a group of 56 children suffering from leukaemia (age group 3 to 13 years old) who were having bone marrow aspiration. As a part of the results, the parents considered the behavioural techniques very helpful to their children. The children cited the breathing exercises as the most helpful. The trophy was voted by the children as the thing they most enjoyed (the children were told that they could win the trophy if they tried to be the best they possibly could during the examination) demonstrating that they were able to differentiate between what was most helpful and what was most likeable for them. The pharmacological intervention made no difference to the children's behaviour.

APPENDIX II

AMENDED OBSERVATION SCALE OF BEHAVIOURAL DISTRESS
(Bradford, 1990)

Date:__________________________ **Observer:**______________________________

Name of child:_____________________________________ **BOY/GIRL**

Examination:________________ **Started at:**_________ **Finished at:** ________

BEHAVIOUR	DEFINITION	LARGE EXTENT	OCCASIONALLY	ABSENT
Crying	Tears in eyes and/or low-pitched non-word sounds.			
Scream	Loud non-word, shrill vocal expressions at high pitch intensity.			
Clinging	Physically holds on to parent or radiographer.			
Fear (verbal)	Says e.g. 'I am afraid' or 'I am scared', etc.			
Pain (verbal)	Says e.g. 'Ow' or 'That hurt', etc.			
Carry	Has to be carried into the room or put on table.			
Flail	Random gross movements of arms, legs, or whole body.			
Refusal position	Does not follow instruction, e.g. body placement on examination table.			
Restraint	Has to be held down owing to lack of cooperation.			
Muscular rigidity	Noticeable contraction of observable body part.			
Emotional support	Seeks reassurance either verbally or non-verbally.			

Amended from: Bradford, R. (1990) The importance of psychosocial factors in understanding child distress during routine X-ray. *Journal of Child Psychology and Psychiatry.* 31 (6), 973-982.

APPENDIX III

Likert-type rating scale of children's distress

YOUNG CHILDREN AND RADIOLOGICAL EXAMINATIONS

Child: ______________________________ ( ) F ( ) M
Date of examination: ______________________________
Examination: ______________ Filled in by: ___________

*****

How bothered or upset was the child during the examination?
(Please, tick the appropriate box)

1 9
I____I____I____I____I____I____I____I____I____I
Not at all Highly upset

APPENDIX IV

AMENDED OBSERVATION SCALE OF BEHAVIOURAL DISTRESS

(Katz et al., 1980; Jay & Elliott, 1986)

OBSERVATION BEFORE EXAMINATION

Child: ______________________ **F( ) ¦ M( ) Birth:** ______________

Arrival waiting area at __________ **Observation started at** __________ **and finished at** __________

Examination: ______________________ **Observer** ______________________

BEHAVIOURS' DEFINITION	TIME 1	TIME 2	TIME 3	TIME 4	TIME 5	TIME 6	TIME 7	TIME 8
has to be **carried** into the room or to table	carry	carry	carry	carry	carry	carry	carry	carry
physically holds **(clings)** on to parent or staff	cling	cling	cling	cling	cling	cling	cling	cling
moves grossly **(flails)** and randomly arms, legs	flail	flail	flail	flail	flail	flail	flail	flail
does not comply or assist with position **(refuse)**	refuse pos/n	refuse pos/n	refuse pos/n	refuse pos/n	refuse pos/n	refuse pos/n	refuse pos/n	refuse pos/n
has to be held down owing lack of co-operation	restrain	restrain	restrain	restrain	restrain	restrain	restrain	restra in
tears in eyes/low pitch non-word sounds	cry/ moan	cry/ moan	cry/ moan	cry/ moan	cry/ moan	cry/ moan	cry/ moan	cry/ moan
loud non-word sounds, shrill vocal expression	scream	scream	scream	scream	scream	scream	scream	scream
pleasant spontaneous face due tickles or talking	smile	smile	smile	smile	smile	smile	smile	smile
says ' Mum help me' or 'Mum hold me'**(emotional)**	emot/l supp/t	emot/l supp/t	emot/l supp/t	emot/l supp/t	emot/l supp/t	emot/l supp/t	emot/l supp/t	emot/l supp/t
thumb/dummy sucking, toy, blanket, body part cuddle	self-comf/t	self-com/t	self-comf/t	self-comf/t	self-comf/t	self-comf/t	self-comf/t	self-comf/t
explores toy or moves hands/arms enjoying it	play	play	play	play	play	play	play	play
complies or assists during examination	cooperat ive	cooperat ive	cooperat ive	cooperat ive	cooperat ive	cooperat ive	cooperat ive	cooperati ve
PARENT	**TIME 1**	**TIME 2**	**TIME 3**	**TIME 4**	**TIME 5**	**TIME 6**	**TIME 7**	**TIME 8**
mentions to child that all is fine, no worries	reassure	reassure	reassure	reassure	reassure	reassure	reassure	reassure
says what is happening or will happen in exam/n	explain	explain	explain	explain	explain	explain	explain	explain
holds child's hand or says is doing well	comf/t praise	com/t praise	com/t praise	com/t praise	com/t praise	com/t praise	com/t praise	com/t praise
shows or points to toys, pictures in the room	distract	distract	distract	distract	distract	distract	distract	distract
does not interact with child, talking with other adults or reading, etc	non interact	non interact	non interact	non interact	non interact	non interact	non interact	non interact

ADDITIONAL OBSERVATIONS:

PERIOD 1 - EXAMINER ENTERS ROOM/PERIOD 4 - EXAMINATION FINISHED

Child:____________________ F( ) ¦ M( ) Birth: ____________
Observation started at ________ **and finished at** ________
Examiner: ________________ **Observer** ________________

BEHAVIOURS' DEFINITION	**TIME 1**	**TIME 2**	**TIME 3**	**TIME 4**
has to be **carried** into the room or to table	carry	carry	carry	carry
physically holds **(clings)** on to parent or staff	cling	cling	cling	cling
moves grossly **(flails)** and randomly arms, legs	flail	flail	flail	flail
does not comply or assist with position **(refuse)**	refuse pos/n	refuse pos/n	refuse pos/n	refuse pos/n
has to be held down owing lack of co-operation	restrain	restrain	restrain	restrain
tears in eyes/low pitch non-word sounds	cry/ moan	cry/ moan	cry/ moan	cry/ moan
loud non-word sounds, shrill vocal expression	scream	scream	scream	scream
pleasant spontaneous face due tickles or talking	smile	smile	smile	smile
says ' Mum help me' or 'Mum hold me'**(emotional)**	emot/l supp/t	emot/l supp/t	emot/l supp/t	emot/l supp/t
thumb/dummy sucking, toy, blanket, body part cuddle	self-comf/t	self-com/t	self-comf/t	self-comf/t
explores toy or moves hands/arms enjoying it	play	play	play	play
complies or assists during examination	cooperat ive	cooperat ive	cooperat ive	cooperati ve
PARENT	**TIME 1**	**TIME 2**	**TIME 3**	**TIME 5**
mentions to child that all is fine, no worries	reassure	reassure	reassure	reassure
says what is happening or will happen in exam/n	explain	explain	explain	explain
holds child's hand or says is doing well	comf/t praise	com/t praise	com/t praise	com/t praise
shows or points to toys, pictures in the room	distract	distract	distract	distract
does not interact with child, looks screen or talks w/staff	non interact	non interact	non-interact	non interact
STAFF	**TIME 1**	**TIME 2**	**TIME 3**	**TIME 5**
mentions to child that all is fine, no worries	reassure	reassure	reassure	reassure
says what is happening or will happen in exam/n	explain	explain	explain	explain
mentions child's good attitude during procedure	praise	praise	praise	praise
shows toy or points pictures in the wall	distract	distract	distract	distract
carries out examination, no attention to child	non interact	non interact	non interact	non interact

PERIOD 2 - SUPINE POSITION/PERIOD 3 - PRONE POSITION

Child:____ **F( ) ¦ M( ) Birth:** ______________________
Arrival examination room at __________ **Observation started at** __________ **and finished at** __________
Examiner: ____________________________________ **Observer** ____________________________________

BEHAVIOURS' DEFINITION	**TIME 1**	**TIME 2**	**TIME 3**	**TIME 4**	**TIME 5**	**TIME 6**	**TIME 7**	**TIME 8**
has to be **carried** into the room or to table	carry	carry	carry	carry	carry	carry	carry	carry
physically holds **(clings)** on to parent or staff	cling	cling	cling	cling	cling	cling	cling	cling
moves grossly **(flails)** and randomly arms, legs	flail	flail	flail	flail	flail	flail	flail	flail
does not comply or assist with position **(refuse)**	refuse pos/n	refuse pos/n	refuse pos/n	refuse pos/n	refuse pos/n	refuse pos/n	refuse pos/n	refuse pos/n
has to be held down owing lack of co-operation	restrain	restrain	restrain	restrain	restrain	restrain	restrain	restra in
tears in eyes/low pitch non-word sounds	cry/ moan	cry/ moan	cry/ moan	cry/ moan	cry/ moan	cry/ moan	cry/ moan	cry/ moan
loud non-word sounds, shrill vocal expression	scream	scream	scream	scream	scream	scream	scream	scream
pleasant spontaneous face due tickles or talking	smile	smile	smile	smile	smile	smile	smile	smile
says ' Mum help me' or 'Mum hold me'**(emotional)**	emot/l supp/t	emot/l supp/t	emot/l supp/t	emot/l supp/t	emot/l supp/t	emot/l supp/t	emot/l supp/t	emot/l supp/t
thumb/dummy sucking, toy, blanket, body part cuddle	self- comf/t	self- com/t	self- comf/t	self- comf/t	self- comf/t	self- comf/t	self- comf/t	self- comf/t
explores toy or moves hands/arms enjoying it	play	play	play	play	play	play	play	play
complies or assists during examination	cooperat ive	cooperat ive	cooperat ive	cooperat ive	cooperat ive	cooperat ive	cooperat ive	cooperati ve
PARENT	**TIME 1**	**TIME 2**	**TIME 3**	**TIME 4**	**TIME 5**	**TIME 6**	**TIME 7**	**TIME 8**
mentions to child that all is fine, no worries	reassure	reassure	reassure	reassure	reassure	reassure	reassure	reassure
says what is happening or will happen in exam/n	explain	explain	explain	explain	explain	explain	explain	explain
holds child's hand or says is doing well	comf/t praise	com/t praise	com/t praise	com/t praise	com/t praise	com/t praise	com/t praise	com/t praise
shows or points to toys, pictures in the room	distract	distract	distract	distract	distract	distract	distract	distract
seems ignore child, looks screen or talks w/staff	non interact	non interact	non interact	non interact	non interact	non interact	non interact	non interact
STAFF	**TIME 1**	**TIME 2**	**TIME 3**	**TIME 4**	**TIME 5**	**TIME 6**	**TIME 7**	**TIME 8**
mentions to child that all is fine, no worries	reassure	reassure	reassure	reassure	reassure	reassure	reassure	reassure
says what is happening or will happen in exam/n	explain	explain	explain	explain	explain	explain	explain	explain
mentions child's good attitude during procedure	praise	praise	praise	praise	praise	praise	praise	praise
shows toy or points pictures in the wall	distract	distract	distract	distract	distract	distract	distract	distract
carries out examination, no attention to child	non interact	non interact	non interact	non interact	non interact	non interact	non interact	non interact

APPENDIX V

INFORMATION LETTER FOR PARENTS

Young Children and Radiological Examinations
An invitation to participate in some research

Dear Parent/Guardian of ________________________________

I am writing in connection with your child's forthcoming visit for an examination at this Department. I am carrying out some research into children's feelings during their visits and I hope that you and your child will be willing to take part.

Hospitals can be daunting places, even for adults. For young children, the combination of an unfamiliar place, new people and strange equipment can be quite alarming. Generally children cope well with their visits - maybe even better than adults! But with young children it is difficult to know what they are thinking or feeling.

The long term aim of this research is to make the examinations and care as friendly as possible for young children. As a first step, I want to learn more about the types of things which concern or bother them.

If you agree to take part, you will be asked to do 3 things:

1. To fill in the consent form and the short temperament scale (enclosed). This scale will tell us whether individual differences in children's temperament affect their responses to hospital examinations at all.

2. I will meet you and observe your child's expressions and behaviour before and during his/her examination. I will be observing lots of children and examinations. This will enable me to compare between the different examinations which take place in the Department.

3. I will contact you a week after your child's examination, to ask about your impressions. Usually this will involve a telephone call lasting 10 minutes.

I hope that you will be able to help me with this research. All the families who take part will be sent a copy of the study's findings.

If you decide not to take part, it will not affect your child's treatment in any way. If you do take part, it will not increase the time you will have to spend at the Department and you can, of course, withdraw at any time.

If you need more information or have any queries related to this study, please do contact me at the Department of Paediatric Radiology (071)829-8615 or during the evenings at (071) 833-0644.

If you want to take part, please fill in the attached consent form and the short temperament scale, returning them to me in the stamped addressed envelope enclosed as soon as possible.

Yours sincerely,

Eneida Simoes da Fonseca
X-Ray Researcher
Department of Paediatric Radiology

APPENDIX VI

CONSENT FORM

Young Children and Radiological Examinations

Consent of Parent/Guardian to take part

This research project has been described to me and I understand what is involved. I have been told that the research is not part of my child's treatment and that the treatment will not be affected if I decide not to take part.

Child's name: ______________________________

Parent/Guardian name: ______________________________

Parent/Guardian signature: ______________________________

Address: ______________________________

____

____

Telephone number: ______________________________

Today's date: ______________________________

APPENDIX VII

SHORT TEMPERAMENT SCALE

(Prior *et al.*, 1989)

ID: ________

SHORT TEMPERAMENT SCALE FOR TODDLERS*

FOR EACH QUESTION, PLEASE CIRCLE THE NUMBER WHICH BEST DESCRIBES YOUR CHILD'S RECENT AND CURRENT BEHAVIOUR.

IF ANY QUESTION DOES NOT APPLY TO YOUR CHILD OR CANNOT BE ANSWERED, JUST DRAW A LINE THROUGH IT.

WHAT IS YOUR CHILD'S NAME ? ______________________________

WHAT IS TODAY'S DATE ? ______________________________

* The STST is an uncopyrighted abbreviation of the Toddler Temperament Scale (Fullard, McDevitt and Carey, 1978). The original TTS is copyrighted in the USA.

	Almost never	Not often	Variable, usually does not	Variable, usually does	Frequently	Almost always
1. The child gets sleepy at about the same time each evening (within 1/2 hour).	1	2	3	4	5	6
2. The child is pleasant (smiles, laughs), when first arriving in unfamiliar places.	1	2	3	4	5	6
3. The child plays continuously for more than 10 minutes at a time with a favourite toy.	1	2	3	4	5	6
4. The child sits still while waiting for food.	1	2	3	4	5	6
5. The child cries after a fall or bump.	1	2	3	4	5	6
6. The child fusses or whines when bottom is cleaned after bowel movements.	1	2	3	4	5	6
7. The child smiles when unfamiliar adults play with him/her.	1	2	3	4	5	6
8. The child responds to frustration intensely (screams, yells).	1	2	3	4	5	6
9. The child eats about the same amount of solid food at meals from day to day.	1	2	3	4	5	6
10. The child remains pleasant when hungry and waiting for food to be prepared.	1	2	3	4	5	6
11. The child allows face washing without protest (squirming, turning away).	1	2	3	4	5	6
12. The child plays actively (bangs, throws, runs) with toys indoors.	1	2	3	4	5	6
13. The child ignores voices when playing with a favourite toy.	1	2	3	4	5	6
14. The child wants a snack at a different time each day (over one hour difference).	1	2	3	4	5	6
15. The child runs to get where he/she wants to go.	1	2	3	4	5	6
16. The child takes daytime naps at differing times (over 1/2 hour difference) from day to day.	1	2	3	4	5	6
17. The child is outgoing with adult strangers outside the home.	1	2	3	4	5	6
18. The child stops play and watches when someone walks by.	1	2	3	4	5	6
19. The child goes back to the same activity after brief interruption (snack, trip to toilet).	1	2	3	4	5	6

	Almost never	Not often	Variable, usually does not	Variable, usually does	Frequently	Almost always
20. The child continues to play with a toy in spite of sudden noises from outdoors (car horn, siren, etc).	1	2	3	4	5	6
21. The child has moody 'off' days when he/she is irritable all day.	1	2	3	4	5	6
22. The child stays with a routine task (dressing, picking up toys) for 5 minutes or more.	1	2	3	4	5	6
23. The child stops eating and looks when he/she hears a sudden noise (telephone, doorbell).	1	2	3	4	5	6
24. The child sits still (moves little) during procedures like hair brushing or nail cutting.	1	2	3	4	5	6
25. The child shows much bodily movement (stomps, writhes, swings arms) when upset or crying.	1	2	3	4	5	6
26. The child's initial reaction at home to approach by strangers is acceptance (looks at, reaches out).	1	2	3	4	5	6
27. The child stops to examine new objects thoroughly (5 minutes or more).	1	2	3	4	5	6
27. The child is moody for more than a few minutes when corrected or disciplined.	1	2	3	4	5	6
29. The child is still shy of strangers after 15 minutes.	1	2	3	4	5	6
30. The child frowns or complains when left to play by self.	1	2	3	4	5	6

Thanks for filling in this short temperament scale.
Please, return it (and the signed consent form) to me in the stamped addressed envelope enclosed as soon as possible.
Thanks for your valuable co-operation!

APPENDIX VIII

SHORT TEMPERAMENT SCALE INSTRUCTIONS FOR SCORING AND CALCULATIONS

(Prior *et al.*, 1989)

PROFILE SHEET - SHORT TEMPERAMENT SCALE FOR TODDLERS

AGE: 1-2 YEARS

Name of child: ______________________________ Date: ___________

Age at rating: ______________________________ Sex: ___________

NORMATIVE FACTOR SCORES (N=1280)

Factor	Approach	Cooperation-Manageability	Persistence	Rhythmicity	Distractibility	Reactivity
High score indicates	Withdrawing	Uncooperative, unmanageable	Not persistent	Arrhythmic	Non-distractible non-soothable	Highly Reactive and irritable
1 SD above mean	4.19	4.66	4.27	3.76	4.91	4.29
Mean	3.07	3.64	3.35	2.82	4.13	3.58
1 SD below mean	1.95	2.62	2.43	1.88	3.35	2.87
Low score indicates	Approaching	Cooperative, manageable	Persistent	Rhythmic	Distractible, soothable	Not reactive or irritable
This child's score						

EASY/DIFFICULT SCALE: Mean of Approach, Cooperation-Manageability and Reactivity items.

Normative data:

Mean (average) = 3.46
1 SD above mean (difficult) = 4.08
1 SD below mean (easy) = 2.84

This child's score:

______ Approach score

\+ ______ Cooperation-Manageability score

\+ ______ Irritability score

= ______ Total

Total/3 = ______ Easy/Difficult Score

PROFILE SHEET - SHORT TEMPERAMENT SCALE FOR TODDLERS

AGE: 2-3.5 YEARS

Name of child: ______________________ Date: __________

Age at rating: ______________________ Sex: __________

NORMATIVE FACTOR SCORES (N=1357)

Factor	Approach	Cooperation-Manageability	Persistence	Rhythmicity	Distractibility	Reactivity
High score indicates	Withdrawing	Uncooperative, unmanageable	Not persistent	Arrhythmic	Non-distractible non-soothable	Highly reactive and irritable
1 SD above mean	4.35	4.01	3.70	3.86	4.76	4.20
Mean	3.17	3.09	2.90	2.92	4.01	3.50
1 SD below mean	1.99	2.17	2.10	1.98	3.26	2.80
Low score indicates	Approaching	Cooperative, manageable	Persistent	Rhythmic	Distractible, soothable	Not reactive or irritable
This child's score						

EASY/DIFFICULT SCALE: Mean of Approach, Cooperation-Manageability and Reactivity items.

Normative data:

Mean (average) = 3.32
1 SD above mean (difficult) = 3.94
1 SD below mean (easy) = 2.70

This child's score:

______ Approach score

\+ ______ Cooperation-Manageability

\+ ______ Irritability score

= ______ Total

Total/3 = ______ Easy/Difficult Score

SHORT TEMPERAMENT SCALE FOR TODDLERS - SCORING SHEET

Name of Child ________________ Date of Rating ________________ Age at Rating ________________

Approach/ Adaptability

	Q	Rating					
	2	6	5	4	3	2	1
	7	6	5	4	3	2	1
A	17	6	5	4	3	2	1
	26	6	5	4	3	2	1
	29	1	2	3	4	5	6
B Column sums							
Multiply by		1	2	3	4	5	6
C Column products							
D Sum of products							
E No. of items rated							
F Factor score							

Reactivity

	Q	Rating					
	5	1	2	3	4	5	6
	8	1	2	3	4	5	6
A	12	1	2	3	4	5	6
	15	1	2	3	4	5	6
	21	1	2	3	4	5	6
	25	1	2	3	4	5	6
	28	1	2	3	4	5	6
	30	1	2	3	4	5	6
B Column sums							
Multiply by		1	2	3	4	5	6
C Column products							
D Sum of products							
E No. of items rated							
F Factor score							

Persistence

	Q	Rating					
	3	6	5	4	3	2	1
	19	6	5	4	3	2	1
A	22	6	5	4	3	2	1
	27	6	5	4	3	2	1
B Column sums							
Multiply by		1	2	3	4	5	6
C Column products							
D Sum of products							
E No. of items rated							
F Factor score							

Cooperation/ Manageability

	Q	Rating					
	4	6	5	4	3	2	1
	6	1	2	3	4	5	6
A	10	6	5	4	3	2	1
	11	6	5	4	3	2	1
	24	6	5	4	3	2	1
B Column sums							
Multiply by		1	2	3	4	5	6
C Column products							
D Sum of products							
E No. of items rated							
F Factor score							

Distractibility

	Q	Rating					
	13	6	5	4	3	2	1
	18	1	2	3	4	5	6
A	20	6	5	4	3	2	1
	23	1	2	3	4	5	6
B Column sums							
Multiply by		1	2	3	4	5	6
C Column products							
D Sum of products							
E No. of items rated							
F Factor score							

Rhythmicity

	Q	Rating					
	1	6	5	4	3	2	1
	9	6	5	4	3	2	1
A	14	1	2	3	4	5	6
	16	1	2	3	4	5	6
B Column sums							
Multiply by		1	2	3	4	5	6
C Column products							
D Sum of products							
E No. of items rated							
F Factor score							

ıstructions to scorer:

1. Circle child's rating on each question (A)
2. For each column, sum the number of ratings (B) (i.e. how many items were checked)
3. Multiply each sum by the number indicated (C)
4. For each factor, add resulting products (D) and divide by the number of items rated (E), producing that factor score (F)
5. Transfer the six factor scores to the Profile Sheet.

APPENDIX IX

PROTOCOL INTERVIEW FOR PARENT PRIOR TO EXAMINATION

At the third day before the appointment at the DPR, the researcher will phone the parent for a short interview.

Name of the child: ______________________________ Birth: ___/___/____
Examination to undergo: _________________________ Date: ____________
Date to be phoned: ______________________________ Time: ____________

1. INTRODUCTION

Hello! Is it the parent/guardian of ...?
I am Eneida, the researcher from GOSH/London who posted you some material related to the study I am carrying out.
Is it possible for you to talk with me now? It will last just 5 minutes. (If it is an inconvenient time for Mr/Mrs/Ms ..., an appointment will be agreed for a later call; a record will be kept of the parent's agreement/availability in answering or not the call and the reasons, if explicit, for not answering).

Yes (   )(1) Reason for why not: ________________________________
No (   )(2) New appointment date and time: ______________________

2. REASON FOR CALLING

The aim of this call is to get some understanding of the parent's impressions of the child's behaviour related to the coming examination.

If the parent has sent back the short temperament scale and the consent form both filled in, the researcher will thanks the parent for agreeing to take part in the research.

If the parent has not returned the material, the research will ask:

2.1. Are not you interested in taking part in the study?
Yes (   ) (1) the material may be in the post
(2) I will mail it immediately
(3) I didn't fill the forms but will do and mail
(4) I did not fill the forms but will do and take them to the hospital
(5) others, ______________________________

No (   ) (6) I received no material
(7) I am not interested
(8) I got no time

(9) others, ______________________

The researcher will register the answer and reason given by the parent. If the answer is 'no' the researcher will thanks the parent and say good bye reassuring the parent that the decision does not interfere in the treatment of the child.

If the answer is 'yes' (or if the parent returned the material as requested) the researcher will ask the following questions:

3. INTERVIEW

3.1. Has your child undertaken this examination before? Yes (1)
No (2)

3.2. If 'yes' to 3.1, When was the last time s/he had the examination?
____

3.3. If 'yes' to 3.1, can you tell me how many times in the total?
____

4. LEAFLET GROUP <u>ONLY</u>

The following questions are just for the parents to whom a leaflet was sent.

4.1. Have you prepared your child for the examination? If 'yes' how? If 'no' why not?
(1) Yes, I used the leaflet.
(2) Yes, I showed her/him a book with pictures of hospital and I told a story of her/his own examination.
(3) Yes, we played hospital with toys, etc.

(4) No, s/he would not understand.
(5) No, s/he could become more upset.
(6) No, I did not feel confident in talking about it.
(7) Others, ______________________________

If the parent to whom a leaflet was sent mentions it as an answer to 4.1, the researcher will ask:

4.2. What did you think about the leaflet? *
(1) no difference from other similar material I have seen
(2) I know the examination but the game is good for preparing my child
(3) useful to know better the examination and how to prepare my child
(4) more worried knowing more about the examination but the game seems to be helpful to my child
(5) more worried knowing more about the examination and the game did not help much my child
(6) others, ______________________________

If the parent to whom a leaflet was sent does not mention the leaflet as an answer to 4.1, the researcher will ask:

4.3. Did not you use the leaflet?
(1) No, I did not have time to read it
(2) No, I did not have time to use it
(3) No, I do not think it can be helpful
(4) Others, ____

If the parent answers 'no time' to 4.1, the researcher will say: Do you think it would be possible to try out with the leaflet and prepare your child for the examination - we think it will help to make this easier for ... (child's name)'s? I will phone you shortly before the examination, so then you will have time to try the leaflet. If the parent says it is alright, the researcher will phone latter to get the parent's impressions. If the answer is 'no' (related to 'not think it is useful') the researcher will thanks the parent and say good bye reassuring the parent that the decision does not interfere in the treatment of the child.

A record will be kept of the different situations that can occur at this final point.

Ok. parent/guardian of ... . That was my last question. Thanks a lot for your attention and time in answering my call.

I am looking forward to seeing you at the DPR.

See you then. Good bye! Interview finished at ________

* *ask again in a second call*

Additional information:

APPENDIX X

CONSENT FORM FOR VIDEO

Young Children and Radiological Examinations

Parent/Guardian video recording consent

I understand that:

1. The purpose for recording my child ultrasound scan examination is for the sole checking of reliability of the observations of the researcher present during the examination.

2. All recorded video tapes will be stored in a secure manner with access to them limited to the research personnel.

3. The videos will be erased at the end of the research project and will not be used for lectures, demonstrations or public presentation of any sort.

4. I may withdraw this written consent at any time during the recording.

The purpose of the video recording of my child's scan has been described to me and I understand what is involved.

Parent/Guardian Signature: ______________________________

Child'sname: ______________________________

Today'sdate: ______________________________

APPENDIX XI

AMENDED OSBD APPLIED TO RADIOLOGICAL EXAMINATIONS

(Jay *et al.*, 1986; Katz *et al.*, 1980)

OSBD APPLIED TO RADIOLOGICAL EXAMINATIONS
CODE SHEET FOR BASELINE BEHAVIOURS

Child: ____________________ Birth: __/__/__ ( )F ( )M Group: ( )NB ( )B ( )I CODE NUMBER: ______
Examination: ( )MCU ( )USS Date examination: __/__/__ Examiner: ________________ ( )RR ( )RT
Child followed by: ( )Mother ( )Father ( ) Grandparent ( )Sibling ( )W. Nurse ( )W. Staff ( ) Others
Observer: ______________________ Observation started at ________ and finished at ________

CHILD	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18
CArry	01 CA	02 CA	03 CA	04 CA	05 CA	06 CA	07 CA	08 CA	09 CA	10 CA	11 CA	12 CA	13 CA	14 CA	15 CA	16 CA	17 CA	18 CA
CLing	01 CL	02 CL	03 CL	04 CL	05 CL	06 CL	07 CL	08 CL	09 CL	10 CL	11 CL	12 CL	13 CL	14 CL	15 CL	16 CL	17 CL	18 CL
FLail	01 FL	02 FL	03 FL	04 FL	05 FL	06 FL	07 FL	08 FL	09 FL	10 FL	11 FL	12 FL	13 FL	14 FL	15 FL	16 FL	17 FL	18 FL
REfusal	01 RE	02 RE	03 RE	04 RE	05 RE	06 RE	07 RE	08 RE	09 RE	10 RE	11 RE	12 RE	13 RE	14 RE	15 RE	16 RE	17 RE	18 RE
ReStraint	01 RS	02 RS	03 RS	04 RS	05 RS	06 RS	07 RS	08 RS	09 RS	10 RS	11 RS	12 RS	13 RS	14 RS	15 RS	16 RS	17 RS	18 RS
CRy/moan	01 CR	02 CR	03 CR	04 CR	05 CR	06 CR	07 CR	08 CR	09 CR	10 CR	11 CR	12 CR	13 CR	14 CR	15 CR	16 CR	17 CR	18 CR
SCream	01 SC	02 SC	03 SC	04 SC	05 SC	06 SC	07 SC	08 SC	09 SC	10 SC	11 SC	12 SC	13 SC	14 SC	15 SC	16 SC	17 SC	18 SC
FEar (verbal)	01 FE	02 FE	03 FE	04 FE	05 FE	06 FE	07 FE	08 FE	09 FE	10 FE	11 FE	12 FE	13 FE	14 FE	15 FE	16 FE	17 FE	18 FE
PAin (verbal)	01 PA	02 PA	03 PA	04 PA	05 PA	06 PA	07 PA	08 PA	09 PA	10 PA	11 PA	12 PA	13 PA	14 PA	15 PA	16 PA	17 PA	18 PA
Emotional Support	01 ES	02 ES	03 ES	04 ES	05 ES	06 ES	07 ES	08 ES	09 ES	10 ES	11 ES	12 ES	13 ES	14 ES	15 ES	16 ES	17 ES	18 ES
SElf Comfort	01 SE	02 SE	03 SE	04 SE	05 SE	06 SE	07 SE	08 SE	09 SE	10 SE	11 SE	12 SE	13 SE	14 SE	15 SE	16 SE	17 SE	18 SE
SMile	01 SM	02 SM	03 SM	04 SM	05 SM	06 SM	07 SM	08 SM	09 SM	10 SM	11 SM	12 SM	13 SM	14 SM	15 SM	16 SM	17 SM	18 SM
PLay	01 PL	02 PL	03 PL	04 PL	05 PL	06 PL	07 PL	08 PL	09 PL	10 PL	11 PL	12 PL	13 PL	14 PL	15 PL	16 PL	17 PL	18 PL
CO-operative	01 CD	02 CO	03 CO	04 CO	05 CO	06 CO	07 CO	08 CO	09 CO	10 CO	11 CO	12 CO	13 CO	14 CO	15 CO	16 CO	17 CO	18 CO

PARENT	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18
REassure	01 RE	02 RE	03 RE	04 RE	05 RE	06 RE	07 RE	08 RE	09 RE	10 RE	11 RE	12 RE	13 RE	14 RE	15 RE	16 RE	17 RE	18 RE
EXplain	01 EX	02 EX	03 EX	04 EX	05 EX	06 EX	07 EX	08 EX	09 EX	10 EX	11 EX	12 EX	13 EX	14 EX	15 EX	16 EX	17 EX	18 EX
Comfort/Praise	01 CP	02 CP	03 CP	04 CP	05 CP	06 CP	07 CP	08 CP	09 CP	10 CP	11 CP	12 CP	13 CP	14 CP	15 CP	16 CP	17 CP	18 CP
DIstract	01 01	03 DI	04 DI	05 DI	05 DI	06 DI	07 DI	08 DI	09 01	10 DI	11 DI	12 DI	13 DI	14 DI	15 DI	16 DI	17 01	18 01
Non-Interact	01 NI	02 NI	03 NI	04 NI	05 NI	06 NI	07 NI	08 NI	09 NI	10 NI	11 NI	12 NI	13 NI	14 NI	15 NI	16 NI	17 NI	18 NI

* Emla before observation? ( ) YES ( )NO

* Number of siblings with the observed child: ________ * Age of boys: ______________________
* Age of girls: ______________________

* Number of relatives with the child: ________

* Other comments or observations:

OSBD APPLIED TO RADIOLOGICAL EXAMINATIONS
CODE SHEET FOR EXAMINATION

Child: ____________________ Birth: __/__/__ ( )F ( )M Group: ( )NB ( )B ( )I CODE NUMBER: ______
Examination: ( )MCU ( )USS Date examination: __/__/__ Examiner: ________________ ( )RR ( )RT
Child followed by: ( )Mother ( )Father ( ) Grandparent ( )Sibling ( )W. Nurse ( )W. Staff ( ) Others
Observer: ____________________ Child enters room at ______ Examination starts at _______ and finishes at _____

CHILD	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18
CArry	01 CA	02 CA	03 CA	04 CA	05 CA	06 CA	07 CA	08 CA	09 CA	10 CA	11 CA	12 CA	13 CA	14 CA	15 CA	16 CA	17 CA	18 CA
CLing	01 CL	02 CL	03 CL	04 CL	05 CL	06 CL	07 CL	08 CL	09 CL	10 CL	11 CL	12 CL	13 CL	14 CL	15 CL	16 CL	17 CL	18 CL
FLail	01 FL	02 FL	03 FL	04 FL	05 FL	06 FL	07 FL	08 FL	09 FL	10 FL	11 FL	12 FL	13 FL	14 FL	15 FL	16 FL	17 FL	18 FL
REfusal	01 RE	02 RE	03 RE	04 RE	05 RE	06 RE	07 RE	08 RE	09 RE	10 RE	11 RE	12 RE	13 RE	14 RE	15 RE	16 RE	17 RE	18 RE
ReStraint	01 RS	02 RS	03 RS	04 RS	05 RS	06 RS	07 RS	08 RS	09 RS	10 RS	11 RS	12 RS	13 RS	14 RS	15 RS	16 RS	17 RS	18 RS
CRy/moan	01 CR	02 CR	03 CR	04 CR	05 CR	06 CR	07 CR	08 CR	09 CR	10 CR	11 CR	12 CR	13 CR	14 CR	15 CR	16 CR	17 CR	18 CR
SCream	01 SC	02 SC	03 SC	04 SC	05 SC	06 SC	07 SC	08 SC	09 SC	10 SC	11 SC	12 SC	13 SC	14 SC	15 SC	16 SC	17 SC	18 SC
FEar (verbal)	01 FE	02 FE	03 FE	04 FE	05 FE	06 FE	07 FE	08 FE	09 FE	10 FE	11 FE	12 FE	13 FE	14 FE	15 FE	16 FE	17 FE	18 FE
PAin (verbal)	01 PA	02 PA	03 PA	04 PA	05 PA	06 PA	07 PA	08 PA	09 PA	10 PA	11 PA	12 PA	13 PA	14 PA	15 PA	16 PA	17 PA	18 PA
Emotional Support	01 ES	02 ES	03 ES	04 ES	05 ES	06 ES	07 ES	08 ES	09 ES	10 ES	11 ES	12 ES	13 ES	14 ES	15 ES	16 ES	17 ES	18 ES
SElf comfort	01 SE	02 SE	03 SE	04 SE	05 SE	06 SE	07 SE	08 SE	09 SE	10 SE	11 SE	12 SE	13 SE	14 SE	15 SE	16 SE	17 SE	18 SE
SMile	01 SM	02 SM	03 SM	04 SM	05 SM	06 SM	07 SM	08 SM	09 SM	10 SM	11 SM	12 SM	13 SM	14 SM	15 SM	16 SM	17 SM	18 SM
PLay	01 PL	02 PL	03 PL	04 PL	05 PL	06 PL	07 PL	08 PL	09 PL	10 PL	11 PL	12 PL	13 PL	14 PL	15 PL	16 PL	17 PL	18 PL
CO-operative	01 CO	02 CO	03 CO	04 CO	05 CO	06 CO	07 CO	08 CO	09 CO	10 CO	11 CO	12 CO	13 CO	14 CO	15 CO	16 CO	17 CO	18 CO

PARENT	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18
REassure	01 RE	02 RE	03 RE	04 RE	05 RE	06 RE	07 RE	08 RE	09 RE	10 RE	11 RE	12 RE	13 RE	14 RE	15 RE	16 RE	17 RE	18 RE
EXplain	01 EX	02 EX	03 EX	04 EX	05 EX	06 EX	07 EX	08 EX	09 EX	10 EX	11 EX	12 EX	13 EX	14 EX	15 EX	16 EX	17 EX	18 EX
Comfort/Praise	01 CP	02 CP	03 CP	04 CP	05 CP	06 CP	07 CP	08 CP	09 CP	10 CP	11 CP	12 CP	13 CP	14 CP	15 CP	16 CP	17 CP	18 CP
DIstract	01 DI	02 DI	03 DI	04 DI	05 DI	06 DI	07 DI	08 DI	09 DI	10 DI	11 OI	12 OI	13 DI	14 DI	15 DI	16 DI	17 DI	18 DI
Non-Interact	01 NI	02 NI	03 NI	04 NI	05 NI	06 NI	07 NI	08 NI	09 NI	10 NI	11 NI	12 NI	13 NI	14 NI	15 NI	16 NI	17 NI	18 NI

STAFF	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18
REassure	01 RE	02 RE	03 RE	04 RE	05 RE	06 RE	D7 RE	08 RE	09 RE	10 RE	11 RE	12 RE	13 RE	14 RE	15 RE	16 RE	17 RE	18 RE
EXplain	01 EX	02 EX	03 EX	D4 EX	05 EX	06 EX	07 EX	08 EX	09 EX	10 EX	11 EX	12 EX	13 EX	14 EX	15 EX	16 EX	17 EX	18 EX
PRaise	01 PR	02 PR	03 PR	04 PR	05 PR	06 PR	07 PR	08 PR	09 PR	10 PR	11 PR	12 PR	13 PR	14 PR	15 PR	16 PR	17 PR	18 PR
DIstract	01 DI	02 DI	03 DI	D4 DI	05 DI	06 DI	07 DI	08 DI	D9 DI	10 DI	11 DI	12 DI	13 DI	14 DI	15 DI	16 DI	17 DI	18 OI
IGnore	01 IG	02 IG	D3 IG	04 IG	05 IG	D6 IG	07 IG	08 IG	09 IG	10 IG	11 IG	12 IG	13 IG	14 IG	15 IG	16 IG	17 IG	18 IG

APPENDIX XII

PROTOCOL INTERVIEW FOR PARENT AFTER EXAMINATION

(amended Behaviour Screening Questionnaire, Richman & Graham, 1971)

The parent will be asked previously (during the visit to the hospital) what could be the best time for her/him to answer the researcher's phone call.

The parent will be phoned one week after the examination takes place.

***

Child's name: ______________________________ Birth: ___/___/___

Examination undergone: ______________________ Date: __________

Date of interview: ______________ Time interview started: __________

***

1. INTRODUCTION:

Hello! Is it the parent/guardian of ... ?
I am Eneida, the researcher from GOSH/London. How are you?

Is it possible for you to talk with me now? It will last just 10 minutes. (If it is an inconvenient time for Mr/Mrs/Ms ..., an appointment will be agreed for a later call; a record will be kept of the parent's agreement/availability in answering or not the call and their reasons, if explicit, for not answering).

(1) Yes　　Reason for why not: ____________________
(2) No　　New appointment date and time: ___________

2. RECALL:

When we met at GOSH last week, we agreed that I was going to phone you today for asking some questions about your child's visit to the hospital.

The reason for this call is to get some information about any changes you have observed in your child's behaviour during the past week since her/his visit to the DPR. What I am interested in is whether you feel that the visit to the GOSH and the examination has affected ... (child's name), so that s/he has been behaving differently from usual in the last week - compared to one week or two before going to the GOSH.

3. COMPARING THE CHILD'S BEHAVIOUR BEFORE AND AFTER EXAMINATION:

3.1. Did you notice any change in ... (child's name)'s behaviour during the last week comparing it with the way s/he is in general?

(1) yes, s/he was behaving better than before the examination.
(2) no, no change at all; s/he was behaving as usual.
(3) yes, a bit of change; s/he was slightly different but just until the 2nd/3rd day after the examination behaving as usual afterwards.
(4) yes, a bit of change; s/he is still presenting such behaviours.
(5) yes, very much of change; s/he was completely different but just until the 2nd/3rd day after the examination behaving as usual afterwards.
(6) yes, very much of change; s/he is still presenting such behaviours.

***

If the parent answers 'no change at all' to question 3.1, the interviewer may probe: Ok, thanks! You did not notice any general change in your child's behaviour. Can we now just check quickly through a number of areas of behaviours which sometimes change if children are upset? Firstly, have you observed any change in, e.g., eating habits like refusal to eat, fadiness or loss of appetite (then, introduce the other areas of the item 3.2)?

3.2. Areas of change

(1) in eating habits (like refusal to eat, fadiness or loss of appetite)
(2) in toileting (for instance, soiling clothes during day, wetting bed at night)
(3) in sleeping patterns (e.g. waking during night, going to parent's bed)
(4) in mood (like fearful, clinging, crying or tantrums)
(5) in her/his reaction to a strange person/environment/setting (for instance, crying when approached by strange, clinging when in a strange environment)
(6) in her/his reaction to the parent (e.g. more disobedient to the parent)
(7) in playing with siblings or other children (like conflict/rivalry with others or playing alone)
(8) in autonomy/level of independency (e.g. dependent, waiting people to do things for him/her)
(9) others ____

***

According to the answer to 3.2 the interviewer moves to the question related to the comment done by the parent (e.g. 3.2.1 eating habits). Otherwise the researcher moves to item 4. (other comments) before resuming the interview.

3.2.1. CHANGES IN EATING HABITS:

A. Have there been any changes in your child's eating habits (e.g., refusal to eat, fadiness, loss of appetite)?

(1) s/he was eating better than before the examination.
(2) no change at all; s/he was eating as usual (good/poor appetite).
(3) s/he presented a bit of a problem (e.g. food fad in some meals) until 2nd/3rd day after examination but returning to her/his usual pattern since then.
(4) s/he presented a bit of a problem (e.g. food fad in some meals) what is lasting until now.
(5) s/he presented a lot of problems (e.g. food fad) until 2nd/3rd day after examination but returning to her/his usual pattern since then.
(6) s/he presented a lot of problems (e.g. food fad in all meals) what is lasting until now.

B. What exactly was your child's main change in eating habits?

(1) s/he was fussing about eating ordinary food
(2) s/he was fussing about eating a new type of food
(3) spitting food s/he was used to eat
(4) spitting food is new to her/him
(5) chewing food s/he was used to eat and throwing it away
(6) chewing food s/he was not used to eat and throwing it away
(7) food fad in relation to things that s/he likes eating
(8) food fad in relation to new food introduced
(9) refusal to eat a specific thing in a meal
(10) deliberated refusal to eat the meal
(11) others ______________________________

3.2.2. CHANGES IN TOILETING:

A. What about any changes in ... (child's name)'s toileting behaviours in the last week (e.g. wet or soil clothes during day or at night)?

(1) s/he seemed better in the toileting behaviours.
(2) no changes at all; her/his toileting behaviours were as usual.
(3) presented a few problems until 2nd/3rd day after examination but returning to her/his usual toileting since then.
(4) presented a bit of problems what is lasting until now.
(5) presented a lot of problems until 2nd/3rd day after examination but returning to her/his usual toileting since then.
(6) presented a lot of problems what is lasting until now.

B. What exactly was your child's main change in toileting?

(1) s/he was soiling clothes during the day
(2) s/he was wetting clothes during the day
(3) s/he was soiling/wetting bed during the night
(4) s/he had to be reminded to go to the toilet, otherwise would soil/wet

clothes.
(5) messy with ...
(6) others ______________________________

3.2.3. CHANGES IN SLEEPING PATTERNS:

A. Have there been any changes in your child's sleeping patterns in the last week?

(1) s/he was sleeping better than before the examination.
(2) no changes at all; her/his sleeping patterns were as usual.
(3) s/he presented a bit of a problem until 2nd/3rd day after examination but returned to usual pattern since then.
(4) s/he presented a bit of a problem what is lasting until now.
(5) s/he presented a lot of problems until 2nd/3rd day after examination but returned to usual pattern since then.
(6) s/he presented a lot of problems what is lasting until now.

B. What exactly was your child's main change in sleeping patterns?

(1) s/he was sleeping well all night
(2) s/he eventually woke during the night
(3) s/he woke during the night and calls for parent
(4) s/he cried and went/asked to be taken to the parents' bed
(5) s/he was difficulty to sleep and woke frequently
(6) others ______________________________

3.2.4. CHANGES IN MOOD:

A. Have there been any changes to your child's moods in the last week compared with the weeks before the examination?

(1) s/he was more cheerful than before the examination.
(2) no changes at all; s/he has been as usual.
(3) s/he was a bit different until the 2nd/3rd day after examination but since then is as usual.
(4) s/he was a bit different what is lasting until now.
(5) s/he was much different until the 2nd/3rd day after examination but since then is as usual.
(6) s/he was much different what is lasting until now.

B. What exactly was your child's change in mood?

(1) more smiling and easy to comfort
(2) cries when said something trivial (e.g. would you like to help me collecting the toys; take care or your toy will fall from the window)
(3) fusses when asked to do something (e.g. come here and I will do your shoes' lace) or when is offered something (e.g. a toy to include in the play)

(4) quiet, sitting in a corner (as day dreaming)
(5) withdrawal
(6) sad, upset
(7) fearful
(8) cries when left alone inside home (when parent goes out e.g. to put litter off)
(9) cries when left alone in one of the rooms of the house
(10) cries most of the time as needing much of close attention
(11) clinging when parent (or a close relation) attempts to leave place where the child is
(12) clinging most of the time as needing much of close contact
(13) tantrums if not given what wants when wants it
(14) tantrums if not succeeding in what is doing
(15) tantrums if not succeeding in what is doing, even if someone approaches to help
(16) others ______________________________

3.2.5. CHANGES TOWARD A STRANGE PERSON, ENVIRONMENT, SETTING:

A. Have there been any changes in your child's reaction to a strange person/environment/setting?

(1) s/he was more social/adventurous than before the examination.
(2) no changes at all; s/he has been as usual.
(3) s/he was a bit different until the 2nd/3rd day after examination but since then is as usual.
(4) s/he was a bit different what is lasting until now.
(5) s/he was much different until the 2nd/3rd day after examination but since then is as usual.
(6) s/he was much different what is lasting until now.

B. What was exactly the change in your child's reaction to a strange person/environment?

(1) s/he was easier to relate to others/explore setting when parent is near.
(2) s/he was easier to relate to others/explore setting even on her/his own.
(3) crying when approached by a stranger/entering a new setting even with parent near.
(4) crying when approached by a stranger/being in a new setting when on her/his own.
(5) clinging to parent when approached by a stranger (as shy) or when entering a new setting.
(6) clinging to parent when approached by a stranger (as afraid) or when entering a new setting.
(7) asks to leave the environment (may leave the place if not stopped to do so)
(8) others ______________________________

3.2.6. CHANGES IN RELATION TO THE PARENT:

A. Have there been any changes in the way you dealt with your child during the week after the examination?

(1) s/he was more obedient and compliant with requests and suggestions
(2) no changes at all; s/he was the same
(3) a bit of change; s/he was less obedient and less compliant until 2nd/3rd day after examination returning to usual since then
(4) a bit of change; s/he was less obedient and less compliant what is lasting until now
(5) a lot of change; s/he was very difficult to deal until 2nd/3rd day after examination returning to usual since then
(6) a lot of change: s/he was very difficult to deal what is lasting until now

B. What was exactly the change in the way you deal with your child?

(1) it was really easier to deal with her/him: more obedient and compliant
(2) it was necessary more talking before s/he agreed
(3) it was necessary lots of patience and talking to get the things under control for a period of time
(4) it was really difficult as s/he would not stop to listen or obey when asked to do so; talking and telling off was of little effect.
(5) others ____

3.2.7. CHANGES IN PLAY WITH SIBLINGS OR OTHERS:

A. Have there been any changes in the way your child's played with other children or siblings during the week after the examination?

(1) s/he was playing better with others than before the examination
(2) no changes at all; s/he was as always with the others.
(3) presented a bit of a problem (conflict/rivalry; playing alone) until 2nd/3rd day after examination returning to her/his normal way.
(4) presented a bit of a problem (conflict/rivalry; playing alone) what is lasting until now.
(5) presented a lot of problems (much conflicts/rivalries; playing alone) until 2nd/3rd day after examination returning to her/his normal way.
(6) presented a lot of problems (much conflicts/rivalries; playing alone) what is lasting until now.

B. What was exactly the change in your child's play during the week after the examination?

(1) avoiding play with others
(2) conflicts and rivalries with other children's play activity
(3) conflicts and rivalries with other children's toys
(4) inviting other children to participate in the play activity
(5) sharing toys with other children

(6) more active, noise (running, climbing, etc)
(7) less active (watching TV or other children's play, looking at picture books)
(8) did not play
(9) others ____

3.2.8. CHANGES IN INDEPENDENCY/LEVEL OF ACTIVITY:

A. Have there been any changes in your child's level of independency/ activity?

(1) s/he was more independent/active than before the examination.
(2) no changes at all; s/he has been as usual.
(3) s/he was a bit different until the 2nd/3rd day after examination but since then is as usual.
(4) s/he was a bit different what is lasting until now.
(5) s/he was much different until the 2nd/3rd day after examination but since then is as usual.
(6) s/he was much different what is lasting until now.

B. What was exactly the change in your child's level of independency/ activity?

(1) s/he was trying to manage to do things on her/his own
(2) s/he was making attempts to do things but gives up afterwards, looking for help.
(3) s/he was trying to do things but always looking for support and help.
(4) s/he was not attempting to do things and waits for things to be done by someone else
(5) others ____

4. OTHER COMMENTS:

4.1. Would you like to say something else (e.g. item 'others') about your impressions of your child during the past week?

(1) Yes, ____
____
(2) No

5. THE END:

Thanks very much indeed for your time and attention talking with me. My best wishes to your child, you and all the family. Many thanks!

Interview finished at ____________________

APPENDIX XIII

OSBD SCORING AND CALCULATION GUIDELINES

Observation Scale of Behavioral Distress - Revised

Information
Scoring Procedures
Definitions of Behaviours

Developed by Susan M. Jay, Ph.D.
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1981

Revised 1986

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Observation Scale of Behavioral Distress - Revised

Introduction

The Observation Scale of Behavioral Distress (OSBD) constitutes an objective measure of behavioral distress in children undergoing bone marrow aspirations (BMA's) and lumbar punctures (spinal taps) procedures and can be modified for use with other medical procedures. The OSBD consists of operationally-defined behaviors indicative of anxiety and/or pain in children. The original OSBD consisted of 11 behaviors and was developed with the following features which included the following modifications of the Procedure Behavior Rating Scale (PBRS) developed by Katz, Kellerman, and Siegel (1980): a) the continuous recording of behaviors in 15-second intervals rather than one gross recording over an entire phase; and b) each behavioral category in the OSBD was weighted according to intensity (e.g. screaming and flailing are perceived as more intense indicators of distress than crying and verbal resistance). Intensity scores were generated by averaging independent ratings of three experienced clinic personnel. Rating scores between these three clinicians were highly similar and none differed more than one point on a 4-point scale for any behavioral category.

Item Analysis of Original OSBD

The original OSBD contained 11 behavioral categories: Nervous Behavior, Information Seeking, Cry, Scream, Restraint, Verbal Resistance, Requests Emotional Support, Muscular Rigidity, Verbal Fear, Verbal Pain, and Flail. These 11 behavioral categories were subjected to an item analysis in which individual category scores were scored for frequency of occurrence, were intercorrelated, and were correlated with total OSBD scores. Item analyses were conducted for the total sample and for each age

Observation Scale of Behavioral Distress - Revised

Information
Scoring Procedures
Definitions of Behaviors
OSBD Interval Coding Form

Developed by Susan M. Jay, Ph.D.
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group separately. The purpose of the item analysis was to eliminate any categories which were of extremely low frequency and those which were not correlated with other behavioral categories or to total OSBD scores.

The criterion for eliminating any behavioral category was as follows: a) category scores had to occur for at least 10 percent of the subjects, and b) category scores had to have an item-total correlation coefficient of +.3 or more for the total sample and/or for at least one age group. An exception to this criteria was made for one category "Emotional Support" because it correlated .28 for the young age group and it was a high frequency item, that is, it occurred in over half the sample.

Results indicated that eight of the eleven OSBD categories met the criterion and three were eliminated. Verbal Fear was eliminated because it occurred in only 5 percent of the total subjects. Furthermore, it never occurred in children above the age of 6 years. Nervous Behavior was eliminated because it correlated .07 with the total score for the total sample, -.28 for children aged 4 to 6 years, and -.11 for children aged 7 to 14 years. Muscular Rigidity was eliminated because it correlated -.20 with the total score for the total sample, -.17 for children aged 4 to 6 years, and -.37 for children aged 7 to 14 years. Thus, Muscular Rigidity appeared to be a behavior which occured when other distress behaviors were not occurring. In other words, more stoic children and/or children who coped well were more likely to react to the painful stimulus by tensing their muscles, rather than by crying, screaming, flailing, expressing verbal pain, etc. Given the nature of the OSBD, this item does not contribute to the scale since it does not appear to be measuring <u>behavioral</u> distress per se.

Cronbach's Alpha Test of Internal Consistency was conducted before and after elimination of Nervous Behavior, Verbal Fear, and Muscular Rigidity. Results <u>before</u> the categories were eliminated indicated an alpha internal

consistency coefficient of .68. The alpha internal consistency coefficient <u>after</u> the behaviors were eliminated was .72.

<u>Observation Procedures</u>

Observers record behaviors using the OSBD in continuous 15-second intervals during four phases of the medical procedures. The 15-second intervals are indicated on an audiotape which the observer listens to through an earphone while observing the procedures. The time period encompassing the procedures are divided into four phases for the purpose of observation. Phase 1 consists of the first 3 minutes (12 intervals) in the treatment room (measurement of anticipatory anxiety). Phase 2 begins with the first cleansing and the "numbing gun" and ends with Phase 3. Phase 3 begins with the second cleansing of the aspiration site and includes the actual procedure. Phase 4 begins with the removal of the needle and lasts for one and one-half minutes (measurement of post-procedure recovery).

<u>NOTE</u>: Phases of medical procedures may differ at different institutions due to different techniques and methods of conducting procedures. Also, Phase 1a may be added to include the child's distress behaviors occurring from the time the child is instructed to lay down to the time of the first cleansing (onset of Phase 2).

<u>Reliability</u>

The reliability of the OSBD has been documented in a number of studies (Jay, Ozolins, Elliott, & Caldwell, 1983; Jay & Elliott, 1984; Jay & Elliott, 1986). Reliability was calculated by dividing the number of agreements within each 15-second interval by the total number of agreements plus disagreements.

In these studies, independent reliability checks were conducted during 10-20 percent of the medical procedures. The results of percent agreement in upon arrival at clinic (r=.38, p<.01), pulse rates just before BMA (r=.55, p<.0001), pulse rates after the BMA (r=.33, p<.01), diastolic and systolic blood pressure upon arrival at clinic (r=.32, p<.01 and r=.32, p<.01, respectively), and diastolic and systolic blood pressure just before BMA (r=.38, p<.01 and r=.38, p<.01, respectively). Pain self-ratings were significantly correlated with OSBD scores for children above the age of 7 years, (r=.61, p<.01 for anticipated pain, and r=.51, p<.05 for experienced pain).

Scoring Information

The following scoring system is designed to score either BMA's or LPs separately. However, since BMA's and LPs are sometimes conducted one after the other, one could revise the scoring system and have Phase 3A include one procedure and Phase 3B include the second procedure.

The OSBD is scored to yield 4 weighted mean interval Phase scores and a Total Distress Score. Unweighted mean category scores (across phases) can also be generated if one is interested in individual behaviors of subjects.

If medical procedures vary considerably in length between children (or between persons conducting the procedure), this can distort OSBD scores. Therefore, at Childrens Hospital of Los Angeles, a pre-specified number of intervals for each phase are scored from the coding sheet since we have found wide variance in the length of procedures for different children. This variance applies only to Phases 3 and 4 since these are the procedure-related phases. Phases 1 and 4 already consist of a predetermined number of intervals (12 and 6 intervals, respectively).

The number of interval scored for each phase is as follows:

Phase 1 = First 12 intervals. If Phase 2 begins before 3 minutes or 12 intervals have passed, score whatever number of intervals occurred.

these studies ranged from 80 to 84 percent. Pearson correction coefficients calculated between total OSBD scores ranged from 97 to 99 percent.

Validity

The validity of the OSBD has been demonstrated in several studies. The validity of the OSBD was first demonstrated in a study which yielded significant correlations between OSBD Total Distress scores and a number of variables including patient self-report measures and parental report measures (Jay et al., 1983). OSBD scores were significantly correlated with children's trait anxiety scores (r = .63, p <.001), children's self-ratings of anticipated pain levels prior to the procedures (r = .76, p <.001), children's self-rated experienced pain during procedures (r = .62, p <.05), parental ratings of child's anxiety (r = .38, p <.05) and the number of anxiety symptoms in the child 24 hours prior to clinic visit (r = .38, p<.05).

A second study indicated additional evidence for the validity of the OSBD (Jay & Elliott, 1984). OSBD scores were significantly related to the following measures: Nurse ratings of children's anxiety (r = .73, p <.001), pulse rate of child upon arrival at clinic (r = .45, p <.05), pulse rate of child when he/she entered treatment room (r = .61, p <.001), pulse rate of child 3 minutes after procedure was over (r = .50, p <.01), children's self-ratings of anticipated pain levels prior to procedure (r = .47, p <.01) and children's self-rated experienced pain levels during procedure (r = .52, p <.05).

A third study conducted between August 1982 and August 1985 (Jay & Elliott, 1986) indicated that OSBD scores were significantly correlated with the following measures: Nurse ratings of children's distress (r=.69, p<.0001), fear ratings of children (r=.38, p<.01), pulse rates of children

References

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Jay, S.M., Ozolins, M., Elliott, C., & Caldwell, S. (1983) Assessment of children distress during painful medical procedures. Health Psychology, 2(2):133-147.

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Phase 2 = First 3 intervals. If Phase 2 consists of less than 3 intervals, score whatever number of intervals occurred.

Phase 3 = Last 8 intervals (this is done so that actual aspiration is always scored). If Phase 3 consists of less than 8 intervals, score whatever number of intervals occurred.

Phase 4 = 6 Intervals after end of Phase 3.

Note: These scoring procedures were developed for scoring bone marrow aspirations only. LP procedures are generally longer than BMA's and might require a different interval-scoring procedure.

Scoring Procedures (Need Interval Coding Sheet and Scoring Sheet)

1. Frequencies (F) of each behavior category are added for specified number of intervals within each phase.
2. Number of intervals scored (I) are noted for each phase.
3. Each behavioral category frequency score is then divided by the number of intervals scored in each phase, yielding unweighted mean interval category scores (F/I).
4. Each mean interval category score is multiplied by its assigned intensity weight, yielding a weighted mean interval category score (F/I X weight).
5. The weighted mean interval category scores are summed across categories, within each phase, yielding four weighted phase scores.
6. The four weighted phase scores are summed, yielding one Total Distress Score.

   Note: Unweighted mean category scores can be generated, if needed, by adding the unweighted mean interval category scores across phases. These scores can yield information about individual behaviors which constitute distress and can be used for item analyses.

Emotional Support (ES)

Definition: Verbal or nonverbal solicitation of hugs, hand holding, physical or verbal comfort by child.

Rules: Code initiation only for physical behaviors.

Examples:
"Hold me"
"I love you"
"Momma" & "Daddy"
"Momma please"
"Help me"
Grabbing at others.
Reaching out to be held
(Do not code "Mommy" if part of statement is appropriate for another code, e.g., "Mommy, get me out of here"=Verbal Resistance, not Emotional Support.)

Verbal Pain (P)

Definition: Any words, phrases, or statements which refer to pain, damage or being hurt, or discomfort.

Rule: Must be intelligible. May be in any tense. Can be anticipatory as well as actual. Has to be a statement, not a question. This category is distinguished from "Cry" by coding discrete intelligible words as pain (Owh, ouch) and non-word crying sounds as "Cry." Only exception is that groans without crying are coded as Verbal Pain (Ahhh).

Examples:
"That hurt"
"It stings"
"Owwwh"
"Owwhee"
"You are killing me"
"You are pinching me"
"Oh!"

Nonexamples: "Will it hurt?" (=IS)

Flail (F)

Definition: Random gross movements of arms and legs or whole body. Flail often occurs in response to restraint. (Out-of-control behavior)

Rule: Must be random.

Examples:
Pounding fists
Kicking legs repeatedly and randomly
Throwing arms out repeatedly and randomly
Flapping arms on self or otherwise
Child's back moving back and forth repeatedly during procedure.

The Observation Scale of Behavioral Distress

Behavioral Definitions

Information Seeking (IS)

Definition: Any questions regarding medical procedures

Examples:
"When will you stop?"
"Is the needle in?"
"Is the drip coming?"

Nonexamples: "Will I get a toy?"

Cry (C)

Definition: Crying sounds and/or onset of tears--usually nonintelligible but can be double coded with verbal categories.

Examples:
Sobbing
Scrunching up face--obvious onset of tears
Booohooohoo
Crying sounds
Tears (code as long as still flowing and/or sounds)

Nonexamples:
Sniffling
Heavy breathing

Scream (S)

Definition: Loud vocal expression at high pitch/intensity, usually nonintelligible, but can be double coded with verbal categories. High pitch distinguishes this category from "Cry."

Examples:
Sharp, shrill, harsh, high tones
Shrieks

Nonexamples: Loud yelling but at low pitch

Restraint (R)

Definition: Child must be physically held down by staff member or parent with noticeable pressure and/or child must be exerting force, resistance in response to restraint attempts by staff. Sometimes it is not clear if the child is exercising pressure back due to tightness of restraint (i.e., child cannot move). In such cases where restraint is obvious and child's resistance is not clear, code Restraint.

Verbal Resistance (VR)

Definition: Any verbal expression of delay, termination, or resistance.

Rule: Must be intelligible.

Examples:

"I want to go ..."	"Stop"
"I want to go to the bathroom."	"No More"
"No, No, No"	"Don't"
"I don't like this."	"Let me rest"
"Let me loose."	"Take needle out"
"Take me home."	"I don't want it"
"Don't hurt me"	