PARENTAL INFLUENCES ON CHILDRENS' COPING DURING A VENEPUNCTURE

SUBMITTED BY

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ABSTRACT

This study investigated the influences of parental behaviours on child coping behaviours during venepunctures. This exploratory-descriptive study was undertaken in a paediatric Emergency Department with 66 parent-child dyads of children aged 3 years to 11.9 years. A questionnaire for demographic data and State-Trait anxiety inventory were administered to parents prior to the venepuncture. During the venepuncture verbal behaviours were audiotaped and non-verbal behaviours recorded. Five minutes after completion of the procedure a Faces Pain Scale was administered to the child.

Parent and child behaviours were coded using a modified Child-Adult Medical Procedure Interaction Scale refined from a pilot study. Descriptive analyses were performed on the proportions of child and parent coded behaviours and across the five phases of the procedure. Results showed that child and parent behaviours varied across phase of the procedure and cannulation attempt. Child age had a significant effect on behaviour with children under the age of 7 years exhibiting more distress behaviours than children 7 years and over. Parental State anxiety had a minimal effect on child and parent behaviours. The effects of child gender, previous medical experience and EMLA application were not significant. Sackett's lag sequential analysis was used to identify the probable behavioural relationships between child and adult behaviours. Parental behaviours were identified that influenced child coping behaviours, particularly distress, information-exchange, distraction, control and coping-other.

Results indicated that parents might need to be coached in Non-procedural talk to promote distraction behaviours in children and avoid the use of Reassurance. Further studies into child coping should take account of the effects of child age and phase of procedure. Directions for future research include investigating other contexts, staff and paternal behaviours. Recommendations for nursing practice are given.

STATEMENT OF AUTHORSHIP

Except where reference is made in the text of this thesis, this thesis contains no material published elsewhere or extracted in whole or in part from a thesis by which I have qualified for or been awarded another degree or diploma.

No other person's work has been used without due acknowledgment in the main text of the thesis.

This thesis has not been submitted for the award of any degree or diploma in any other tertiary institution.

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Candidates Signature. .....Date...14th January 2002.....

CHAPTER - 1 INTRODUCTION

Most children will experience a painful medical procedure at some time in their childhood. Many children become distressed during such procedures, which is in contrast to adults who generally cooperate and respond to painful medical procedures with stoicism. Child distress can lead to the child's perception of the experience as negative, which may be transferred to other medical situations, thus perpetuating the distressed behaviour (Robieux, Kumar, Radhakrishnan, & Koren, 1991). Staff and parents employ a variety of techniques (such as hugs and explanations) to calm a child who may be kicking and moving to encourage cooperation for successful completion of the procedure, however these behaviours also delay the procedure (Rudolph, Dennig, & Weisz, 1995). Many tests have to be repeated (for example blood samples, X-rays, and electrocardiographs) due to a distressed child moving. Inaccurate tests can result from a child screaming thereby increasing their blood pressure, or hyperventilating which can change their serum electrolyte balance.

Often painful medical procedures, such as having an injection, blood taken, sutures (stitches) or removing dressings cannot be avoided. In hospital the insertion of a needle into a vein (venepuncture) is a common painful procedure many children will encounter. This procedure is performed for a variety of reasons such as medication administration, preparation for X-rays, giving local anaesthetic and taking blood samples to assist in obtaining medical diagnoses or to evaluate the effectiveness of medical treatment. It can be expected that if a procedure is painful it is also potentially stressful for the child.

Nurses' participation in venepunctures involves assisting the parent and child to cope during the procedure. However, many nurses often equate coping with cooperative behaviour (Ellerton, Ritchie, & Caty, 1989), an attitude that limits the options available for nurses to assist children in coping with venepunctures. Although the application of a topical local anaesthetic is often employed by health professionals to minimise the pain associated with venepunctures some children still become distressed (Cohen, Blount, Cohen, Schaen, & Zaff, 1999; Lal, McClelland, Phillips, Taub, & Beattie, 2001; Robieux et al., 1991). Therefore, factors other than pain must contribute to children's adverse reactions to venepunctures. Most research studies have sought to minimise child distress without seeking to understand the causes of and influences on distress behaviour.

Various strategies have been employed to minimise child distress during painful medical procedures, such as providing information and distraction, yet none have been found to decrease distress in all children. There is a widespread belief that providing information about a forthcoming medical event will decrease a person's anxiety regarding the event (Egbert, Batit, Welch, & Bartlett, 1964; Janis, 1958; Miller, 1980). Some studies with children have found distraction techniques had no effect on child distress (Christiano & Russ, 1998; Smith, Ackerson, & Blotcky, 1989). Studies evaluating the effectiveness of distraction techniques to minimise child distress or pain have also been inconclusive (Blount, Powers, Cotter, Swan, & Free, 1994; Caire & Erickson, 1986; Kazak et al., 1996; Malone, 1996). Kleiber and Harper (1999) reviewed studies utilising distraction and found one-third showed no effects on child distress. The results suggest there may be influences on children's coping not addressed by the studies, therefore further understanding of coping is needed. However, variations in results from both information-

giving and distraction strategies may be partly due to methodological differences such as procedures, measuring instruments, study populations and conceptual bases.

There is no definitive perspective from which to study coping as researchers differ in their theoretical bases (Vaillant, 1977; Weisz, McCabe, & Dennig, 1994; White, 1974). In an effort to explain children's coping behaviours researchers have drawn upon adult coping theories and concepts, for example Bachanas and Blount (1996) and Field, Alpert, Vega-Lahr, Goldstein, and Perry (1988) applied trait and coping styles to children. Trait and coping styles are sets of attributes a person possesses which direct coping behaviour (Lazarus & Folkman, 1984). For example repression-sensitisation is a description of a person's willingness to seek or repress information as a form of coping. However, research findings have thrown doubt on the assumptions of trait theory (Christiano & Russ, 1998; Fanurik, Zeltzer, Roberts, & Blount, 1993; Smith et al., 1989). Naturalistic observation has shown that coping involves a complex multidimensional interaction of thoughts and ideas between a person and the environment (Moos & Tsu, 1977; Murphy & Moriarty, 1976) resulting in individual behaviour which is not accounted for by personality characteristics alone (Magnussen & Endler, 1977; Mischel, 1968).

Lazarus and Folkman's (1984) cognitive transactional theory of adult coping has been widely used to explain child coping. In Lazarus and Folkman's theory coping is viewed as a dynamic process that changes across time and context where a person interacts with the environment via a cognitive appraisal process. Although several researchers have used Lazarus and Folkman's theory to describe child coping (Ellerton, Ritchie, & Caty, 1994; LaMontagne, Hepworth, Johnson, & Cohen, 1996; Rudolph et al., 1995) the models differ in focus and constructs. An important element of the stress-coping theory is appraisal, where an individual assesses a given stressor as a threat, challenge or loss/harm. As

children think differently to adults (Piaget & Inhelder, 1966/1969; Siegler, 1986) it can be expected that their appraisal of events varies to that of adults, and hence children react differently. Therefore children's perceptions of venepunctures can expect to vary from adults. Cognitive processes can also change as the child grows and develops (Piaget & Inhelder, 1966/1969; Siegler, 1986). Hence, children's beliefs and understanding of illness and their reactions to medical procedures and pain will vary according to their age (Tudge & Rogoff, 1989). However, few studies have focused on specific age-related child coping behaviours during venepunctures. Some investigators have incorporated developmental concepts within their applications of the stress-coping theory (Ellerton et al., 1994; LaMontagne et al., 1996; Rudolph et al., 1995). Several guides for applying child development to practice are available (Hurley & Whelan, 1988; Pontious, 1982; Pridham, Adelson, & Hansen, 1987) yet the relationships between child development and child coping have not been widely explored.

A child's developmental level is only one factor thought to influence coping. Other influences on children's coping are categorised by Lazarus and Folkman (1984) as being person or environmentally orientated. Person-specific influences include the child's age and developmental level, temperament, prior experience with painful medical procedures and gender. Environmental influences include the nature of the stressor, timing of the procedure and parental characteristics. Characteristics of temperament such as level of activity (for example highly active children), predictability (regularity of behaviour) and distractibility have been measured (Carson & Bittner, 1994; McDevitt & Carey, 1978) but results have been inconclusive probably due to differences in methodologies. Research into gender differences in coping is also equivocal, with some studies showing no difference in coping between genders (Carson, Gravley, & Council, 1992; Perrin &

Gerrity, 1981) whilst others reporting significant effects (Eisenberg, Fabes, Schaller, & Miller, 1989; Frydenberg & Lewis, 1991). Similarly, prior experience of medical procedures has been shown to affect child behaviour in some studies (Jay, Ozolins, Elliot, & Caldwell, 1983) but not in others (Rodriguez & Boggs, 1998).

Environmental factors that may influence coping include the stressor and parent (Blount, Davis, Powers, & Roberts, 1991). Children may react differently to an acute and short-term stressor (for example physical examination or venepuncture) compared to a chronic stressor such as diabetes mellitus (Holmes, Yu, & Frentz, 1999). The intensity of a stressor, for example a catastrophe versus minor daily 'hassles' (Fernandez & Sheffield, 1996; Weisenberg, Schwarzwald, Waysman, Solomon, & Klingman, 1993), as well as number of stressors (Jensen, Richters, Ussery, Bloedau, & Davis, 1991) were found to influence children's coping responses. Everyday stressors or daily 'hassles' may be accumulative and increase a person's vulnerability to stress (Lazarus & Folkman, 1984), with young children being more vulnerable due to their limited physical and psychological development (Anthony, 1987; Maccoby, 1983; Murphy & Moriarty, 1976; Rutter, 1983). A venepuncture can involve many stressors such as the novelty of the situation (Biddinger, 1993), the presence of the parent (Gonzalez et al., 1989; Gross, Stein, Levin, Date, & Wojnilower, 1983) and the nature of the procedure itself (Field et al., 1988) and hence is particularly stressful for young children. The timing of the stressor, for example the phase of a procedure, may also influence the child's coping responses. Although minimal research has been conducted in this area there is some support to the idea that child and parent behaviours change according to the phase of the procedure (Blount, Sturges, & Powers, 1990; Katz, Kellerman, & Siegel, 1980).

A potentially important influence on young children's coping is parental behaviour as the limited cognitive, emotional and physical abilities of a child may lead to considerable dependence on parents or caregivers for physical and psychological needs. Through interaction with the parents children learn their place in the world, their sense of identity and sense of worth (Coon, 2000). From an early age children are exposed to a wide array of stressors and through their interactions with parents children learn how to cope and react (Coon, 2000). However, few studies have investigated the reciprocal relationship of parental behaviours and children's coping behaviours. Research into the role of parental behaviours in children's coping with a painful medical procedure has been mostly limited to parental presence or anxiety. Results from previous research are equivocal, as some studies showed parental presence decreased the level of child distress (Frankl, Shiere, & Fogels, 1962; Vernon, Foley, & Schilman, 1967) while others found the opposite (Blount et al., 1989; Gonzalez et al., 1989; Gross et al., 1983; Jacobsen et al., 1990). A possible explanation to account for such differences is the nature of parent-child interaction yet this was not explored in the studies. Studies that have investigated parental anxiety and its relation to child's coping during medical procedures (Broome & Endsley, 1989; Bush, 1987; Jay et al., 1983; Johnson & Baldwin, 1968) found no relationship between parental anxiety level and either child or parental behaviours.

The few studies that have examined parent-child interaction during a painful medical procedure identified some specific parental behaviours associated with child coping behaviours (Blount et al., 1989; Gonzalez, Routh, & Armstrong, 1993), such as non-procedure related talk to the child and reassurance. Results are difficult to compare and generalise due to different methodologies and small numbers of participants. The effect of non-procedure related talk to the child has had mixed results, with some studies showing

a decrease in children's crying (Gonzalez et al., 1993) whilst others found no relation to child distress (Jacobsen et al., 1990). Blount et al. (1989) found that non-procedure related talk to the child was associated with an increase in similar distraction behaviours by the child. The role of reassurance in influencing child coping behaviours is also unclear. Reassurance has been associated with child distress (Blount et al., 1989; Gonzalez et al., 1993) yet also with non-distress behaviours (Blount et al., 1989). Some parental behaviours seem to influence child coping behaviours however the nature of the relationship to children's coping is unclear.

It can be seen that coping is a complex process involving many different elements. A plethora of studies have investigated various aspects of child coping yet the results remain unclear with little agreement on the nature of child coping or on a common model of child coping. The models developed to explain child coping give scant attention to parental influences often only considering parental anxiety. Despite the many studies in this field there are some important areas of child coping that have received little attention, such as parental influences, the nature of the child's illness and the location of the stressor. Parents may have an important influence on children's behaviour yet very few studies have investigated the reciprocal nature of parent and child interaction. Many studies focus on children with cancer undergoing bone marrow aspirations or well-children undergoing immunisations, yet the majority of painful medical procedures children will experience in hospitals are venepunctures, and the majority of children undergoing such procedures are acutely ill but generally well children. Very few studies have investigated acutely ill children undergoing venepunctures. In addition, the initial point of contact for many children in hospital, and often the location for the initial venepuncture, is the Emergency Department yet few studies have investigated child coping in this situation. It is clear that

further research is needed to clarify parental influences on child coping in this large population of acutely ill children.

The purpose of this thesis was to address some of the gaps in the coping research by developing and implementing a study that will provide a unique contribution to child coping research and extend previous knowledge. The study investigated the nature of parent-child interaction during a venepuncture in an Emergency department with acutely ill children, using Lazarus's stress-coping theory (1980; Lazarus & Folkman, 1984) as a conceptual framework. The conceptual framework guided research and coherently linked concepts, providing a broad, flexible and comprehensive framework for studying coping. Consistent with Lazarus's conceptual view, parent-child interaction was observed in a natural setting of an Emergency department to describe behaviours specific to the situation. As little research has been conducted in this area of child coping, and previous research findings in associated areas of coping are inconclusive, a descriptive-exploratory design was selected. As Lazarus and Folkman (1984) view coping as changing across time the study measured changes in behaviours across specific phases of the venepuncture.

Following Lazarus' stress-coping theory (1980; Lazarus & Folkman, 1984), coping was defined as a process where *all* efforts to manage stressors, regardless of the effectiveness of the effort, were considered as coping behaviours. Child distress was considered as incorporating behaviours associated with the feelings of pain, sorrow, anguish, fear and anxiety. Further explanation and discussion surrounding these definitions will be given in the following chapter.

This thesis is structured into seven chapters of which the introduction forms the first chapter. The second chapter, the literature review, explores the elements of child coping, stress and distress. The chapter critically reviews and analyses the relevant literature related to children's coping including parental influences, child cognitive development and intervention strategies employed to assist child coping. It was found that the nature of child coping is multidimensional, involving interactions between child and environment. The study of child coping is complicated by the variety of methodologies, definitions and conceptual bases used by investigators. Parental influence on children's coping has been poorly addressed in the literature particularly related to venepunctures in acutely ill populations. Lazarus and Folkman's (1984) stress-coping theory was explored and found to be useful in providing a framework for studying child coping.

Chapter Three provides a detailed account of the methodology used in the study, including aspects such as the selection of participants, setting and population description. Details were provided of the venepuncture procedure, categorisation of phases of procedure and data collection. Descriptions of the measurement tools were given and rationales provided, including coder training and refinement of the interaction measurement tool. The pilot study was described and related to the current study, and ethical considerations discussed. The descriptive-exploratory design focused on parent-child interaction during a venepuncture in an acutely ill otherwise well population in an Emergency department. Observational methods were used and quantitative techniques chosen for analysis.

Chapter Four describes the results from parent and child behavioural analyses. Parent and child behaviours were described and the proportions of occurrences for each behavioural code were provided. Quantitative analyses such as one-way Analysis of Variance were

used extensively for this data. The effect of child age, phase of procedure and other demographic variables upon child and parent behaviours were described and charts used to illustrate the results. It was found that some child and parent behaviours varied according to phase of procedure and child age, but parental anxiety level or child gender did not vary according to child or parent behaviours. Parent-child interaction was not explored in this chapter.

Chapter Five focuses on results from the sequential analyses of parent-child interaction data. As sequential analysis is not a common analytical technique the process was described in depth, using results from the study to illustrate the process. Transitional probabilities obtained enabled significant patterns of behaviours to be described. From these patterns adult coping promoting behaviours were identified. Non-procedural talk to child and Reassurance were analysed further using correlational techniques to clarify the relationships of these behaviours to child coping behaviours.

Chapter Six critically discusses the results of the study and related them to the research questions, previous research findings and Lazarus and Folkman's (1984) stress-coping theory. The study findings supported concepts within the stress-coping theory, for example that child coping changes over time, and supports some previous research findings such as the high level of distress behaviours shown by young children. However, unique insights gained from the study are also described and discussed such as the nature of parent-child interaction and the effect of child age on parental behaviours. Methodological issues such as measuring instruments and population selection are discussed and shown to be major hindrances in the investigation of child coping.

In the final conclusion chapter the study and findings are summarised, strengths and limitations of the study discussed and a conclusion drawn. Recommendations for nursing practice and directions for future research are given. It was shown that this study provides a unique contribution to child coping knowledge by identifying and exploring parent and child interaction in a common, but little studied, population of acutely ill children undergoing a venepuncture. The study was undertaken within an Emergency department, which provided a unique insight into child coping in a specific situation that has been rarely investigated. The study extended prior knowledge regarding the influence of parental anxiety and child age in child coping. An important contribution was made by this study in supporting Lazarus and Folkman's (1984) stress-coping theory where child coping was shown to change according to the nature of the stressor and certain child characteristics, hence supporting the concept of child appraisal during venepunctures. This study shows that parent and child interact in a unique way according to the characteristics of the child and the nature of the situation.

CHAPTER - 2 LITERATURE REVIEW

In this chapter relevant literature relating to parental influences on children's coping during a venepuncture will be critically reviewed. The concept of coping is extremely complex, involving many different factors. An explanation of some of these factors will be provided to increase the understanding of children's coping. The nature of stress, stressors, and children's responses to stress and venepunctures will be explored. Prior to a discussion of influences on children's coping behaviours theories on coping and the measurement of coping and distress will be considered. The discussion on child coping will include children's general coping behaviours and strategies used to minimise child distress during stressful encounters. The concept of cognitive appraisal in children will be explored, including children's perceptions of pain and illness. The factors thought to influence children's coping behaviours, such as child age, child development, prior experience, parental anxiety and parent-child interaction will be critically discussed.

The focus of this thesis is parent and child behaviour during a venepuncture. In the literature the most frequent painful medical procedures recorded are bone marrow aspirations, lumbar punctures and immunisations. Before commencing the literature review of child coping a description of these medical procedures will be given.

2.1 Painful Medical Procedures

For many children painful medical procedures are unavoidable, as they are often required for the diagnosis and treatment of childhood illnesses. One of the most common painful medical procedures performed within a hospital is a venepuncture. This involves the insertion of a special needle (a cannula) into a vein for the purpose of introducing medications and fluids or withdrawing blood for testing.

Very few studies have investigated children's coping during venepunctures. The focus of research in this area has been on less common, and often more painful procedures, such as bone marrow aspiration and lumbar puncture. Populations receiving these procedures are often limited to children with cancer who may have different coping behaviours from children without cancer. Another common painful procedure children may require is immunisation, and although a painful procedure involving a needle, it is very different to a venepuncture. Immunisations are quick compared to venepunctures yet children may react differently in longer procedures. As there is very little research available on venepunctures, studies involving bone marrow aspirations, lumbar punctures and immunisations will be reviewed.

A bone marrow aspiration is an extremely painful procedure whereby a large-bore needle is inserted into a bone and marrow withdrawn by syringe. This is often performed under local anaesthetic (via a needle) with the child usually positioned on their abdomen. A lumbar puncture (also called a 'spinal tap') is a procedure whereby a long needle is inserted between lumbar vertebrae to obtain cerebrospinal fluid for diagnostic testing. The child is positioned in a foetal position and asked to remain still during the procedure. Young children need to be held firmly to minimise movement. A local anaesthetic cream

is sometimes applied prior to the procedure. Older children may be given local anaesthetic through a needle. Both bone marrow aspirations and lumbar punctures are often performed on children with cancer for diagnostic and evaluative purposes. In clinical practice lumbar punctures are also performed on acutely ill children such as those with suspected meningitis, however there is scant published research on this population.

2.2 Children and Stress

A venepuncture can be considered a stressor, evoking a stress response due to the potentially threatening nature of the procedure (Lazarus & Folkman, 1984). A stressor has been defined as a demand that upsets an organism's homeostasis (Antonovsky, 1985), discomforting physical and social conditions (Mechanic, 1968), a disruption to "smooth functioning" (Benner & Wrubel, 1989, p. 59) or an event that strains or exceeds a person's resources (Lazarus & Folkman, 1984). Stress is therefore described as adversely affecting a person's internal resources, such as coping skills and health status (Lazarus & Folkman, 1984) in response to a demand. Stress is viewed as a complex multidimensional construct consisting of psychological, social, cognitive and physical aspects (Antonovsky, 1985; Garmezy, 1983; Lazarus & Folkman, 1984).

Children's behavioural responses to a stressor can include temper outbursts, excitability, low self-esteem, under-achievement, uncooperative behaviour and lack of self-confidence (Chandler, 1985, 1986). Children vary widely in their responses to a specific stressor, such as an invasive medical procedure, compared to adults. An adult will generally be cooperative and placid during a routine medical procedure, such as a venepuncture. Child responses to painful medical procedures have been reported across several studies (Blount et al., 1989; Caty, Ritchie, & Ellerton, 1989; Ellerton et al., 1994; Jay et al., 1983), and

include crying, kicking, hitting, screaming, tense or cheerful cooperation and visual inspection.

The term distress has been used widely in the literature to describe distraught child behaviour yet very few researchers have defined distress. Skinner (1995) defines distress as 'the subjective experience that a need...is being impinged upon' (p. 81). The majority of research studies imply a definition of distress in the measurement tools they use, for example including measures of crying/screaming, flailing, resistance, muscle rigidity, verbal pain, requesting emotional support (Blount et al., 1990; Jay et al., 1983; Katz et al., 1980) and hostility (Frankl et al., 1962). In common usage distress is described as mental pain, "to upset badly" (Collins Dictionary and Thesaurus, 1994) or as "severe pressure of pain, sorrow, etc., anguish" (Sykes, 1976, p. 220). These definitions imply that fear and anxiety could also be a component of distress. In this study distress is defined as a concept incorporating the behaviours associated with the feelings of pain, sorrow, anguish, fear and anxiety.

2.2.1 Venepunctures and Stress

Being subjected to a venepuncture has been found to be stressful to children (Humphrey, Boon, van Linden van den Heuvell, & van de Wiel, 1992). One reason is the fear invoked by a 'needle' (Broome & Hellier, 1987) which some children consider one of the most stress-provoking medical experiences (Caty et al., 1989; Fassler, 1985; Hart & Bossert, 1994). In a study of well-children undergoing a venepuncture it was found that more than 65% of unprepared children found venepunctures frightening and very painful (Harrison, 1991). Fowler-Kerry and Lander (1987) found that following surgery children preferred to suffer pain rather than have a needle. Polillio and Kiley (1997) investigated children's

anxiety to an injection and a needle-less injection (which still caused pain) and found no difference in anxiety between the two groups.

The reactions of children to stress would account for some of the observed child behaviours during venepunctures. Researchers tend to approach stress from their own conceptual backgrounds (Elliott & Eisdorfer, 1982). Most researchers agree that the concept of stress embodies both physical and psychological aspects (Lazarus & Folkman, 1984). The physical symptoms of stress, for example rapid heart rate and dry mouth, stem from the physiological changes which occur in the body's chemistry in response to exposure to a stressor (Ciarenello, 1983; Selye, 1956). Research of children's physical responses to stressful encounters has been inconclusive (Ellerton et al., 1994; Gedaly-Duff, 1987; Harrison, 1991; Melamed & Siegel, 1975) which indicates that children's reactions to stress involve more than a physical response.

Internal and external aspects of coping may account for some of the children's reactions to stressors. It has been shown that there are certain internal characteristics that assist a child in coping with stressors, for example social competence, the ability to postpone gratification and attention span (Garmezy, 1987; Smith, Smoll, & Ptacek, 1990; Thompson, 1998; Ulbrich, Warheit, & Zimmerman, 1989). These characteristics are partly a product of the child's age and developmental level. Young children are vulnerable to stressors (Anthony, 1987; Maccoby, 1983; Murphy & Moriarty, 1976; Rutter, 1983) due to their lack of physical and psychological resources such as social competence (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 1992), therefore they can be expected to have difficulty managing stressors such as venepunctures. External aspects associated with children maintaining behavioural and emotion integrity during a stressful event include parental behaviours such as consistent

discipline practices and nurturing behaviour (Wyman et al., 1992) and family cohesion (Luthar, 1991; Masten et al., 1999; Thompson, 1998).

The type of illness a child has can affect children's responses to stress. Some studies (Boekaerts & Roder, 1999; Olson, Johansen, Powers, Pope, & Klein, 1993) found that chronically ill children displayed similar coping behaviours to well children, whereas other studies reported differences in child coping between chronically ill and acutely ill children (Holmes et al., 1999; Ritchie, Caty, & Ellerton, 1988). Differences may partly be explained by diverse study populations and methodologies, the type of stressor and the cumulative effect of stressors.

Everyday stressors or daily 'hassles' may be accumulative and increase a person's vulnerability to stress (Lazarus & Folkman, 1984). School-aged children have identified their 'minor' stressors as including poor examination results, arguments at home, social rejection from peers and concerns over appearance (Garmezy, 1983; Hutton & Roberts, 1990; Ryan, 1988). Some studies investigating the effects of accumulated everyday stressors indicate that the severity of daily hassles is more important in predicting the functioning of the child than the amount of daily hassles (Fernandez & Sheffield, 1996; Monroe, 1983). Results from other studies are inconclusive, either finding an adverse effect on child behaviour with increased daily hassles (Kanner & Feldman, 1991; Rowlinson & Felner, 1988; Banez & Compas, 1990; Monroe, 1983) or no effect (Jensen et al., 1991; Jung & Khalsa, 1987; Holmes et al., 1999). However, a consistent finding is the detrimental effect of parental conflict on child behaviour (Forehand et al., 1991; Kliewer & Kung, 1998; Shaw & Emery, 1987) which supports the importance of parent factors in predicting child behaviour.

The nature of the procedure may also be an influencing factor in children's reactions to venepunctures. It is possible that venepunctures conducted in hospitals are more stressful than routine child immunisations due to the difference in length and complexity of the procedure, location and presence of child acute illnesses. Although there is little evidence to support this statement related to venepunctures, events such as admission to hospital (Hodapp, 1982) and unfamiliar surroundings were found by Biddinger (1993) to be stressful for the child. There have been few studies that have focused on children's ability to deal with multiple stressors. Maccoby (1983) found that children are unable to deal with large amounts of simultaneous novel stimulation compared to adults. The combined stressors of hospital and unfamiliar surroundings, an illness or injury and a medical procedure will generally tax a child's coping resources more than it will an adult.

In summary, venepunctures have been shown to be stressful for children and some children respond with distress and fear. Some factors that may influence the responses of children to a stressor include the child's developmental level, type of illness (chronic or acute), the cumulative effect of daily hassles and the effect of multiple concurrent stressors. An important influence found in some studies was the role of parental behaviour, although this was not explored in depth.

2.2.2 Distress as a Coping Response

Many researchers describe children's reactions to stressors in terms of coping behaviours or styles (Chandler, 1985). In accordance with Lazarus and Folkman's (1984) definition that coping includes all efforts to manage a situation, distress may be considered as a coping response. Not all researchers consider child distress as coping, but rather as a stress response. Rudolph et al. (1995) in line with Lazarus and Folkman's (1984)

definition of coping defined a coping response as an "intentional action" (Rudolph et al., 1995, p. 329): a response that reflected a spontaneous reaction rather than a deliberate effort to cope was deemed a stress response. A coping goal was defined as the intent of an action to reduce an aversive aspect of the stressor. Rudolph et al. (1995) considered child distress behaviours, such as kicking and screaming, as stress responses. Yet, how can researchers determine the difference between a young child's intentional action and a child's intentional effort? Young children do not have the mature skills to express their thoughts and feelings therefore researchers should not assume meaning without being able to justify its source. It should not be assumed that immediate responses to a stressor do not involve some aspects of cognitive processing. Studies have yet to be conducted to adequately address this issue. This study will consider child distress as a coping response.

The effectiveness of coping efforts include a child's freedom from "marked tenseness, unmanageable anxiety, loss of motor coordination, and deterioration of speech, and disorganization (sic) of thought processes" (Murphy &Moriarty, 1976, p. 117). When applying this concept to children undergoing venepunctures then distress behaviours may reflect ineffective coping responses. Young children may be unable to identify their coping goals (Rudolph et al., 1995) but it does not imply that children do not desire freedom from tenseness, anxiety and fear. Band and Weisz (1988) found that 96.5% of children reported using efforts to cope rather than relinquish coping efforts. In this study it will be assumed that children desire freedom from tenseness and anxiety although they may be unable to express this wish. Before exploring child coping responses the issues surrounding child coping research will be discussed

2.3 Methodological Issues In Child Coping Research

Although many studies have investigated children's coping behaviour there is no agreed taxonomy of coping amongst researchers. The complex nature of the concept makes it difficult for researchers to clarify and explain the phenomenon and agree on a common construct of coping. This lack of consistency and differences in measurement tools, methodologies and subject populations makes it difficult to compare results between studies. These methodological issues need to be clarified prior to further discussion on children's coping during venepunctures.

2.3.1 Definitions Of Coping

Some researchers believe that coping is aimed towards mastering the stressor (Murphy, 1962) or adapting to the environment (Vaillant, 1977; White, 1974), whereas others use a theoretical background related to control to explain coping (Weisz et al., 1994). A common view is coping as a set of traits, which are enduring sets of characteristics that are used across all situations (Byrne, 1974; Goldstein, 1973) such as extroversion and introversion. These theoretical approaches, based on adult coping concepts, have been applied to child coping without investigating the appropriateness of such an approach.

Murphy (1962) defined coping as 'any attempt to master a new situation that can be potentially threatening, frustrating, challenging, or gratifying' (p. 38). This definition implies that everyone wishes to control or overcome a stressor. However, not all coping behaviours can be viewed this way, for example denial is not an attempt to master a situation but to avoid it, resulting in positive or negative consequences (Katz, Weiner, & Gallagher, 1970). Similarly, not all problems or stressors can be changed or overcome as seen with natural disasters or sudden death of a loved one. Others see coping as

'adaptation under relatively difficult conditions' (White, 1974, p. 47) a definition that includes mastery of and continual interaction with the environment. Children, due to their limited developmental level, are often unable to master stressors and therefore a more general and flexible model of coping is required.

Coping is often equated with adaptational success, such as a decrease in distress or anxiety (Murphy & Moriarty, 1962) and an increase in cooperation or certain coping strategies (Boekaerts & Roder, 1999). Failure to engage in adaptational behaviours is often considered a sign of inadequacy, which can lead to the confounding of coping behaviours with coping outcome (Lazarus & Folkman, 1984; Rudolph et al., 1995). This may confuse the investigation of child coping therefore coping needs to be defined independent of outcome.

Weisz et al. (1994) used a model of control to study coping in children. In this model control was categorised as influencing the stressor, distracting from the stressor, or an absence of control behaviours. With young children it becomes difficult to differentiate between a child not attempting to cope and a child trying to cope by keeping still or thinking pleasant thoughts. Skinner (1995) proposed that perceived control is a major influence on behaviour, with individuals who believe they have 'control' acting in ways that encourage success and competence in tasks. The child's developmental level is seen as important in the cause and influence of perceived control. Caty, Ellerton, and Ritchie (1984), in an analysis of 39 case studies, found that the amount of controlling behaviour increased with age although the significance of this observation was not explored. In a later study of 208 hospitalised pre-school aged children, Ritchie et al. (1988) found that controlling behaviours were amongst those most frequently used, but there was little difference between the amount of controlling behaviour used by acutely and chronically

ill children. Children are often not allowed to control high stress events such as venepunctures to enable successful completion of the event. Ritchie et al. found controlling behaviours by children were used more often with low stress (mealtime) compared to high stress events (fingerprick), implying that the controllability of a stressor is a factor in perceived control.

Another view explaining coping behaviours is trait and coping style, which is derived from psychoanalytic ego theory. Traits and coping styles are sets of relatively permanent personality characteristics or attributes which are used across situations and most are across a single dimension (Byrne, 1974) for example coping-avoiding (Goldstein, 1973). Terms are not used consistently by researchers, for example Lazarus and Folkman (1984) define coping style as broad in focus whereas other researchers use coping styles in a very narrow context (Blount et al., 1991; Smith et al., 1989). In this study traits and coping styles are considered interchangeable terms as there is no consensus amongst investigators. One coping style investigated is the predisposition of an individual to seek or avoid information, which has been described using different nomenclature such as repression-sensitisation (Byrne, 1974; Field et al., 1988), approach-avoidance (Goldstein, 1973; LaMontagne, 1984, 1987), blunting versus monitoring (Miller, 1980, 1989; Seligman, 1968) and avoidant versus vigilant coping (Cohen & Lazarus, 1973). In some studies coping style has been matched with intervention so that those with an information seeking disposition have been given information, but the findings have been contradictory either supporting (Fanurik et al., 1993) or refuting (Christiano & Russ, 1998; Smith et al., 1989) the use of matched interventions. The results may be due to methodological differences in interventions and subject populations. Research findings have thrown doubt upon the assumptions of trait theory. Naturalistic observation has shown that coping

involves a complex multidimensional interaction of thoughts and behaviours between a person and the environment (Blount et al., 1991; Moos & Tsu, 1977; Murphy & Moriarty, 1976) not provided by the single dimensions of coping style.

Lazarus' (1980) transactional model of coping (henceforth called the stress-coping theory) attempts to address some of the deficiencies found in other approaches and is probably the most commonly used theoretical basis for studies into child coping (LaMontagne et al., 1996; Peterson, 1989). Lazarus and Folkman (1984) defined the process of coping as *all* efforts to manage stressors regardless of the effectiveness of the effort, which varies with the situation and evolves over time, mediated by cognitive appraisal of the situation. This broad definition of coping allows any effort to be considered as coping including distress, mastery and control. No judgement is made of the desirability of using certain ways of coping, which enables an objective investigation of the coping process. This view of coping gives a comprehensive and flexible framework for studying coping, particularly in naturalistic settings as coping is viewed as context-specific. The stress-coping theory will be used as the conceptual basis for this study. However, the theory is adult-based and has not been developed specifically for children (Peterson, 1989) therefore the theory needs to be adapted to child-specific characteristics and contexts, such as developmental level and childhood illness.

2.3.2 Lazarus' Stress-Coping Theory, Appraisal and Child Coping Behaviours

Stress-coping theory categorises coping on the basis of two functions: efforts directed at managing the problem or situation and efforts to manage the emotional responses to the situation (Lazarus, 1980; Lazarus & Launier, 1978; Murphy & Moriarty, 1976). In situations where children have little control over events, such as venepunctures, the major

function of coping would be to regulate emotional states. However, studies have shown that children utilise both functions during situations at home (Murphy & Moriarty, 1976), during painful medical procedures (Broome, Bates, Lillis, & McGahee, 1990) and hospitalisation (Caty et al., 1984; Stevens, 1989). Therefore, other ways to categorise coping behaviours are needed that can clearly describe relationships between different elements in the coping process.

Investigators have used the stress-coping theory to categorise coping behaviours in several ways. Lazarus and Launier (1978) further classified emotion and problem-focused functions into four coping modes: information seeking, direct action, indirect action and intrapsychic processes. However, these categories are broad, consisting of different types of coping behaviours in the same category, for example the direct action category includes mastery, control and aggressive behaviours. Therefore, the four coping modes are limited in the information they can provide regarding specific children's coping behaviours. Other investigators have partitioned coping into behavioural and cognitive coping responses (Curry & Russ, 1985; Rudolph et al., 1995; Walker, 1988; Worchel, Copeland, & Barker, 1987). However, behavioural responses may involve a significant cognitive component, for example information seeking. Cognitive processes are also difficult to investigate in children under the age of five years due to their developmental immaturity. Therefore, this categorisation is not useful for exploring child behaviour in depth. There seems to be an agreement amongst researchers that children's coping involves cognitive, physical and emotional elements although there is no taxonomy of child coping that is used consistently by researchers.

A major strength of Lazarus and Folkman's (1984) model of stress and coping is that it takes into account individual differences in response to stressors. Lazarus and Folkman

propose that an individual's cognitive appraisal of a potential stressor can affect, or mediate, the response to a stressor. The cognitive appraisal process is considered a continuous evaluative process (Lazarus & Folkman, 1984; Lazarus & Launier, 1978; Folkman, Schaefer, & Lazarus, 1979), and it can be expected that children will continually appraise events during venepunctures. Children have been shown to appraise events (Mazur, Wolchik, Virdin, Sandler, & West, 1999; Murphy, Thompson, & Morris, 1997; Spitzer, 1992) as young as four years of age (Caty, Ellerton, & Ritchie, 1997). Due to different levels of cognitive, emotional and physical development and past experiences children may perceive stressors differently to adults and would exhibit coping behaviours that vary according to their level of development (Peterson, 1989). Young children tend to view new situations as fearful, whereas older children view them as anger-provoking (Kagan, 1983). Younger children are also at risk of misinterpreting events through their limited cognitive processes (Peterson, 1989; Siegler, 1986). Therefore, children's appraisal of situations, such as venepunctures, will vary according to child age with younger children at risk of greater distress during the procedure.

The children's level of cognitive ability also affects their understanding of pain and illness, and their interpretation and reactions to events such as venepunctures. Piaget and Inhelder (1966/1969) and Vygotsky (Vygotsky, 1896-1934/1978) proposed that children pass through stages of cognitive development during their childhood. Cognitive development is viewed as a series of sequential stages each containing critical cognitive skills, and dependent upon the previous stage. However, Vygotsky allows for multidirectional development and social influences on cognition (Tudge & Rogoff, 1989), so that children can learn outside their expected development level with the support of

others (Vygotsky, 1896-1934/1978). This approach suggests that adults may be able to assist children to use effective coping strategies.

Children's perceptions of illness vary as they grow and develop (Brewster, 1982; Bibace & Walsh, 1980; Perrin & Gerrity, 1981) yet few studies have investigated the effects of these perceptions on child coping. Children's understanding of illness (Carson et al., 1992) and pain (Rudolph et al., 1995) increased with cognitive maturity. Children over the age of five years can accurately recall pain experiences and understand its causes (Ross & Ross, 1984; Rudolph et al., 1995; Savedra, Tesler, Ward, Wegner, & Gibbons, 1981) but only consider pain as one-dimensional (Ross & Ross, 1984). This has methodological implications where some pain measures may not be used accurately by young children, for example faces scales showing crying faces (McGrath, Johnson, Goodman, Schillinger, & Chapman, 1985; Wong & Baker, 1988) that may be confused with sadness or pain. Children's limited understanding of language may lead to cognitive distortions by the child during medical procedures (Peterson, 1989) thereby affecting cognitive appraisal. Rasnake and Linscheid (1989) found that matching information with a child's conceptual ability resulted in decreased anxiety and increased cooperation for the child. Adults need to be aware of language used when explaining procedures and providing information to children of different ages yet this is rarely taken into account when implementing coping strategies or developing coping instruments.

2.3.3 Measuring Coping

There is no consensus amongst researchers on how to measure coping in children. Ryan-Wenger's (1994) review of child coping measures identified 13 instruments measuring coping styles and nine measuring coping strategies, representing seven different

theoretical orientations. This plethora of coping measures reflects the complexity of the concept and difficulty in studying child coping.

A methodological problem with some instruments is that they are based on self-report measures. Research with children has found that predicted behaviour does not match actual behaviour (Stevens, 1989). Asking children to self-report on the specific stressful situations they have experienced presents difficulties in interpretation as children may not accurately recall the experience, or may unintentionally have altered their memory into a 'wishful thinking' episode, or simply report what they believe the researchers consider 'correct' behaviour. A far more accurate investigation of child behaviour would be to observe actual behaviour in a natural 'real' situation.

A problem with some existing measures is that they are too unwieldy to use. For example Murphy and Moriarty (1976) used the Comprehensive Coping Inventory that consists of 999 variables and the Ways of Coping Checklist (Folkman & Lazarus, 1980) which consists of 66 items. Some measures that have measured child coping in medical situations have questionable validity such as Rose's Coping Assessment Tool (Broome et al., 1990; Rose, 1984), which includes categories that are not mutually exclusive and therefore would confound results. The Children's Coping Strategies Checklist (CCSC: Ritchie et al., 1988; Ritchie, Caty, Ellerton, & Arklie, 1990) has low internal consistency little overall variance in the sample, and the population tested was from the one hospital (Ritchie et al., 1988).

Chess (1967) and Chess and Thomas (1985) developed a coping instrument based on temperament, hence its validity in measuring general coping behaviours is questionable. In addition the three behavioural styles developed ascribe to a child a judgemental label,

that is Easy, Difficult or Slow to Warm Up, which can interfere with the objective interpretation of results. The 'Kidcope' (Spirito, Stark, & Williams, 1988) measured general child coping and has questionable reliability as each coping strategy is only represented by one item and was tested on a restricted adolescent age sample, thereby limiting its generalisability to younger age groups. The Schoolagers' Coping Strategies Inventory (Ryan-Wenger, 1990) also measures general coping and had an adequate internal consistency (.79) but was tested on a white population from one town which limits its generalisability.

Added to the problems inherent in coping measures is the feasibility and appropriateness of using such measures for acutely ill populations undergoing high stress events such as venepunctures. It is likely that self-report and parent-report measures used in some measures may not be accurately recorded due to distractions related to coping with the stressful environment. The ages of test populations in some measures may not be applicable to a wide age group of children, as children may have different coping behaviours according to age.

2.3.4 Measuring Child Distress

Research into child distress suffers from the same methodological confusion as studies into child coping. Katz et al. (1980) developed the Procedure Behaviour Rating Scale (PBRS) to observe the response of children with cancer to bone marrow aspiration. The 25 items were derived from clinical observation and included Cry, Cling, Questions and Requests termination, and scale development deleted non-occurring and low-occurring (less than 2%) items. However, the items deleted occur during venepunctures, for example, Laugh, Curse, Stoic silence, Kick, Hit and Verbal hostility, therefore the use of

this scale would not elicit valid data for venepunctures. The instrument has questionable validity when used during bone marrow aspirations as the measure does not distinguish between anxiety, coping and pain behaviours, which may confound the results (Shacham & Daut, 1981).

The Observational Scale of Behavioural Distress (OSBD; Jay & Elliott, 1984; Jay et al., 1983) is based, in part, on the PBRS. The OSBD made two major methodological revisions of the PBRS, which included behaviour intensity and behaviour recorded in time intervals. However, the instrument does not clearly differentiate between anxiety, pain and child distress. The instrument has questionable validity as it is unclear which constructs are being measured, yet the OSBD has been widely used in child coping studies and in procedures other than bone marrow aspirations (Bachanas & Roberts, 1995; Blount et al., 1992; Gonzalez et al., 1993; Kleiber & Harper, 1999).

Few instruments have measured parent-child interaction. Blount et al. (1989; 1991; Blount, Bunke, Cohen, & Forbes, 2001) developed the Child-Adult Medical Procedure Interaction Scale to measure distress, coping and interaction during bone marrow aspirations. Testing was on a population of children undergoing immunisations and found the concurrent and construct validity satisfactory, however the scale's categories only measure verbal behaviours. Bush, Melamed, Sheras, and Greenbaum (1986) developed the Dyadic Prestressor Interaction Scale, based on social attachment theory (Bretherton & Ainsworth, 1974), to assess parent and child behaviours pre-procedure but the scale does not include child control behaviours. Therefore, although there are instruments to measure coping and distress no single instrument is valid or appropriate for use during venepunctures.

2.4 Strategies used to Assist Coping and Minimise Child Distress

Strategies to assist children to cope with a venepuncture or other painful medical procedures have been investigated but results remain equivocal. Differences in results are probably due, in part, to methodologies where the concepts, theoretical bases and procedures vary creating difficulties in comparing results. Results from adult coping studies have been applied to develop coping strategies for children undergoing painful medical procedures (Peterson, 1989) without regard to their appropriateness. Strategies used to minimise child distress and anxiety include information-giving, distraction, relaxation techniques and participant modelling, however no one strategy has been found to decrease distress in all children.

2.4.1 Sensory And Procedural Information

There is a widespread belief that providing information pre-procedure to adults will lessen their anxiety during the procedure (Egbert et al., 1964; Hunsberger, Love, & Byrne, 1984; Janis, 1958; Kolk, van Hoof, & Fiedeldij Dop, 2000; Miller, 1980; Rasnake & Linscheid, 1989). This strategy has been applied to children, however evidence to support the effectiveness of this strategy is inconclusive (Suls & Fletcher, 1985), which may be partly due to the nature of the information given. The provision of sensory information (related to sensations a child will experience) did not significantly decrease the distress of children (Christiano & Russ, 1998; Smith et al., 1989), yet procedural information (the actions the staff will perform) decreased child distress (Harrison, 1991). However, variations in methodologies between studies, such as measuring instruments, populations and settings and small subject numbers, makes it difficult to draw conclusions from these studies.

An influencing factor in the provision of information may be the person's predisposition for seeking or avoiding information. The congruency hypothesis refers to the concept that if an intervention style matches the person's coping style then it will be more effective in decreasing distress and anxiety than an incongruent intervention (Christiano & Russ, 1998). However, support for the congruency hypothesis is inconclusive. When information was matched to coping style, that is those children who were predisposed to seek information were given information pre-procedure, children's distress during dental restoration (Christiano & Russ, 1998) and pain during bone marrow aspiration (Smith et al., 1989) increased. However, Fanurik et al. (1993) found that matched interventions supported the hypothesis and tolerance to cold pressor pain increased. The findings may be related to methodological differences as the studies had different measures, settings, age groups and procedures. Fanurik et al.'s study was in a laboratory and may not reflect children's responses during medical procedures such as venepunctures. The chronic nature of children's illness and familiarity of the procedure for the children in Smith et al.'s (1989) study could have affected the children's coping styles, and Christiano and Russ' study was in a dental setting which may provide different stressors than medical procedures. An influencing factor on the effectiveness of matched interventions may be the proportion of information-seeking and information-limiting behaviours generally used by each child. Thompson (1994) found that those children anticipating tonsillectomies who used a mix of information-seeking and information-limiting behaviours were more anxious than children who used predominantly information-seeking or information-limiting behaviours.

In some studies the procedural information has been included with other treatments, such as participant modelling (Jay, Elliott, Katz, & Siegel, 1987; Jay, Elliott, Woody, & Siegel,

1991; Peterson & Shigetomi, 1981) but the effects of the information on the child cannot be differentiated from other treatments. In these studies parents were involved with the child yet no investigation of the parents' contribution to the children's coping processes were undertaken.

2.4.2 Distraction

Distraction techniques have been frequently employed to minimise child anxiety and distress during medical procedures, that is "any intervention intended to focus the subject's attention away from pain or discomfort" (Kleiber & Harper, 1999, p. 45). In a review of the literature by Kleiber and Harper (1999), 33% of the studies related to distress (n=5) reported no significant effects for child distress and 75% of studies related to pain (n=7) reported no significant relationships. Of the seven studies that used distraction during venepunctures all differed in the distraction techniques used, which included music (Arts et al., 1994), party blower (Manne et al., 1990), toy (Smith, Barabasz, & Barabasz, 1996), kaleidoscope (Vessey, Carlson, & McGill, 1994), story (unpublished doctoral dissertation by Olsen as cited in Kleiber & Harper, 1999) distraction talk and deep breathing (Powers, Blount, Bachanas, Cotter & Swan, 1993) and cartoons (unpublished doctoral dissertation by Zabin as cited in Kleiber & Harper, 1999). Many measured child distress differently, for example Smith et al. and Powers et al. used the OSBD (Observational Scale of Behavioural Distress), Manne et al. the PBRS (Procedure Behaviour Rating Scale), and the others self-developed scales except Vessey et al. who used a pain scale (CHEOPS: Children's Hospital of Eastern Ontario Pain Scale) to measure distress. Almost all had different age ranges, sample populations and sample sizes that ranged from four (Powers et al., 1993) to 100 (Vessey et al., 1994). These differences make it difficult to identify the effect distraction has on child behaviour

during venepunctures. Different distraction techniques may have different effects upon the child and may only be suitable for specific age groups.

Results from other studies that utilised distraction techniques are inconclusive. The use of party-blowers by Blount et al. (1992, 1994) produced mixed results, helping some children but not others (Blount et al., 1992; 1994). The amount of parent coaching and the possible decrease in parental anxiety through coaching may account for some of these effects. Music has been found to only assist children during non-painful phases of painful medical procedures (Arts et al., 1994; Malone, 1996) and cardiac catheterisations (Caire & Erickson, 1986). Music may not totally engage a child's attention to distract from painful events. Harrison (1991) used story books to prepare children for venous blood sampling and found a reduction in distress behaviours in children aged 6-12 years, but no age, gender or parental presence effect was investigated. Imagery has been successfully used to decrease pain (Fanurik et al., 1993) and distress (Kazak et al., 1996; Peterson & Shigetomi, 1981) by distracting the child's thoughts away from the stressor. Fanurik et al. used rehearsal and imagery (thoughts of pleasant activities) to cope with cold pressor pain but these results may not be applicable in actual painful medical procedures due to the presence of different stressors and the influence of parents. Kazak et al. (1996) used a variety of imagery techniques (imagining special pleasant places or the warm sun upon the child's body) during bone marrow aspirations but the children were also sedated so the use of imagery may not give similar results during venepunctures. Other studies have given children both information and distraction for same-day surgery preparation (Faust, Olson, & Rodriguez, 1991) and bone marrow aspirations (Jay et al., 1987) however it is difficult to differentiate the treatment effects for each coping technique. The role of distraction in child coping remains unclear with further research needed to identify the

relationships between child coping behaviours and the different variables related to distraction.

2.4.3 Relaxation

Relaxation techniques include the use of sedation (Jay et al., 1987; Kazak et al., 1996), guided imagery (Faust et al., 1991), music (Pfaff, Smith, & Gowan, 1989) and muscle relaxation (Christiano & Russ, 1998; Peterson & Shigetomi, 1981). Some studies combined relaxation techniques with other strategies (Faust et al., 1991; Jay et al., 1987; Kazak et al., 1996) so the effects of relaxation are unclear. Peterson and Shigetomi (1981) combined cued muscle relaxation, mental imagery and comforting self-talk as a relaxation/distraction strategy, and Christiano and Russ (1998) combined diversionary thinking, muscle relaxation and deep breathing as a strategy. However, different relaxation techniques may have different effects on children's coping. Pfaff et al. (1989) found that relaxing music only decreased distress prior to needle insertion but had no effect during the rest of the bone marrow aspiration, however the procedure was extremely painful for the child. It is unclear whether relaxation may be beneficial in less painful procedures such as venepunctures. In summary, the effect of relaxation techniques on child coping is not clear.

2.4.4 Participant Modelling

Participant modelling is where a series of behaviours is presented by researchers to a child prior to a medical procedure/event for the child to mimic during the event. It is assumed that these behaviours will decrease a child's distress. Techniques used include imagery (Faust et al., 1991; Jay et al., 1987; Peterson & Shigetomi, 1981), deep breathing

(Christiano & Russ, 1998; Jay et al., 1987; Peterson & Shigetomi, 1981), diversionary thinking (Christiano & Russ, 1998) and muscle relaxation (Peterson & Shigetomi, 1981). However, the effect of modelling is unclear as studies do not focus on the child's use of the technique during the procedure, only the outcome of distress levels. The presence of a parent during modelling training and the procedure may influence the child's use of modelling techniques, yet studies have not focused on parental influences during these interventions. Faust et al. (1991) found that children who were shown a participant modelling videotape alone had higher heart rates than children who saw the videotape in the presence of their mothers. Children who saw the videotape in the presence of their mothers had higher distress scores (although not significant) than children who viewed the tape alone. This may suggest that the mother was more relaxed after viewing the tape and the child senses and responds to this change, or that some maternal behaviours promoted less distress in children. Further research is needed to clarify the effect of parental behaviours on children's coping responses during painful medical procedures.

2.4.5 Combined Therapies

Several studies combine coping techniques in a treatment (Faust et al., 1991; Jay et al., 1987; Kazak et al., 1996), however the individual effect of each technique, and interactions between techniques, are not explicit. Jay et al. (1987; Jay, Elliott, Woody, & Siegel, 1991; Jay, Elliott, Fitzgibbons, Woody, & Siegel, 1995) have investigated cognitive behaviour therapy for children undergoing bone marrow biopsies. Cognitive behaviour therapy included filmed modelling (using active confrontation and mastery), breathing exercises, imagery/distraction, positive incentive (a small trophy) and behaviour rehearsal. The results of these studies indicated that cognitive behaviour therapy decreased child distress but only in some children (Jay et al., 1991). The

individual effect of each technique may account for some of the results. Therefore, identifiable strategies need to be investigated in order to understand their effects on child coping behaviours.

2.4.6 Summary

There is still little agreement among researchers on the most appropriate or effective strategy to assist children to cope during painful medical procedures. The results from research studies are contradictory, for example providing information is associated with both increased and decreased distress in children. The effects of distraction techniques are beneficial to children in some studies yet not in others. Parental behaviour may be part of the reason for such disparate results. Maternal presence was implicated in some studies as potentially influencing results and child behaviours. An understanding of the influence of parental behaviours on child coping is needed, which may clarify the large amount of conflicting and contradictory findings. It is clear that a deeper understanding of the influences on child coping behaviours is needed. The strategies used by researchers were rarely based on explicit theoretical or conceptual concepts, but usually on empirical evidence. Lazarus' stress-coping theory will assist in clarifying the nature of child behaviour by identifying potential influences on children's coping during venepunctures in a coherent framework.

2.5 Influences on Child Coping

Lazarus and Folkman (1984) classified coping influences as person or situation-specific. Person-specific factors include the meaning the encounter has for the person, the person's belief in the amount of control they have over a situation, their level of health and energy,

problem-solving, social skills and cognitive coping style. The stress-coping theory was developed from observations of adults and includes little discussion on the effects of different developmental levels on coping. Child-specific factors could include the age and developmental level of the child, as problem-solving and social skills are age dependent (Piaget & Inhelder, 1966/1969). There may also be less opportunity for a child to exert control in a situation compared to an adult. Prior experience, gender and temperament are other factors that may influence a child's reaction to a venepuncture (Rudolph et al., 1995).

Situation-specific factors, according to Lazarus and Folkman (1984), relate to the nature of the stressor and the timing of events. Stressor factors include the novelty, predictability, uncertainty, imminence, duration and ambiguity of the event. It has been previously shown that children are affected by these elements differently than adults. The timing of the event refers to the stage or phase of the procedure such as preparation or injection. Other situational factors have been identified in relation to children's coping. Rudolph et al. (1995) identified parental influences (e.g., parental presence or anxiety) as situational factors and interactional approaches, such as stressor-coping match and child-parent coping match, as potential influences on child coping. The interaction effects of person and environment have not been widely addressed in the research literature, although there has been interest in the individual contributions of certain child and situational factors.

2.5.1 Child Factors Influencing Coping

Several factors related to child characteristics have been identified as having some effects on child coping behaviours, for example child age and developmental level, gender, prior

medical experience, temperament and sense of control (Rudolph et al., 1995). These factors will be critically discussed in the following section.

2.5.1.1 Age and developmental level

Age has not been the primary focus of investigations in the coping literature, although it has been a major variable in many studies. The importance of age in research studies relates to the developmental level of the child. However, there have been methodological problems in children's coping research, such as the lack of consistent age groupings, different population samples and types of illnesses. Methodologies also differ in procedure and setting, measuring instruments, aspect of coping investigated (e.g., distress or pain) and definitions of terms. Some studies considered pre-procedure pulse rates as measures of anxiety (LeBaron & Zeltzer, 1984; Smith et al., 1989) although an increased pulse could also be an indicator of fear. LeBaron and Zeltzer (1984) and Jay et al. (1995) equated fear with anxiety. The Procedure Behaviour Rating Scale (Katz et al., 1980) and the Observational Scale of Behavioural Distress (Jay et al., 1983) measured anxiety and pain and equated this with distress. Clearly, there needs to be an agreement on nomenclature amongst researchers of child coping to avoid confounding results.

There is strong evidence that children's behaviours during painful medical procedures vary with age. Melamed, Dearborn, and Hermecz (1983) found that children aged 4-7 years were more anxious and fearful than older children pre-surgery. The Palmer Sweat Index (Johnson & Dabbs, 1967) has been used as measure of anxiety (Ellerton et al., 1994), however the Index has been found to vary widely between individuals (Gedaly-Duff, 1987). Children under the age of approximately seven years are more distressed than older children during medical procedures (Jay et al., 1983; Katz et al., 1980; Kazak

et al., 1996; Litman, Berger, & Chhibber, 1996; Malone, 1996; Melamed et al., 1983; Rudolph et al., 1995). In Caty et al.'s (1984) analysis of case studies toddlers (aged 20-24 months) had higher occurrences of cry, soliciting assistance and self-comforting (e.g., thumb-sucking) behaviours whilst pre-schoolers (3-5 years inclusive) had higher occurrences of mastery and control behaviours, tension-reducing (kicking, aggressive acts) and information-giving behaviours. Statistical differences between groups were not reported. LeBaron and Zeltzer (1984) found that children aged 6-9 years were more distressed than children aged 10 years and above. However, when they introduced the observations of 'flinching' and 'groaning' into the analyses no difference was observed. Discrepancies between studies could be due to measuring instruments and definitions of distress. Flinching and groaning can be considered characteristics of pain rather than distress. Perhaps adolescents experience no difference in pain compared to younger school-aged children, although they may exhibit less signs of behavioural distress. In some studies it was found that the expression of negative emotion was greater in younger children and declined as age increased (Eisenberg et al., 1989; Hyson, Snyder, & Andujar, 1982). One explanation for the high level of distress in younger children is the fear-wariness system, in which young children respond to strange situations with distress and avoidance (Bush et al., 1986) and relinquish control to others (LaMontagne et al., 1996). Another explanation is the disinhibiting effect of the parent on child behaviours, where the child feels safe to express emotion in the presence of the parent (Ainsworth, 1964; Gonzalez et al., 1989). Young children also have limited impulse control compared to older children due to their level of cognitive development (Piaget & Inhelder, 1969; Carson & Bittner, 1994) therefore are less likely to control motor activity which results in behaviours such as hitting and kicking. In addition, older children have greater language and problem-solving abilities than young children (Biblace & Walsh, 1980; Perrin &

Gerrity, 1981; Peterson, 1989) and would be expected to utilise different coping behaviours.

Age has also been found to be a factor in children's coping behaviours. Information seeking behaviours have been found to increase with age (Blount et al., 1989; Caty et al., 1984; LaMontagne et al., 1996; Melamed et al., 1983; Peterson & Toler, 1986), which may be related to the children's increased command of language and increased cognitive understanding. The use of problem-solving strategies, compared to emotion-focused strategies, have been found to increase with age in controllable situations (Band, 1990; Band & Weisz, 1988; Rudolph et al., 1995). In uncontrollable situations, such as medical procedures, the reverse occurs with older children found to use more emotion-focused behaviours than younger school-aged children (Bull & Drotar, 1991). This may be due to the adolescents' ability to realise that delays and protests will not affect the inevitability of the procedure. Similarly, a child's use of cognitive distraction, rather than escape strategies, such as refusal or delays (Altshuler & Ruble, 1989), increased with age. As age increased so did secondary control, that is, trying to adjust to circumstances (Band & Weisz, 1988). The perceived sense of control may be an influencing factor in child coping during venepunctures.

Adolescents have been found to exhibit low activity behaviours, for example sleeping (Pattern, Ventura, & Savedra, 1986), detachment (Stevens, 1989), distancing (Weisenberg et al., 1993) and emotion-focused behaviours (Stevens, 1989; Weisenberg et al., 1993) to deal with stressors. This contrasts with the more emotional and active behaviours found in children under 12 years of age (Caty et al., 1984; Stevens, 1989; Weisenberg et al., 1993). In developmental terms, the level of adolescents' cognitive ability is similar to adults' abilities.

Young children are more likely to depend upon adults for coping resources than are older children (Peterson, 1989), however few studies have investigated this aspect. There is a need for further research into parent-child interaction to clarify the effect of parental influences on child coping behaviours. Age has an important influence in children's coping due to the developmental levels of cognition and physical maturation. It can be expected that younger children will display more distress, fear and anxiety, use less information seeking and more active coping than older children during venepunctures. It seems as though child age may be an important influencing factor in child coping behaviours.

2.5.1.2 Gender

The role of gender in children' s coping is unclear. Although differences have been found in language (Moulden & Persinger, 1996) and physical skills between girls and boys (Nordberg, Rydelius, & Zetterstrom, 1991) in non-medical situations some studies found no differences in their understanding of illness (Carson et al., 1992; Perrin & Gerrity, 1981). Results of the effects of gender in children's anxiety and distress behaviours have been inconsistent (Rudolph et al., 1995). In studies of responses to bone marrow aspirations Weisz et al. (1994) found girls expressed more pain and anxiety than boys when reporting their past experiences of the procedure, and Katz et al. (1980) reported more 'cry', 'cling', and 'requests emotional support' in girls and more uncooperative behaviour in boys. Other studies report no differences in distress behaviours between girls and boys during bone marrow aspirations (Blount et al., 1989), venepunctures (Fradet, McGrath, Kay, Adams, & Luke, 1990; Jacobsen et al., 1990), and reaction to hospitalisation (Rodriguez & Boggs, 1998). The differences in results may be due to the expressions of distress displayed by each gender. Girls' reactions (e.g., cry) may be

classified as distress even though boys may be experiencing the same level of fear, anxiety and pain but displaying different behaviours (e.g., non-cooperation).

The effects of gender on child coping behaviours are unclear due to conflicting findings. No differences in coping behaviours between girls and boys were reported by several studies involving painful medical procedures (Bush et al., 1986; Ellerton et al., 1994; Frank, Blount, Smith, Manimala, & Martin, 1995; Jacobsen et al., 1990; Jay et al., 1983). However, other studies reported girls used more requests for emotional support (Frydenberg & Lewis, 1993; Weisenberg et al., 1993), resistance (Jay et al., 1983), wishful thinking and emotion-focused strategies (Kliewer, Fearnow, & Miller, 1996; Sharrer & Ryan-Wenger, 1995: Spirito, Stark, Gil, & Tyc, 1995) than boys. Boys have reported the use of more physical expression (Frydenberg & Lewis, 1993; Weisenberg et al., 1993) and attempts to control (Savedra & Tesler, 1981) in coping with stressors than do girls.

Parental influences may play a role in gender differences as mothers have been found to model active (attentive) coping to girls and avoidant coping to boys (Kliewer & Fearnow, 1996). Differences may be partly accounted for by the situational context as several studies (Kliewer & Fearnow, 1996; Sharrer & Ryan-Wenger, 1995: Spirito et al., 1995) did not involve children undergoing painful medical procedures. The influence of pain, fear and anxiety on children's responses to painful medical procedures may interfere with the child's everyday coping with stressors. Studies of the effect of child gender on parent behaviours during painful medical procedures are scant. However, Bush et al. (1986) found mothers restrained their daughters more during a medical examination. In summary, the results of research studies do not clearly describe the effects of gender in child coping.

2.5.1.3 Prior experience

Research into the effect of previous experience on child coping has provided mixed results. While some studies have indicated that children's prior experiences affect coping responses (Jay et al., 1983; Katz et al., 1980) others have found no effect on behaviour (Fradet et al., 1990; Rodriguez & Boggs, 1998). One reason for the difference in results could be the measures used, ranging from the total number of painful experiences (Dahlquist et al., 1986; Ellerton et al., 1994; Frank et al., 1995), specific procedures (Fradet et al., 1990; Katz et al., 1980) and the number of previous hospitalisations (Ritchie et al., 1988) or surgery (Melamed et al., 1983). Outcome measures also range from hospital adjustment, (Melamed et al., 1983), crying (Dahlquist et al., 1986), anxiety (Faust & Melamed, 1984) and coping behaviours (Dahlquist et al., 1986; Frank et al., 1995; Katz et al., 1980). Whether the experience was positive or negative can also have an effect on child coping. Dahlquist et al. (1986) found that children with negative previous experiences prior to a throat culture displayed greater distress during the procedure, although the study did not define the negative experiences or the child's age when exposed to the experience.

Young children with previous medical experiences have been found to be more distressed (Jay et al., 1983), anxious or fearful pre-surgery than older experienced children (Melamed et al., 1983). Jay et al. (1983) found younger children took longer to habituate to bone marrow aspirations than older children (7 years and over), needing at least 12 exposures for habituation effects to be seen. However, Katz et al. (1980) found no habituation effect, yet both studies used the same distress measure and involved bone marrow aspirations. Katz et al.'s study had a larger cohort that may affect results, and the

average number of previous procedures may have influenced results but this was not clear from the studies.

The type of illness experienced by children has been associated with prior medical experiences. Results from investigations of prior experience in chronically ill and acutely ill children are mixed. Ritchie et al. (1988) reported differences in coping behaviours between chronically and acutely ill children during fingerpricks, whilst Boekaerts and Roder (1999) reviewed studies focusing on functioning with daily stressors and found no differences. Differences between results may partly be due to the painful nature of the fingerprick compared to everyday stressors and length of hospital experiences.

The effect of prior experience in children's reactions to venepunctures is unclear due to the dearth of relevant studies. Results from non-venepuncture studies suggest that child age, type of experience and number of experiences may affect children's responses to the procedure. Methodological issues complicate the interpretation of results, such as differences in measures, methods and population samples.

2.5.1.4 Temperament

Temperament can be defined as the "behavioral (sic) style of the child in interaction with the environment" (McDevitt & Carey, 1978, p. 245). It can be inferred that children with different temperaments will react differently during venepunctures. Children who were categorised as less approachable, adaptable and rhythmic (predictable) were found to display higher levels of pain during venepunctures (Lee & White-Traut, 1996; Young & Fu, 1988) and more distress during immunisations (Schechter, Bernstein, Beck, Hart, & Scherzer, 1991). Children with these characteristics were also found to have more

behaviour problems and less successful adjustment to hospitalisation for surgery than children without these characteristics (Carson, Council, & Gravley, 1991; Quinonez, Santos, Boyer, & Cross, 1997).

Thomas and Chess (1977) state that temperament is the result of a parent and child interactive process, yet this has received little attention in child coping investigations. Carson et al. (1991) investigated children's post-surgical adjustment and found that maternal trait anxiety and rejection behaviour were associated with children's poorer adjustment. Temperament characteristics may influence the child's individual way of responding however a potentially important influencing factor that needs further investigation is parental behaviour.

2.5.1.5 Control

The concept of control has been investigated from different perspectives in child coping. An individual's belief in his/her ability to control events is referred to as Locus of Control. Children with an internal locus of control believe their actions influence events, whereas those with an external locus of control believe external forces control events (LaMontagne et al., 1996). LaMontagne et al.'s (1996) study of pre-operative coping found that locus of control was associated with age and coping style, as age increased so did internality of locus of control and active coping behaviours. This suggests that younger children may attribute the outcomes of venepunctures to external events and people rather than to their own behaviours.

The goodness of fit hypothesis (Conway & Terry, 1992) proposes that the effectiveness of coping strategies depend upon the perceived controllability of the stressor. Some events

give limited control to a child, such as venepunctures. According to the stress-coping theory the effectiveness of coping strategies will vary according to the appraised controllability of the event (Lazarus & Folkman, 1984). It has been suggested that problem-focused strategies would be used in high-control events and emotion-focused coping in low control events (Lazarus & Folkman, 1984). Band and Weisz (1988) found that children who perceived themselves as having a greater sense of control with everyday stressors had less anxiety and distress in response to a stressor. Weisz et al. (1994) found that children who reported using secondary control coping (attempts to adjust oneself to the situation) during bone marrow aspirations exhibited less distress during the procedure. Conversely, Carpenter (1992) found that children who perceived a venepuncture as low in controllability had greater distress and longer procedures. It follows that children who are given some element of control during venepunctures will exhibit less distress. However, Blount et al. (1989) found that during bone marrow aspiration the parental behaviour 'Giving control to the child' was followed by child distress behaviours. A reason for this result may be that control given by parents cued a painful event and the parental behaviour then was associated with the painful event by the child. Further investigation into the effect of giving control to the child will clarify this aspect of child coping.

An issue related to the concept of control is the nature of the procedure. Venepunctures are comprised of different stressors that allow varying degrees of control during the procedure. Hence, it can be expected that children's appraisal and responses will vary across the procedure.

2.5.1.6 Summary

From the previous discussion it is apparent that age, gender, prior experience, control, and coping style may interact, therefore supporting the view that coping is an interactive process. Although Lazarus and Folkman (1984) view coping as an interaction between person and environment it can be seen that intrapersonal interaction in children may also be present.

2.5.2 Environmental Influences on Children's Coping

Lazarus and Folkman (1984) stated that coping varies according to the situation. Venepunctures present a situation different to other painful medical procedures, for example the positioning of the child, actions involved, the setting and explanations used. Research into child coping during other medical procedures is relevant but may not fully apply to the study of children's coping during venepunctures.

2.5.2.1 Phase of procedure

There has been limited research into the effects of phase of the medical procedure on children's coping. If coping is a process then children's behaviour can be expected to change as the stressor changes. Venepunctures consist of a variety of stressors and different coping patterns may occur depending on the stage or phase of the procedure. The different stressors encountered in each type of procedure, for example bone marrow aspiration and immunisation, may help explain the disparate results from coping studies.

There is no consistency across studies in the definition of the phases of procedure, even for the same procedure (Blount et al., 1990). Ellerton et al. (1994) divided the

venepuncture into phases but conducted no correlational or comparative statistics on the results. Jacobsen et al. (1990) investigated parent and child behaviour during a venepuncture and found an interaction between parent use of explanation, phase of procedure and child distress. The timing of parental explanation also had an effect on the amount of child distress. These results support other findings on the influence of timing of events during a procedure on child coping (Broome et al., 1990; Katz, et al., 1980; LeBaron & Zeltzer, 1984). Blount et al. (1990) explored child distress during bone marrow aspirations and found child distress varied across phase of procedure, being highest at the beginning of the procedure and lowest after completion of the procedure. Other child behaviours also varied with phase, Verbal coping (Non-procedural talk, Humour by child) had a significantly higher occurrence in the first two pre-insertion phases than Audible deep breathing and the opposite pattern was reported during the bone marrow aspiration phase. Broome et al. (1990) also found a greater use of active coping by children (e.g., asking questions, attempting control, resistance, attacking) before needle insertion and a higher use of passive coping (e.g., motionless, ignoring, cooperation, avoidance) after insertion. No analysis for coping was undertaken so significance of these results cannot be assigned.

It is difficult to compare studies relating phase of procedure and children's coping behaviours due to different methodologies. There is some evidence that phase of procedure has a potentially important effect on the pattern of child coping behaviours. Therefore, the timing of parental behaviours may also be an important factor in child coping behaviours.

2.5.3 Parental Influences on Children's Coping

Parental behaviour has been cited as a situation-specific influence on children's coping (Peterson, 1989; Rudolph et al., 1995). However, it is proposed by the author that the influence of parental behaviour is closely related to the response of the child. Conceptually, parents are expected to influence child behaviour by the inter-dependent nature of the parent-child relationship. It has been suggested that infants and young children's carers act as coping agents for the children (White, 1959), and as a child develops the parent takes on less of the coping responsibility (Peterson, 1989). Hence parental behaviour is more than a situational variable, but rather a part of the child's coping resources. Early studies of parental influences on children's coping have focused on parental presence or anxiety during procedures. Only recently has the nature of child-parent interaction been explored, but only in a limited way.

2.5.3.1 Parental presence

Early research of parental influence on children's behaviour examined parental presence during medical procedures, but has produced conflicting results (Blount et al., 1991). Some studies found that parental presence was associated with increased child distress (Gonzalez et al., 1989; Gross et al., 1983; Shaw & Routh, 1982) whilst others found it decreased (Frankl et al., 1962; Vernon et al., 1967) or had no effect on child distress (Bauchner, Vinci, Bak, Pearson, & Corwin, 1996). Although some children may become more distressed during procedures with parents some studies have shown that most children preferred the parent to be present (Gonzalez et al., 1989; Ross & Ross, 1984). However, there seems to be no consistency in results between studies that had the parent absent from the beginning of the session (Frankl et al., 1962; Gross et al., 1983; Vernon et

al., 1967), and those in which the parent left halfway through the session (Shaw & Routh, 1982). Blount et al. (1991) assert that the separation of parent and child is an additional stressor to that of the medical procedure and hence the child may display different behaviours. Gonzalez et al. (1989) suggested emotional 'disinhibition' as an explanation for the different findings between studies, where children become disinhibited and display distress behaviours in the presence of a parent. A factor not mentioned by Gonzalez et al. was the potential influence that specific parental behaviours might have on a child's reaction to a stressor. It is probable that the specific nature of the parent-child interaction could influence child coping rather than the general presence or absence of the parent. Gross et al. (1983) suggest that conflicting results related to parent presence during medical procedures were due to the parent being a discriminant stimulus associated with comfort. The child associates comfort with parental presence and signals the need for comfort by crying.

The physical closeness of the parent to the child may also be an influencing factor in children's coping. A parent who is holding the child, or in close physical proximity, will be more likely to interact with the child. In the study by Gonzalez et al. (1989) parents were asked to sit on a chair during the injection and were not encouraged to be close to their child, and in Jacobsen et al.'s (1990) study 81% of the study population were seated on a parent's lap during the venepuncture. Both studies reported high cry behaviour in children. Weekes, Kagan, James, and Seboni (1993) found children over 11 years of age self-reported that handholding decreased their pain during painful medical procedures, preferring maternal handholding to other adults. There needs to be further investigations to clarify the effect of parental proximity on children's coping and the influences of other variables such as child age and type of procedure.

Parental presence and behaviour can also be regarded as a form of social support, considered to buffer the effects of stress (Cohen & Willis, 1985; Lazarus & Folkman, 1984). There has been little investigation of the role of the parent as part of the social support system of a child, as most studies consider friends and teachers as the support system (Ryan-Wenger, 1996). Although low social support has been found to be predictive of depression symptoms (Mabe, Treiber, & Riley, 1991) and stress-related injuries (Smith et al., 1990) these studies did not differentiate between maternal and other sources of social support. The effect of parental presence and social support on children's coping during venepunctures is unclear, however the effects of parental behaviours and interactions with children may significantly influence children's coping.

2.5.3.2 Parental anxiety

The Emotional Contagion Hypothesis (Hatfield, Cacioppo, & Rapson, 1994) proposes that a parent's emotional state can be transferred to the child resulting in an increase in child anxiety. However, research studies present conflicting results regarding the association between parental anxiety and child behaviours. The State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970) has been used widely to measure two types of anxiety; State anxiety, which is the current feeling of anxiety, and Trait anxiety which is the feeling of anxiety a person generally experiences. LaMontagne et al. (1996) only measured parental State anxiety and found high parental anxiety associated with high pre-operative anxiety and more vigilant (attention toward the procedure) coping behaviours in children. Frank et al. (1995) only measured parental Trait anxiety,which produced a significant effect in child neutral behaviours (Child informs about status, Requests relief from non-procedural discomfort, Assertive procedural verbalisation) during immunisations. Jacobsen et al. (1990) found no significant effects for Trait anxiety

but significant effects for State anxiety (on a visual analogue scale) on child distress. Bush et al. (1986) measured State and Trait parental anxiety but did not analyse the effects on child coping behaviours. However, some studies found that parental anxiety had no significant effects on child behaviours in a variety of procedures such as venepuncture (Ellerton et al., 1994), bone marrow aspiration (Jay et al., 1983) and immunisation (Broome & Endsley, 1989). Methodological differences could account for the conflicting findings. Some studies use a self-developed anxiety scale (Broome & Endsley, 1989) whilst others use different forms of the State-Trait Anxiety Inventory. Measures of child behaviours also differ, with studies measuring children's distress (Broome & Endsley, 1989; Bush et al., 1986; Jay et al., 1983), modes of coping (LaMontagne et al., 1996) and coping (Ellerton et al., 1994; Frank et al., 1995). It can be expected that a parent's feeling of anxiety would produce a set of behaviours that indicate to children the parent's emotional state. Parental agitation, thought to reflect anxiety, has been associated with child distress behaviours (Bush et al., 1986). However, the influence of specific parental anxiety behaviours on child distress behaviours has received scant attention by investigators.

The effects of parental anxiety on child distress from the literature are unclear. Jacobsen et al. (1990) found significant correlations between State anxiety and total child distress scores and relationships to Trait anxiety were not significant. Conversely Jay et al. (1983) found that Trait anxiety scores were related to child total distress scores. Both studies used the same measure of child distress and parental anxiety and both involved children with cancer, however Jacobsen et al.'s study investigated venepunctures whereas Jay et al.'s study investigated bone marrow aspirations. The distress measures in the studies used an overall distress score yet children may respond to parental anxiety with changes

in specific behaviours rather than overall distress behaviours, as total distress behaviours may also reflect children's fear, pain and anxiety. These views support the use of a coping measure that identifies specific child behaviours rather than total distress scores. In addition, the majority of children (81%) in Jacobsen et al.'s study sat on their parents' laps during the procedure. The nature of the venepuncture and proximity to the parent may influence the effects of parental anxiety. Close contact of the parent with the child may transmit current state of anxiety to the child more effectively than when the parent is not close to the child. This aspect is difficult to elicit from studies as few report the proximity of the parent to the child. Child age may also be involved as young children were found to exhibit high distress behaviours (Jay et al., 1983; Katz et al., 1980; Kazak et al., 1996), and high parental anxiety was associated with lower child age during medical procedures (Litman et al., 1996; Parkinson, Gordon, Camfield, & Fitzpatrick, 1999). In summary, no clear relationship between parent anxiety and child coping behaviours can be found from the literature.

2.5.4 Parent-Child Interaction

Lumley, Abeles, Melamed, Pistone, and Johnson (1990) stated that the outcome of coping was not determined by child or maternal characteristics alone but by the interaction of the two. From the literature two parental behaviours have been consistently associated with child behaviours, distraction and reassurance. Kleiber and Harper (1999) reviewed the literature to identify the effect of distraction on children's pain and distress during medical procedures. Distraction was associated with a decrease in children's self-reported pain and observed distress during medical procedures. Sub-analyses were conducted for three studies having the same age group (3-7 years) and procedure (immunisation) but age and type of procedure only accounted for 60% of the effect size. This result is

supported by some studies (Blount et al., 1989; Bush et al., 1986; Gonzalez et al., 1993; Manne et al., 1992) where non-procedural talk by adults was not associated with child distress during painful medical procedures. In Blount et al.'s (1989) study non-procedural talk by adults promoted the same behaviour in children during bone marrow aspirations. Bush et al. (1986) found distraction correlated positively with pro-social behaviour (distraction behaviours) in the child. Manne et al. (1992) found distraction was associated with an increase in coping behaviours and decrease in distress and cry/scream behaviours during venepunctures in children with cancer. Conversely, Jacobsen et al. (1990) found that distraction (non-procedural talk) was associated with an increase in child distress during venepunctures. The majority of children in this study sat on the parent's lap during the procedure, which may have affected the parent's implementation of distraction behaviours.

Reassurance has been associated with child distress in several studies (Blount et al., 1989; Bush et al., 1986; Dahlquist, Power, & Carlson, 1995; Gonzalez et al., 1993). However, some studies also found reassurance associated with non-distress behaviours such as information-seeking and Makes coping statement (Blount et al., 1989), attachment behaviours (Bush et al., 1986) and coping (Audible deep breathing, Non-procedural talk by child, Humour by child, Makes coping statements) (Miller, Johann-Murphy, & Zhelezniak, 2001). Gonzalez, et al. (1993) investigated the effects of maternal distraction versus reassurance and found more distress was shown by children in the reassurance and control groups than the distraction group. Witkin's psychological differentiation theory (Witkin, Goodenough, & Oltman, 1977) has been proposed to explain these results (Broome et al., 1989), where parents engage in behaviours that provide cues to the child that the procedure is threatening. In this way reassurance may act as a danger signal to a

child (Miller, 1980) who then responds with distress behaviours. Another explanation is stimulus generalisation (Mussen, Conger, & Kagan, 1979), where the child has previously been exposed to parental reassurance in association with a similar stressful situation and then generalises this experience to the current situation.

Behaviours other than reassurance have also been associated with child distress, such as apology (Blount et al., 1989), criticism (Blount et al., 1989; Dahlquist et al., 1995), agitation and ignoring (Bush et al., 1986), giving control to child, empathy (Blount et al., 1990, 1991) and explanations (Jacobsen et al., 1990). One factor that may influence the response of the child to specific parent behaviours is the timing of the behaviour. It can be expected that parents and staff will exhibit different behaviours during medical procedures due to the different focus; a view that has been supported by at least one study (Dahlquist et al., 1995). Conversely, Frank et al. (1995) and Blount et al. (1991), using the same measurement tool for adult-child interaction, found no difference in child responses to parent and staff behaviours. However, the coping categories assessed in these studies were broad and may have lacked sensitivity to detect differences.

Although there has been some research into parent-child interaction the nature of the interaction is unclear. Some results have emerged regarding the influence of maternal reassurance and distraction but further research is needed to explore the relationships between parent, child and environmental variables within the venepuncture.

2.5.5 Parent-Child Interaction: Moderator Or Mediator?

It is contentious whether parent behaviour is a moderator or mediator of children's coping. A moderator is a variable that affects the strength or direction of the relationship

between an independent and dependent variable (Baron & Kenny, 1986). A mediator is a 'generative mechanism' (Baron & Kenny, 1986, p.1173) through which the independent variable is able to influence the dependent variable. In the context of stress-coping theory gender and developmental level are examples of moderator variables and cognitive appraisal an example of a mediator. There is some confusion in the research literature regarding the definition of moderators and mediators, with some studies using the terms interchangeably (Baron & Kenny, 1986). Findley and Cooper (1983), when seeking to interpret data as moderators, labelled gender, age, and race as mediators. Rudolph et al. (1995) stated that parental influences moderate a child's coping. LaMontagne et al. (1996) found that parental anxiety moderated children's pre-operative anxiety. However, the moderating or mediating effects of specific parental behaviours exhibited during a complex parent-child interaction needs further investigation.

2.5.6 The Need for Further Research into Coping

The discussion has shown that coping is a complex phenomenon involving an interaction between child, parent and environmental characteristics. The cognitive development of children can affect their appraisal of events, and therefore is one factor that influences children's reactions to venepunctures. Other child factors implicated in influencing coping include the appraised controllability of an event, gender and prior experience. Environmental factors influencing child coping include the timing of events during a procedure and the nature of the stressor. Parental characteristics that may influence child coping are anxiety level and the specific behaviours directed to the child during a venepuncture. However, the relationships between child, parent and environmental characteristics are not clear as results from studies are inconclusive. The major reason for the confusion of results in child coping is the inconsistency of methodologies between

studies, including measurement, conceptual bases and populations. Investigations into child coping have identified coping strategies used by children but the results have been inconclusive. Few studies have investigated the reasons for these differences or placed the reasons within a theoretical context. No definitive concept of child coping has been identified or agreed upon. Lazarus and Folkman's (1984) stress and coping theory offers a flexible and comprehensive approach increasingly accepted by researchers as a basis for studying children's coping. However, the theory is based on adult concepts and needs further adaptation to children's coping.

Other factors that may affect child coping responses need to be investigated, for example the timing of the procedure, child age, gender and control. Research into children's coping shows parental behaviour may be an important factor in children's coping responses, providing the link between child behaviour and the influence of the environment, yet few studies have investigated this concept. The nature of child coping is an interactive process with the environment, hence parent-child interaction may be important in explaining some of the inconsistencies in coping research. In order to develop a theory of child coping further research is needed into parent and child interaction during venepunctures.

2.6 The Aims of this Study

The purpose of this study is to explore the nature of parent-child interaction during a venepuncture through naturalistic observation to accurately record specific behaviours exhibited by parents and children. There are three main aims for the study: first, to describe parent and child behaviours during each phase of a venepuncture; second, to examine the interaction between parent and child characteristics; and finally, to explore

the relationships and interaction between specific parental behaviours and child coping behaviours.

To achieve the first aim parent and child behaviours during each phase of the venepuncture will be described and the most commonly occurring behaviours for parents and children in each phase of the venepuncture identified. For the second, the interaction between parent and child behaviours and characteristics during the venepuncture will be examined and differences in child and parent behaviours noted according to child age, child gender, parental anxiety, parental relationship and phase of procedure. Pain concepts will be explored by identifying if younger children report higher pain scores than older children, whether the application of EMLA decreases pain scores in children, if parents are able to predict their child's reaction during a venepuncture, and whether highly anxious parents have children who display high distress behaviours. The final aim explores parent-child interaction by identifying patterns of interaction between parents and children during the venepuncture. Parental behaviours that promote child distress and non-distress behaviours and patterns of parent-child interaction related to child coping will be examined. The goal is to investigate the relationships between specific parental behaviours and specific child coping behaviours. A detailed description of the study design enabling these aims to be achieved is given in the following chapter.

Before describing the study's methodology the following assumptions need to be noted:

i) that children desire freedom from tenseness and anxiety although they may be unable to express this wish, and

ii) children will utilise parents as part of their coping resources.

CHAPTER - 3 METHODOLOGY

This chapter documents the methodology used to conduct the study and includes a description of the study setting, research design, sample and sample selection, measures of key variables and data collection procedures. Included is a description of observational procedures and results of the pilot test conducted to confirm reliability of observations and coding of selected measures. The chapter concludes with a discussion of ethical considerations and data analysis strategies.

3.1 Study Design

This study will provide a unique investigation into the exact nature of the parent-child interaction process and its influence on child coping behaviours during venepunctures in an acutely ill population in an Emergency department. Previous research investigating aspects of child coping and distress have been inconclusive. A descriptive-exploratory study was therefore employed to identify the relationships between specific parental behaviours and specific child coping behaviours. In this thesis parental behaviours that promote or inhibit coping will be identified. A study design was selected that was compatible with the stress-coping theory of Lazarus and Folkman (1984). The theory states that coping is situation-specific and changes dynamically over time. A naturalistic environment was selected in which behaviours could be observed specific to venepunctures. A naturalistic setting is also necessary for the accurate description of coping processes (Folkman & Lazarus, 1988) during the different stages of the procedure

in order to determine whether children's coping changes over time and between stages of the venepuncture.

3.2 The Setting

The location for the study was the Paediatric Emergency Department of a large urban paediatric hospital. The hospital has a policy of cannulating every child prior to admission so that intravenous access is available for obtaining blood samples or administering medications. It is in the Emergency Department that the decision is made to admit a child and insert the cannula prior to transfer to a ward. Therefore the Emergency department was a suitable location for the study as well as providing unique data on an area that has had scant attention in child coping research. The hospital has 350 beds and 120 departments, is a major referral hospital providing 24-hour emergency care and assesses an average of 100 children a day.

The Emergency Department consists of three main areas: triage, assessment and observation (see Figure 3-1 on page 61). The triage area is attended by a nurse for the purpose of initial patient contact and assessment of the urgency for medical treatment. The assessment area consists of twelve assessment rooms (called cubicles) and a central open area where patients may wait during some treatments. It is in the assessment area that the decision is made to admit the child. Once the child is to be admitted the child moves to the observation area that consists of two rows of beds in a large room. It is from the observation area that children were recruited for inclusion in the study. The procedure room is equipped with an examination table (bed) for performing venepunctures and other procedures, a trolley with the necessary equipment and an overhead bed light. There were

also some colourful children's posters on the walls. The procedure room was the observation site for all children included in the study.

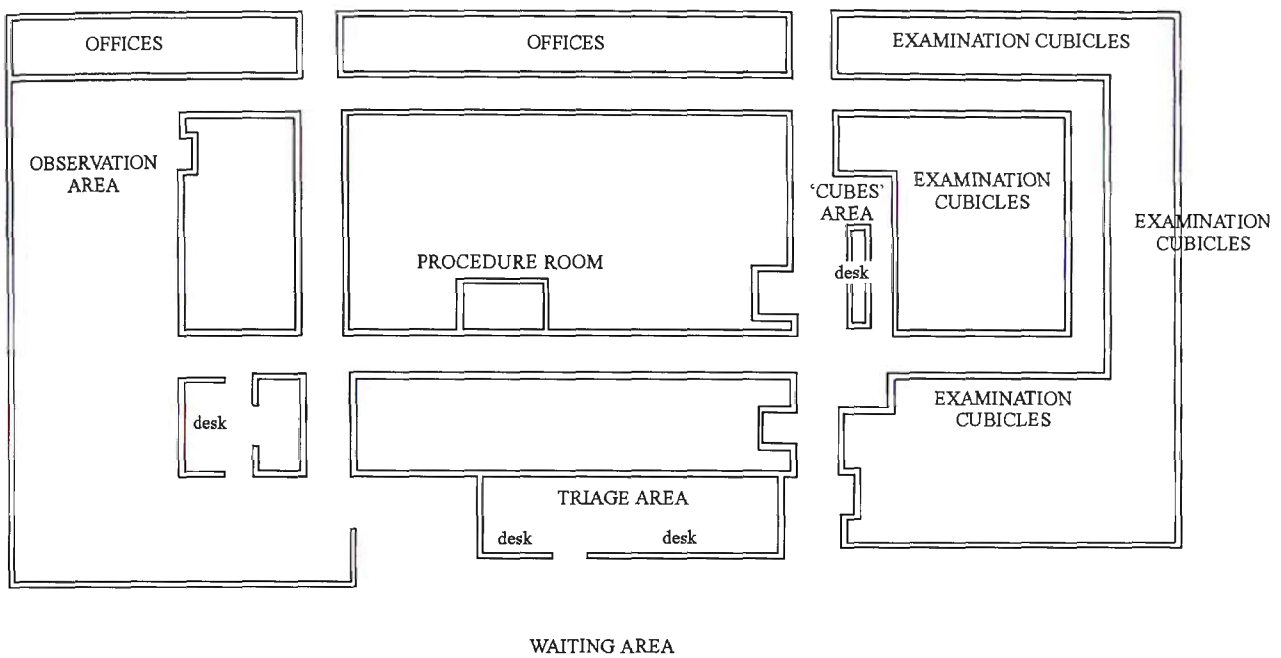


Figure 3-1: Floorplan of Emergency Department (not to scale)

3.3 The Participants

The participants in this study were 66 children who had a venepuncture and their respective parent/guardian forming 66 parent-child dyads. The selection of subjects was by non-random convenience sampling as the nature of the setting precluded the use of random sampling methods. However, time-periods for recruiting participants were randomly determined in blocks of six hours across a 24-hour day over a four-month period. The ages of the children ranged from 3 years to 11 years and 9 months. This age range was selected in order to explore whether parental responses differed according to the different developmental levels of the child, and to enable comparison of findings with previous studies. Children under the age of three years were not selected as they have difficulty expressing their feelings and needs through speech. Children twelve years of age and older were also excluded due to physiological and emotional difference between

individuals of the same age as a result of pubertal changes in some individuals. Other criteria for selection into the study were that the child was accompanied by a parent or guardian and that the child and parent could understand English. Children were excluded from the study if they: suffered from traumatic or multiple injuries or had a serious illness such as cancer or shock; presented to the Emergency Department by ambulance; suffered from a chronic illness which necessitated their current admission; or, had a physical/sensory handicap or developmental delay. All parent-child dyads meeting the study criteria were asked to participate until 70 dyads were selected. Only two parents refused to participate in the study, stating that they were too worried to participate. Four participant dyads were later rejected (see section 3.10.1 on page 79 for further discussion). The final sample included a large proportion of participants who resided more than 10 kilometres from the hospital (30%) and therefore provided a wide cross-section of the community.

3.4 The Venepuncture Procedure

Before any decision is made as to whether the child requires a venepuncture all children presenting to the Emergency Department are triaged. Triage is a brief initial assessment by a nurse to determine the urgency of a child's condition. The presenting child is then reviewed by a doctor in the assessment area of the department to determine the nature of the condition and potential treatments, such as venepunctures. The child is weighed, has a physical examination and a medical history is obtained from the parent. If the child is to stay in the department he/she is allocated a bed in the observation ward. This procedure is common to all children before a venepuncture is performed. In the study hospital all venepunctures are conducted by doctors. The venepuncture procedure consists of three main stages; preparation, insertion and post-insertion.

3.4.1 Preparation for the Venepuncture

Prior to venepuncture a local anaesthetic cream, EMLA™ (lignocaine 25mg/g and prilocaine 25mg/g), is applied, time permitting, by nursing or medical staff to at least two sites on each child, for example the back of the child's hand and inner elbow. The cream is usually applied 60 minutes before the procedure begins following departmental policy. An occlusive dressing is applied over the cream as recommended by the manufacturers.

The doctor explains the procedure to the parent and child. Immediately prior to the procedure the EMLA cream is wiped off, the adhesive occlusive dressing removed and a tourniquet is applied and tightened around the child's arm. The child's arm or hand is then swabbed (wiped) with an alcohol solution and the site is palpated. Palpation is a gentle pushing action by the doctor's fingers upon the skin's surface to locate a vein for insertion of the cannula. The doctor may need to tap the child's hand over the insertion site to assist in locating the vein. To minimise movement during the procedure, the child is laid in the supine position (flat on his or her back) prior to insertion of the needle, or if the child is young the child may be wrapped in a sheet limiting limb movements. This may be accomplished at any time during the preparation procedure depending upon the child.

3.4.2 The Venepuncture

A cannula needle is inserted through the child's skin and into the vein and the tourniquet is released. The needle is then removed and the small plastic tube around the outside of the needle is left in place. If only blood samples are required in older children the doctor may use a hypodermic needle attached to a syringe to pierce the skin and withdraw blood.

Sometimes the needle pierces both sides of the vein, or the vein cannot be located, requiring the needle to be withdrawn and inserted into another site.

For the cannula to remain in place small thin strips of tape are applied to secure the external part (the hub) of the cannula tube. The child's arm is then taped to a small board to minimise the chance of dislodgment of the cannula. A small plastic cover is placed over the cannula site for added protection. Often the child's arm is bandaged to minimise child interference with the cannula. In the time immediately after completion of the procedure a nurse or doctor informs the child the procedure is over and notifies the parent of the next step in the medical treatment. The nurse also asks the child or parent if they have any questions regarding the procedure or further treatment. For the purposes of analysis the phases of the venepuncture were coded as: 1 = Pre-procedure, 2 = Preparation, 3 = Insertion, 4 = Procedure, and 5 = Post-procedure.

3.5 Measures

A number of measures were employed to describe child and parent behaviours and to collect demographic and medical details. These will be described and discussed below.

3.5.1 Demographic/ Medical History

A brief (10-15 minutes) self-report questionnaire (Appendix A, on page 244) was administered to the parent/guardian to obtain information on their age, relationship to child, occupation, language used at home, educational level, income and the child's expected level of cooperation with the venepuncture. The parent's partner's occupation and educational level were also requested. Information on the child was also sought and included the child's age, gender, attendance at school or preschool, previous experience

with painful medical procedures and hospitals, and if they had coexisting minor medical conditions.

3.5.2 Parental Anxiety

Parental anxiety was measured using Spielberger's (1983) State-Trait Anxiety Inventory-Form Y (STAI). The inventory incorporates two 20 item scales (Appendix A on page 244), the State Anxiety scale (S-Anxiety) and the Trait Anxiety scale (T-Anxiety). State anxiety is the level of anxiety experienced at the time of completion of the inventory, whereas trait anxiety measures "anxiety-proneness" (Spielberger, 1983, p. 1) when perceiving stressful situations in general. Items on the state anxiety measure are responded to on a 4-point scale from 1 (not at all) to 4 (very much so). Items on the trait anxiety measure on a 4-point scale from 1 (almost never) to 4 (almost always). Responses to items on each scale are summed to provide a total state or trait anxiety score ranging from 20 to 80.

The STAI has been widely used and validated over the past 20 years. Normative data was collected by Spielberger (1983) across several studies involving 4,818 persons classified as working adults, college students, high school students and military recruits. Cronbach's alpha coefficients for all groups was .89 or higher on both the state and trait forms of the inventory. From tests involving college students the resulting stability coefficients for trait anxiety ranges from .73 to .86, with as median reliability coefficient of .77. The stability coefficients for the state anxiety scale ranged from .16 to .62 with a median reliability coefficient of .33. This relatively low stability on the S-Anxiety scale is to be expected as the measure assesses change in anxiety in current situations (Spielberger, 1983).

3.5.3 Pain

The Faces Pain Scale developed by Bieri, Reeve, Champion, Addicoat, and Ziegler (1990) was used for this study. The 7-point scale consists of a printed row of seven faces with each face 4 cm in height. The first face has an expression of neutral affect and is ascribed a value of 0 ('no pain'). Each face in the scale progresses through different expressions of pain to the final face (right-hand side) showing severe pain and ascribed the value 6 ('worst pain ever imagined'). The child was asked to rate his/her level of pain experienced during the Insertion phase of the venepuncture (Appendix A on page 253). The scale has the advantage of focusing on pain intensity and not affect such as happiness. Bieri et al. (1990) tested the Faces Pain Scale over a series of five studies with revisions considered after each study. The instrument was tested in an earlier study (Bieri et al., 1985) and was found to discern different severities of pain in children aged 2-12 years. The test-retest rank correlation coefficient for the scale was .79.

Wong and Baker (1988) compared several pain assessment tools and found that children aged 3 to 18 years preferred a faces scale over other forms of pain scales such as visual analogue scales. In addition, children as young as four years old have been found to distinguish between facial patterns and responses (Felleman, Barden, Carlson, Rosenberg, & Masters, 1983; Walden & Field, 1982). Other faces scales have been used (McGrath, de Veber, & Hearn, 1985; Whaley & Wong, 1987) but they include a smiling face at the no-pain end of the scales and require the child to rate his/her happiness or sadness in relation to their pain. These scales would confound the description of pain as the scale measures both affect (happy/sad) and pain. In addition, young children under about 8 years of age can only understand one meaning of a word (Pontious, 1982) and the implied double meaning of these pain scales, sadness and pain, may lead to confusion of the child

over use of these scales. Therefore the Bieri et al. (1990) Faces Pain Scale was considered to be the most appropriate for this study as it specifically measures pain intensity and has the additional benefit of having been developed and normed on local population samples.

3.5.4 Parent-Child Interaction

A modified version of the Child-Adult Medical Procedure Interaction Scale (CAMPIS: Blount et al., 1989), was used in this study. The original CAMPIS was developed from previous research by Blount, Corbin and Wolfe (as cited in Blount et al., 1989) and tested on children during bone marrow aspirations to specifically measure parent-child interaction during medical procedures. This scale allows for categorisation of phases of a medical procedure and adult and child vocalisations related to child coping. The original CAMPIS tool (Blount et al., 1989) consisted of 35 codes, 19 adult codes and 16 child codes, for vocal behaviours (Appendix B on page 255). The obtained kappa results for inter-rater reliabilities were .80 for the 19 adult codes and .92 for the 16 child codes. Three codes were subsequently discarded, the Commands for managing child behaviour (SMC), Current general status comments (CGST) and Child general condition-related talk by child (CGCT-child) due to lower agreement scores (below 70%) and one miscellaneous code *other* was added. The mean percentage agreement (Gelfand & Hartmann, 1984) for the remaining 32 codes (not including *other*) was 89% with a range of 71-100% (Blount et al., 1989).

The CAMPIS tool was considered a most appropriate interaction measure for this study. The tool is consistent with the stress and coping theory as it considers all behaviours as coping behaviours and it is context-based (Lazarus & Folkman, 1984). However, the measure was developed specifically for children undergoing bone marrow aspirations and

lumbar punctures. To ensure all behaviours exhibited by children and parents during venepunctures were represented, the tool was modified by adding non-verbal behavioural codes to provide a more comprehensive categorisation of child and parent interaction. The modified scale was tested and refined in a pilot study and further details are provided in sections 3.6.6 and 3.6.7.

3.5.5 Child Coping

In this study child coping behaviours were considered as all attempts by the child to manage the situation. The measurement of coping was therefore empirically derived. The child coping behaviours of the CAMPIS-CT tool were collapsed to give four major categories of coping: coping-distress, information exchange/control, distraction and coping-other. These categories were derived from previous research (Blount et al., 1989, 1990, 1991; Caty et al., 1984; Cohen & Lazarus, 1973; Ritchie et al., 1988) and observation.

3.6 The Pilot Study

A pilot study was conducted to test the data collection procedure to assess the reliability of key measures using 12 child-parent dyads during venepunctures in a paediatric Emergency Department not used for the main study. The study videotaped parents, children and staff during venepunctures.

3.6.1 The Participants

Any parent-child dyad presenting at the Emergency Department at random time-periods that fulfilled the selection criteria was asked to participate in the study until 12 dyads

were selected. One parent declined to participate in the study as she had a scarred face from a previous burn injury and did not wish to be videotaped. All children were to have venepunctures as part of their medical treatment. Two dyads were excluded from the study, one due to equipment malfunction and the other to excessive background noise. Nine mothers and one father were in the final selection. The children consisted of 8 boys and 2 girls, 7 were aged under 5 years and 3 were aged 5-6.9 years.

3.6.2 The Setting

The setting was a paediatric Emergency Department different to that used in the main study. The plan of the department was similar to the department used in the main study; it consisted of a triage area, an observation area and examination cubicles. The venepunctures were performed in a designated procedure room.

3.6.3 Measures

Demographic data were obtained using a questionnaire (Appendix A on page 244). The State-Trait Anxiety Inventory (Spielberger, 1983) was administered to measure parental anxiety prior to the venepuncture. A Faces Pain Scale was administered to each child 5 minutes after completion of the procedure. Poker chips (Wong & Baker, 1988) were used as an additional measure of pain in children 3-4.9 years of age. Each poker chip represents a 'piece' of pain and the children were asked to give the researcher the amount of pain they had using the corresponding number of chips. Five chips were given to the child with which to indicate their pain severity. Parent-child interaction was coded using the CAMPIS-CT measure (Appendix C on page 256) which was a modification of Blount et al.'s (1989) CAMPIS tool.

3.6.4 The Procedure

After gaining consent from the parents and children for participation in the pilot study the questionnaire was administered. Department staff had usually applied EMLA to the child in preparation for the venepuncture. The child proceeded to the designated procedure room accompanied by a parent for the venepuncture procedure. The researcher was positioned to enable a clear view of the procedure and yet to be as unobtrusive as possible. Videotaping with a VHS-sized camera commenced as soon as the child entered the room and ceased 1.5 minutes after the commencement of the Post-procedure phase.

3.6.5 Transcribing and Recording Codes

The verbal utterances from the videotapes were transcribed and verified by a research assistant. The videotaped interactions were then observed and non-verbal behaviours were identified by recording the behaviours on a designated form (Appendix D on page 258). The behaviours were recorded every 15 seconds. Time was also recorded at one-minute intervals using a stopwatch.

3.6.6 Modification of the CAMPIS Tool

The original descriptors for the CAMPIS vocal codes were expanded to include non-verbal behaviours (Appendix E, on page 259) for example, the code Verbal resistance became Resistance and any verbal or non-verbal indicators of resistance were coded as Resistance. In the original CAMPIS tool (Appendix B on page 255) Non-procedure related talk to child (by adults) and Non-procedure related talk by child (to adults) were given the same coded abbreviation, NPTC. To avoid confusion these codes were differentiated by the numeral 2 for the child behaviour that gave the child code NPTC2.

Similarly, the shared code, Child's general condition related talk, was also modified using the suffixes *A* for the adult behaviour and *C* for the child behaviour. Nine additional non-verbal behavioural codes were identified from the literature (Frankl et al., 1962; Jacobsen et al., 1990; Ritchie et al., 1988) and observation such as Behaviour cooperation and Behavioural interest (in the procedure). Other codes were derived from three nursing experts' extensive clinical experiences specifically related to medical procedures such as ignoring and relaxed behaviours. The non-verbal adult behavioural codes were Painful and Non-painful procedural behaviours, Procedural talk, Behaviour ceased and Behaviour ignoring child, and additional non-verbal child behaviours were Behaviour cooperation, Behaviour relaxed, Procedural talk to adult, Behaviour ceased, Behavioural interest, Child's general condition-related talk and Behaviour ignoring adult. This gave a final measure of 45 codes, 22 adult and 22 child codes, plus one shared code, Other, for the CAMPIS-CT tool.

3.6.7 Refinement of the CAMPIS Tool

The coded transcripts from the research assistant and the researcher were compared and the kappa reliability (Gottman, 1979) determined. The average kappa reliability for the adult codes was .87 and .94 for the child codes. Each individual code was assessed for percentage of agreement between raters. Two codes, Behaviour ceased by child and Behaviour ceased by adults, were found to have less than 70% agreement and were subsequently omitted from the measuring tool. This gave a measuring tool that had 43 codes, 21 adult and 21 child codes plus one shared code, Other.

3.6.8 Comments on the Pilot Study

The use of videorecording was intended for the main study, however advisers from the study hospital indicated that the use of videos would not be approved by the ethics committee so audiotapes were used. The pilot study hospital was unable to be used for the main study as the hospital closed down all paediatric services and relocated them to the study hospital.

The pilot study procedure was found appropriate and comprehensive to follow for the main study. The pilot study also highlighted the need for the researcher to be in frequent communication with Department staff during the study. It was found that without frequent reminders by the researcher the staff would perform venepunctures without notifying the researcher first. It was also found that the questionnaires took 5 minutes longer to complete than the original estimation of 10-15 minutes. The only changes to the procedure were the use of audiotaping and direct observation during the venepunctures instead of videotaping. However, the videotapes were available for trainer coding and agreement.

The Poker chip measure was not used in the main study. The first three children under the age of 5 years refused to use the chips; they withdrew from the researcher and cuddled their parents. However, two of these three children did use the faces pain scale with the parents' assistance and encouragement.

Affect of the parent and child were recorded in the pilot study to clarify coding categories and to identify instances where tone of voice was different from expected, for example happiness or sadness. The coding process revealed that the parents' tone of voice was

congruent with the behavioural codes, therefore affect was not recorded in the main study.

3.7 Data Collection

This section will describe the measures used in the study, including the measurement of demographic data. Observation during the venepuncture and training of observers will be described in detail.

3.7.1 Demographic Data

All parent participants were asked to complete a questionnaire prior to their child's venepuncture (Appendix A on page 244). Parents were given instructions in the use of the questionnaire by the researcher and the researcher was available during administration to answer any queries. The questionnaires were completed by parents at their child's bedside and took 15 to 20 minutes to complete. Demographic data such as parental age and relationship to the child and child variables such as age, previous experience, and gender were obtained. The level of psychological preparation for the procedure was not included, as it was unlikely to have occurred given the setting was an emergency department.

3.7.2 Parental Anxiety

Prior to the child's venepuncture the parent was administered the state and trait forms of the STAI. Instructions were given in the use of the questionnaire by the researcher in accordance with the guide provided for the inventory (Spielberger, 1983), and the researcher was available during administration to answer any queries.

3.7.3 Faces Pain Scale

Five minutes after completion of the last phase of the venepuncture the child was shown the Faces Pain Scale (Bieri et al., 1990) and asked to rate his or her level of pain experienced during the procedure on the scale. The scale was administered to the child in the observation ward area as all parent-child dyads had left the procedure room almost immediately after procedure completion.

3.7.4 EMLA Application Time

For data analysis the amount of time (in minutes) the cream was left *in-situ* was recorded as the length of application time is directly related to the effectiveness and depth of anaesthesia (de Waard-van der Spek, van den Berg, & Oranje, 1992). The time was also categorised for some analyses: 1 = not applied, 2 = 0 - 29 minutes, 3 = 30 - 59 minutes, 4 = 60 - 119 minutes, 5 = 120 minutes plus. These categories were derived from a review of the literature (Bjerring & Arendt-Nielsen, 1990; de Waard-van der Spek et al., 1992; Ehrenström-Reiz, Reiz, & Stockman, 1983; Robieux et al., 1991).

3.7.5 Observation during the Venepuncture

A Sony portable audio-cassette player was used for audio-recording each venepuncture session as it has a belt clip, external microphone and cord, and is compact in size. The tape-recorder was attached to the belt of the observer and the small stereo microphone attached to the observer's jacket. The tape recorder was battery-powered and had an indicator of battery strength built into the casing of each battery. The batteries were checked after each venepuncture and changed when one-third strength remained.

The observer did not take part in the procedure and was in a location where all participants could be observed in the least obtrusive manner Recording commenced as soon as the child entered the procedure room. Description details such as time and persons involved were immediately completed on the field notes sheet. Medical officers performed all venepunctures, having a minimum six months experience in venepuncture. Parents were present in all cases. A nurse was in attendance to assist the child, parent and doctor during the procedure in all but two cases. For the purpose of observation the procedure was divided into five distinct phases; Pre-procedure, Preparation, Insertion, Procedure and Post-procedure. Pre-procedure was recorded from the time the child entered the procedure room until the nurse or doctor notified the child of the first intervention (involving touching the child). The Preparation phase was the time immediately after notification of the first intervention, which included touching the child, up to notification of the needle insertion. Insertion was the time immediately after notification of the needle insertion up to 10 seconds after needle insertion. The Procedure phase was from 11 seconds after the needle insertion to notification by a staff member that the procedure was over/finished. Post-procedure was the time immediately after notification of the completion of the procedure to 1.5 minutes after this notification, or if less time, to the exit from the procedure room or notification of commencement of another procedure.

3.7.5.1 Observational training

The pilot study videotapes were used by the researcher to train the researcher and research assistant in the use of the field observation form (Appendix D on page 258), timing mechanism and audiotape equipment. The researcher and research assistant spent time familiarising themselves with the non-verbal codes of the coding tool until they felt

confident in identifying behaviours. Then the researcher and research assistant observed two videotaped venepunctures and afterwards reflected upon and discussed the results. Any weaknesses in procedure, such as observation of behaviours, were identified and further training undertaken.

3.7.5.2 Coding training and agreement

In order to validate the coding process a research assistant coded the behaviours from audiotapes of the pilot study. To train the research assistant in coding one session of one hour was given to explain the coding procedure and answer questions. The research assistant then spent time familiarising himself with the coding categories. The research assistant was a registered nurse with knowledge of child psychology.

After the research assistant was confident in understanding the coding system three separate sessions were provided on consecutive days. Each session asked the assistant to code sections of an audiotaped venepuncture from the pilot study. The assistant was provided with an audiotape of the venepuncture and the typed transcript. The field notes were inserted in the appropriate places within the transcript of each case. It was necessary for the assistant to listen to the tapes as the tone of voice and context of the behaviours needed to be identified in order to accurately code the data. After each session the researcher answered questions regarding the use of the coding system and any problems were discussed. After three sessions the research assistant was given a full transcript to code. The research assistant listened to the tape first to familiarise himself with the context of the transcript and then he coded the data. A discussion session followed the coding. After this coding session the assistant felt confident in using the tool. The

research assistant then coded ten more cases with the stipulation that they be coded close together in time for consistency, and audiotapes were provided for all cases.

During each venepuncture the observer was positioned unobtrusively to gain an uninterrupted view of the procedure and participants. Field notes were taken by the researcher on a specially designed form (Appendix D on page 258) attached to a clipboard. The form enabled participants to be identified by gender, relationship to the child, case number and details of the procedure such as phase and repeated insertions. Non-verbal behaviours were recorded once every 15 seconds according to a stopwatch attached to the top of the clipboard. These behaviours included the position of the parent to the child, cuddles and stroking by the parent and child behaviours such as kicking and struggling.

3.8 The Procedure

At the time of recruitment parents of the selected children had the study and consent procedure explained to them. Each participant was given an information sheet (Appendix F, on page 268), including staff (Appendix G on page 270), to read about their participation in the study and any questions were answered. Once the parent had agreed to be included in the study a signed consent form for participation was obtained (Appendix H, on page 272). Parental consent was also obtained for the children's participation as the children were minors.

Prior to conducting the study the researcher explained the study to all staff, provided information sheets and answered questions. Prior to each venepuncture the staff members

involved had the study and their participation briefly explained and verbal consent obtained.

3.9 Ethical Considerations

Approval to conduct the study was obtained from both the hospital and university ethics committees. As children were minors consent was obtained for both parent and child participation from the parent. Anonymity was assured as no names or identifying information was required on data collection forms or tapes. However, the participant's name, address and hospital number of the child were required on the consent form as a copy was placed in the child's medical records. There was no link between the consent forms and the participants' data. Permission was also obtained from all staff participating in the study as they were part of the procedural interaction process. Permission was also gained from all participants for the use of audiorecording during the venepunctures.

All transcripts and tapes were kept under lock when not in use and the tapes are to be destroyed after a length of time specified by the hospital ethics committee. The participants, that is the parent or child from each dyad, could withdraw from the study at any time. It was also agreed that observation should cease immediately at the request of any staff member involved. Inclusion in the study was on a voluntary basis without payment or compensation. It was explained that refusal to participate in the study would not affect the child's treatment in any way. All children had to receive a venepuncture as part of their medical treatment or assessment and not for the sole purpose of this study.

3.10 Transcription and Coding of Data

This section will discuss the transcription and coding of data. Details will be provided on the inclusion of field observations notes and types of codes used during the coding process.

3.10.1 Transcription

When transcribing the audiotapes information for four parent-child dyads were rejected. The recordings for two cases had too much background noise to adequately discern the participants' speech, whilst in the remaining recordings participants' spoken words were not clear enough for adequate analysis. This gave a total of 66 cases for analysis.

Prior to coding the data all audiotapes from the pilot study were transcribed by the researcher and checked for accuracy by a research assistant. Where participants spoke simultaneously the loudest or clearest vocalisation was recorded first. This decision was made in order for later comparisons with Blount et al.'s (1989) study. Where a specific behaviour was continuous, such as crying or reassurance, the behaviour was recorded as every third code. A nurse or doctor not involved in the venepuncture sometimes entered the room to ask a staff member a question or give them information. These individuals were included in the transcripts and coded appropriately.

When transcribing the tapes only the 1.5 minutes prior to the Preparation phase was included in the study to allow greater consistency in the study and comparison with Blount et al.'s (1989) study. If there was less than 1.5 minutes before the next phase then the time commenced when the parent and child entered the procedure room.

Field notes on non-verbal behaviour were incorporated into the transcripts of verbal responses. This was achieved by using the time of the recorded behaviours and comparing it to the timing of the tape recording and then inserting the behaviours in the appropriate place.

3.10.2 Coding

There were four types of codes used in coding the transcripts of the main study: speaker, CAMPIS-CT code, phase of venepuncture and number of attempts at cannulation. The codes for each non-CAMPIS-CT category are given in Appendix I (on page 273). This gave four category codes for each unit of behaviour, for example 3,25,1,1 indicated a girl, using CAMPIS-CT code Information-seeking, in the Pre-procedure phase, on the first attempt at cannulation. An example of a coded transcript is provided in Appendix J (on page 274).

When coding the parent and child behaviours unintelligible words or sounds were coded as Other. If a specific code was repeated in the sequence of codes the codes were regarded as a single event and only coded once for that event. If a child, for example, was transcribed as 'cry...cry' this was only coded as one Cry. When the behaviour changed, for example to Scream, then so was the code. The context of the vocalisation and the nuances of speech, such as pitch and tone, assisted in determining the assigning of a particular code. Of the adults accompanying the children, one adult was the aunt of a child. This person was coded as Mother.

3.11 Data Analysis

A variety of non-parametric and parametric tests were used in which the level of significance was set at $a = 0.05$. Multiple analyses were conducted and use of the post-hoc analyses were considered and rejected. The use of post-hoc analyses were deemed too conservative for the level of analysis in this study and their use may mask important patterns of interactions. Therefore, some of the study's findings must be used with caution.

There were three major stages in the data analysis: descriptive statistics of demographic data; Analysis of Variance (ANOVA) to identify the relationships between child and parent behaviours and demographic variables; and sequential analysis of child-parent interactions to identify patterns of interaction. Sequential analysis is a form of analysis that identifies the probability of specific behaviours occurring in response to other behaviours of interest.

3.11.1 Descriptive Statistics

Frequencies were calculated for all codes, responses of the Faces Pain Scale, EMLA application time, and the proportions of each behaviour for child and parent. This enabled a general picture of the data and population to be described.

3.11.2 Analyses of Variance

One-way ANOVAs were conducted to determine the relationships between phase of procedure and child age to the proportions of child and parent behaviours, with each behaviour analysed separately. The Huyhn-Feldt corrected test of significance was used

(Norusis, 1993) to overcome the assumptions made regarding the variance-covariance matrix used in the univariate approach. The relationships between parental anxiety (state and trait) on child behaviour, parental behaviour and child age were also investigated. Other effects examined included parents' prediction of child's reaction to the venepuncture and the child's actual behaviour, Faces Pain score and child age in years, length of EMLA application in minutes and Faces Pain score and length of EMLA application in minutes and proportion of the CAMPIS-CT Pain code. Two-way ANOVAs were used to identify the relationships between medical condition on the proportion of child behaviours and the number of days in school/child care and child behaviours.

3.11.3 Comparison of Means and Correlational Analyses

Several *t*-tests were used to determine the significance of the child's medical condition and differences between parental state and trait anxiety scores and previous painful medical experiences, child gender and parent gender. Spearman correlation coefficients were calculated for Faces Pain scores and Pain proportions to identify relationships between the two pain measures. In the sequential analyses correlation matrixes were obtained for the proportions of selected parent behaviours for child coping category by person.

3.11.4 Sequential Analyses

Sackett's Lag sequential analysis (1979) was used to identify the most probable behaviours to precede and follow specific child and adult behaviours such as crying and reassurance. The probable relationships between specific child and parent behaviour were identified, also showing those parental behaviours promoting child coping behaviours. As this type of analysis is not often employed the procedure and findings will be explained and explored in detail.

CHAPTER - 4 DESCRIPTION OF CHILD AND PARENT CHARACTERISTICS AND CHANGES OVER TIME

This chapter will describe and present the results of the data analyses related to demographic data, child and parent behaviours. Parent-child interaction and the sequential analysis process will be discussed in the following chapter. The effect of child and parent characteristics such as child age and parental anxiety upon child and parent behaviours will be given. The level of significance has been set at .05 as this study is exploratory in nature due to the lack of studies in this specific area, and the CAMPIS-CT measure has been newly developed. Although this increases the risk of Type I error it may also mask potentially valuable relationships between behaviours and person and environmental variables (Burns & Grove, 1987). Any Type I errors that may occur in this study can be disconfirmed by later studies, but if Type II errors occur then important findings may not be pursued in subsequent research. Therefore, no attempt was made to use post-hoc analyses to control for Type I errors.

4.1 Child Characteristics of the Study Population

A number of child characteristics were measured which included gender, age, coexisting medical condition and attendance at childcare. Details of previous experience with painful medical procedures, emergency departments, and hospital admissions were also recorded. The summary of child characteristics of those who participated in the study is given in Table 4-1 (on page 85). The table displays demographic, medical and childcare

information, and shows a mean age of 5.92 years (*SD* = 2.55, range 3 years to 11 years 9 months) with a slightly higher percentage of boys than girls in the study. Seventy-five percent of children had no coexisting medical condition and, of the 17 children who did have a coexisting medical condition, 14 had asthma. Reasons for admission included gastro-enteritis, pneumonia, cellulitis (inflammation of the tissues), and abdominal or hip pain. The amount of time (in days) of children attending childcare and school was obtained.

Table 4-1: Sociodemographic Characteristics of the Child

Characteristic		**n**	**%**
Gender	Female	30	45.5
	Male	36	54.5
Age	3.0- 4.9 yrs	34	51.5
	5.0- 6.9 yrs	11	16.7
	7.0- 8.9 yrs	8	12.1
	9.0-11.9 yrs	13	19.7
Mean	5.92 yrs		
Standard Deviation	2.55 yrs		
Coexisting Medical Condition	Nil	49	74.3
	Asthma	14	21.2
	Diabetes	1	1.5
	Epilepsy	1	1.5
	Other (metabolic disorder)	1	1.5
School/Child Care	Not Attending Any	11	16.7
	Pre-School Only	18	27.3
	Childcare Only	2	.3
	Pre-School & Childcare	4	.6
	School only	30	45.5
	School And Childcare	1	.02
Reasons for Admission	Gastro-enteritis	14	21.2
	Pneumonia	13	19.7
	Cellulitis	8	12.1
	Other infections [1]	7	10.6
	Abdominal pain	6	9.1
	Hip pain	5	7.6
	Other [2]	13	19.7

[1] other infections included viral illness (unspecified), tonsillitis and skin abscesses.
[2] reasons for admission included knee injury, fracture, renal disorder, anaemia, seizure and lacerated cornea.

Previous painful procedures experienced by the children included blood tests, 'drips', 'needles', and 'stitches'. In addition, one child had an X-ray listed as a painful procedure, another had a circumcision and one child had teeth extracted. Previous medical experiences and attendance at an Emergency Department are given in Table 4-2. Thirty-nine children (59.1%) had prior experience of painful procedures (excluding immunisations), with 27 (40.9%) children experiencing the painful procedure in an Emergency Department and 12 children (18.2%) experienced the painful procedure in locations other than emergency departments. Of the 27 children who experienced painful medical procedures, 10 children (15.2%) had attended an Emergency Department and 17 (25.8%) had not.

Table 4-2: Previous Painful Medical Experiences and Attendence at Emergency Departments

	Previous Painful Medical Experiences				
Painful Procedures	**Nil**	**One**	**Two**	**Three or More**	**n**
Total	27 (40.9%)	21 (31.8%)	11 (16.7%)	7 (10.6%)	66
In Emergency Dept.	10 (27.0%)	14 (37.8%)	9 (24.3%)	4 (10.8%)	37
Sources other than Emergency Dept	17 (58.6%)	7 (24.1%)	2 (7.4%)	3 (11.1%)	29

4.1.1 Application of EMLA

A local anaesthetic cream, EMLA, was applied to most children prior to the venepuncture. Six children (9.1%) did not have EMLA applied as either the child refused or the medical staff wished to insert the cannula as soon as possible. Of the children that did have EMLA applied 48 (80%) of those children had EMLA applied for 60 minutes or longer, the recommended time for adequate analgesia (de Waard-van der Spek et al., 1992).

4.2 Parental Characteristics

The study group included 56 (84.8%) mothers, nine (13.6%) fathers and one aunt. The majority of parents were aged 30-34 years (29.7%). The predominant primary language used at home was English (76.9%) with a small number speaking Chinese, Indian, Spanish, Yugoslav and others. The level of parental education was measured in years of schooling (excluding kindergarten) with the majority of parents (62%) having no post-secondary education. Parental combined household income was measured in increments of $15,000 after the initial $10,000. The highest income category was '$60,000 and above', and the lowest category was 'under $10,000', with the majority of parents (51.6%) having combined parental and partner incomes greater than $45,000. Parental occupation was categorised by type of occupation. Occupations of the parents' partners were also recorded. The majority of parents (43.8%) identified their occupation as homeduties/homemaker. Table 4-3 presents a summary of parental demographic variables.

Table 4-3: Sociodemographic Characteristics of the Parents

Characteristic		n	%
Relationship to child	Mother	56	84.8
	Father	9	13.6
	Other	1	1.5
Age[2]	18-24 yrs	5	7.8
	25-29 yrs	12	18.8
	30-34 yrs	19	29.7
	35-39 yrs	16	25.0
	40-44 yrs	10	15.6
	45-49 yrs	2	3.1
Occupation – Parent[2]	professional	3	4.7
	semi-professional	11	17.2
	trade/services	3	4.7
	management	2	3.1
	office/sales	12	18.8
	unskilled	5	7.8
	homeduties	28	43.8

(Continued overleaf)

Characteristic		n	%
Occupation – Partner[2]	professional	5	7.8
	semi-professional	6	9.4
	trade/services	20	31.3
	management	12	18.8
	office/sales	0	0
	unskilled	4	6.3
	homeduties	7	10.9
	no partner	10	15.5
Income[4]	under 10,000	4	6.7
	10,000-19.999	7	11.7
	20,000-29.999	7	11.7
	30,000-44.999	8	13.3
	45,000-59.999	14	23.3
	60,000 plus	17	28.3
	don't know	3	5.0
Highest Level of Education[3] **(excluding Kindergarten)**	6-9 years	10	15.9
	10 years	19	30.2
	12 years	10	15.9
	Certificate	7	11.1
	Diploma/Degree	17	27.0
Primary Language used at home[1]			
	English	50	76.9
	Indian	4	6.1
	Chinese	3	4.6
	Spanish	2	3.2
	Yugoslav	2	3.2
	Indonesian	1	1.5
	Lebanese	1	1.5
	Maltese	1	1.5
	Russian	1	1.5

[1] One parent did not complete this question, [2] Two parents did not complete this question
[3] Three parents did not complete this question, [4] Six parents did not complete this question

4.3 Describing Parent And Child Behaviours During The Venepuncture

A description of child and parent behaviours during the procedure is given in three sections: total behaviours, phases of procedure and by person. This is followed by a description of parent and child variables such as age of child, child gender, parental anxiety and parental prediction of child reaction. The proportion of behaviours by CAMPIS-CT categories were calculated by dividing the number of occurrences of each behaviour by the total number of CAMPIS-CT codes used by each person category.

Table 4-4: List of CAMPIS-CT codes

Code #	Code	Behaviour
ADULT-TO-ADULT		
1	HMA	Humour to adult by adult
2	NPTA	Non-procedural talk to adult
3	PTA	Procedural talk to adult
4	CGCTA	Child's general condition-related talk by adult
ADULT-TO-CHILD		
5	HMC	Humour to child
6	NPTC	Non-procedural talk to child
7	CCS	Command to use coping strategy
8	CPA	Command to engage in procedural activity
9	PRAS	Praise
10	CRIT	Criticism
11	NPC	Notice of procedure to come
12	REASU	Reassurance
13	GCC	Giving control to child
14	APOL	Apology
15	BCC	Behavioural command to child
16	CST	Checking child's status
17	EMP	Empathy
34	BPROC	Non-painful procedural behaviour
35	BPAPR	Painful procedural behaviour
36	BIGNA	Behaviour ignoring child
37	PTAC	Procedural talk by adult to child
CHILD		
18	CRY	Cry
19	SCRM	Scream
20	RES	Resistance-verbal and behavioural
21	EMSUP	Requests emotional support
22	FEAR	Fear-verbal and behavioural
23	PAIN	Pain-verbal and behavioural
24	EMOT	Emotion-verbal and behavioural
25	INSEK	Information-seeking
26	CIA	Child informs about status
27	RRD	Requests relief from non-procedural discomfort
28	MCOP	Makes coping statement
29	NPTC2	Non-procedural talk by child
30	APV	Assertive procedural verbalisation
31	BRTH	Deep breath
32	HUM	Humour by child
38	CGCTC	Child's general condition-related talk by child
39	BIGNC	Behaviour ignoring adult
40	BCOOP	Behaviour cooperation
41	BINT	Behavioural interest by child
42	BREL	Behaviour relaxed
43	PTC	Procedural talk by child to adult

Note: another code OT (#33, Other) was used for all participants to indicate verbal utterings that were unable to be identified as belonging to any other code.

Proportions were selected as the unit of comparison as they provide a standard unit not dependent on length of phase or the number of codes used. A list of CAMPIS-CT codes is

given in Table 4-4 (on page 89) and also in Appendix C (on page 256) and the descriptors are provided in Appendix E (on page 259).

4.3.1 Proportions of Behaviours used by Child and Parent

The total number of behaviours recorded was 19,710: 7,099 recorded for children, 4,877 for parents and 7,734 for staff. As staff members were part of the interaction process, a description of staff use of CAMPIS-CT codes is also included. The CAMPIS-CT codes included adult-to-adult behaviours, adult-to-child behaviours and child behaviours. The percentage use of adult-to-child behaviours by each type of adult in the venepunctures were mothers 81.1%, fathers 83.7%, doctors 66.7% and nurses 70.5% of total behaviours used.

A summary of the proportions of behaviours by person is presented in Table 4-5 (on page 91). The parent and child behaviours are displayed in order of decreasing proportions of occurrence with a breakdown of adult behaviours for parents and staff. The most common child behaviours were Cry (CRY), Behaviour cooperation (BCOOP), Behavioural interest (BINT) and Behaviour ignoring adult (BIGNC). The least common behaviours included Fear (FEAR), Humour (HUM), Deep breath (BRTH) and Procedural talk to adult (PTC). The most common parental behaviour was Reassurance (REASU) followed by Non-procedural talk to child (NPTC), Behavioural command to child (BCC) and Child's general condition-related talk (CGCTA). The least common behaviours were Apology (APOL), Procedural talk to child (PTAC) and Painful procedural behaviour (BPAPR). The highest occurring staff behaviour was Procedural talk to adults (PTA) followed by Reassurance (REASU), Notice of procedure to come (NPC), Non-procedural talk to child

(NPTC), and Praise (PRAS). Uncommon staff behaviours were Procedural talk to child (PTAC), Behaviour ignoring child (BIGNA) and Criticism (CRIT).

Table 4-5: Total Proportion of CAMPIS-CT Codes used by each Person Category

	CHILD			ADULT					
				Parent		Staff		Total Adult	
Code	n	Prop.		n	Prop	n	Prop	n	Prop
CRY	*1761*	.248	**REASU**	*1587*	.325	*1165*	.151	*2752*	.218
BCOOP	*801*	.113	**NPTC**	*678*	.139	*616*	.080	*1294*	.103
BINT	*630*	.089	**BCC**	*393*	.081	*247*	.032	*640*	.051
BIGNC	*546*	.077	**CGCTA**	*340*	.070	*402*	.052	*742*	.059
NPTC2	*429*	.061	**NPTA**	*261*	.054	*485*	.063	*746*	.059
RES	*424*	.060	**CST**	*234*	.048	*296*	.038	*530*	.042
CIA	*368*	.052	**PRAS**	*227*	.047	*592*	.077	*819*	.065
SCRM	*361*	.051	**PTA**	*187*	.039	*1434*	.185	*1621*	.129
PAIN	*284*	.040	**CCS**	*164*	.034	*179*	.023	*343*	.027
EMSUP	*282*	.040	**EMP**	*122*	.025	*128*	.017	*250*	.020
MCOP	*263*	.037	**CPA**	*117*	.024	*422*	.055	*539*	.043
EMOT	*234*	.033	**HMA**	*105*	.022	*136*	.018	*241*	.019
INSEK	*228*	.032	**BIGNA**	*97*	.020	*31*	.004	*128*	.010
BREL	*194*	.027	**NPC**	*92*	.019	*758*	.098	*850*	.067
APV	*89*	.013	**GCC**	*74*	.015	*145*	.019	*219*	.017
RRD	*52*	.007	**CRIT**	*61*	.013	*26*	.003	*87*	.007
CGCTC	*51*	.007	**BPROC**	*53*	.011	*352*	.046	*405*	.032
FEAR	*35*	.005	**HMC**	*48*	.010	*129*	.017	*177*	.014
HUM	*26*	.004	**APOL**	*20*	.004	*60*	.008	*80*	.006
BRTH	*21*	.003	**OT**	*10*	.002	*5*	.001	*15*	.001
OT	*11*	.002	**PTAC**	*4*	.001	*38*	.005	*42*	.003
PTC	*9*	.001	**BPAPR**	*2*	.000	*89*	.012	*91*	.007

4.4 Comparison of Behaviours by Phase of Venepuncture

The proportions for each CAMPIS-CT code were calculated for each phase of the venepuncture (Pre-procedure, Preparation, Insertion, Procedure and Post-procedure) by dividing the occurrence of each code by the total number of codes per person category in each phase. For example, the number of times cry occurred in phase 1 (n=159) was divided by the total number of occurrences of all child codes in phase 1 (n=629). Results are presented separately for child and parent behaviours.

4.4.1 Child Behaviours

Table 4-6 (on page 93) presents the proportions of child codes for each phase with phase 1 behavioural codes given in descending order of occurrence and other phases ranked by proportions. Cry (CRY) and Behaviour cooperation (BCOOP) were the most commonly occurring codes in all phases except phase 3 (Insertion phase). In the Insertion phase the most commonly occurring codes were Behaviour relaxed (BREL) and Pain (PAIN). Scream (SCRM) occurred most frequently in phases 3 and 4. Codes that had lower occurrences in phase 3 compared to other phases were Behaviour ignoring adult (BIGNC), Non-procedural talk by child (NPTC2), Information-seeking (INSEK) and Child informs about status (CIA).

To identify changes in behaviours by phase of the procedure, single factor repeated measures ANOVAs were performed on the proportions of each of the highest occurring behaviours (those which had proportions of occurrences >3.0% across all phases). In these ANOVAs, the Huyhn-Feldt corrected test of significance was used to avoid problems with sphericity (Norusis, 1993). This test modifies degrees of freedom to overcome the assumptions made regarding the variance-covariance matrix used in the univariate approach.

Table 4-6: Proportion of CAMPIS-CT Codes used by Children in each Phase of Procedure in Descending Order of Frequency

Behaviour	Phase 1		Phase 2		Phase 3		Phase 4		Phase 5	
	Prop	Rank	Prop	Rank	Prop	Rank	Prop	Rank	Prop	Rank
CRY	.253	1	.207	1	.129	4	.293	1	.220	1
BCOOP	.137	2	.126	2	.151	2	.089	2	.144	2
BIGNC	.084	3	.082	4	.053	8	.072	5	.087	4
BINT	.084	3	.116	3	.058	6	.076	3	.065	5
RES	.078	5	.066	6	.044	9	.056	7	.039	10
NPTC2	.057	6	.082	4	.004	14	.039	11	.110	3
INSEK	.056	7	.031	11	.004	14	.028	13	.045	9
EMSUP	.048	8	.038	9	.040	10	.038	12	.046	8
CIA	.041	9	.050	7	.018	12	.057	6	.056	7
BREL	.032	10	.024	14	.156	1	.018	14	.036	11
MCOP	.024	11	.030	12	.036	11	.041	10	.057	6
APV	.024	11	.017	15	.000	17	.007	16	.017	13
SCRM	.016	13	.039	8	.080	5	.073	4	.012	14
CGCTC	.014	14	.010	16	.000	17	.004	17	.008	17
FEAR	.013	15	.007	17	.004	14	.002	19	.003	19
EMOT	.013	15	.026	13	.058	6	.044	9	.012	14
RRD	.013	15	.004	19	.000	17	.008	15	.012	14
PAIN	.008	18	.032	10	.151	2	.048	8	.023	12
OT	.003	19	.001	22	.000	17	.001	21	.005	18
BRTH	.002	20	.003	20	.013	13	.003	18	.000	21
HUM	.002	20	.007	17	.000	17	.002	19	.003	19
PTC	.000	22	.003	20	.000	17	.001	21	.000	21

The results of the 11 ANOVAs that returned significant *p* values (<.05) out of the 14 tested are presented in Table 4-7 (on page 94) followed by specific findings for each of the significant behaviours. Non-significant behaviours were Behaviour ignoring adult (BIGNC), Resistance (RES) and Requests emotional support (EMSUP). Behaviours occurring infrequently (3.0% or less) in each phase of the procedure were not analysed, that is Child's general condition-related talk by child (CGCTC), Requests relief from non-procedural discomfort (RRD), Other (OT), Deep breath (BRTH), Humour by child (HUM), Procedural talk by child (PTC) and Assertive procedural verbalisation (APV).

Table 4-7: Results of ANOVAs for Significant Child CAMPIS-CT Codes over Phase

Behaviour	Source of Variation	*SS*	*df*	*MS*	*F*	*p*
CRY	Between phase	0.36	3.27	0.11	2.69	.043
	Error	8.81	212.19	0.03		
SCRM	Between phase	0.23	1.80	0.13	7.55	.001
	Error	1.96	117.12	0.01		
PAIN	Between phase	0.57	2.33	0.24	12.92	<.001
	Error	2.87	151.67	0.07		
EMOT	Between phase	0.07	1.57	0.02	5.84	.007
	Error	0.83	101.81	0.00		
INSEK	Between phase	0.17	1.71	0.04	4.26	.021
	Error	2.54	111.31	0.01		
CIA	Between phase	0.14	3.21	0.04	4.94	.002
	Error	1.89	208.92	0.01		
MCOP	Between phase	0.06	2.95	0.01	2.98	.033
	Error	1.21	191.74	0.00		
NPTC2	Between phase	0.35	2.34	0.15	11.92	<.001
	Error	1.90	151.76	0.01		
BCOOP	Between phase	0.4	2.64	0.15	2.88	.044
	Error	9.12	171.62	0.04		
BINT	Between phase	0.36	2.42	0.15	3.89	.016
	Error	5.97	157.28	0.02		
BREL	Between phase	1.45	1.62	0.90	24.63	<.001
	Error	3.84	105.42	0.01		

Note: Huynh-Feldt Test of Significance used.

Mean proportions of behaviours that showed a significant difference by phase were charted. Some behaviours showed similar patterns and are displayed on the same chart. Cry (CRY), Child informs about status (CIA) and Non-procedural talk (NPTC2) are shown in Figure 4-1 (on page 95). All behaviours have a low proportion of occurrence in phase 3 (Insertion phase).

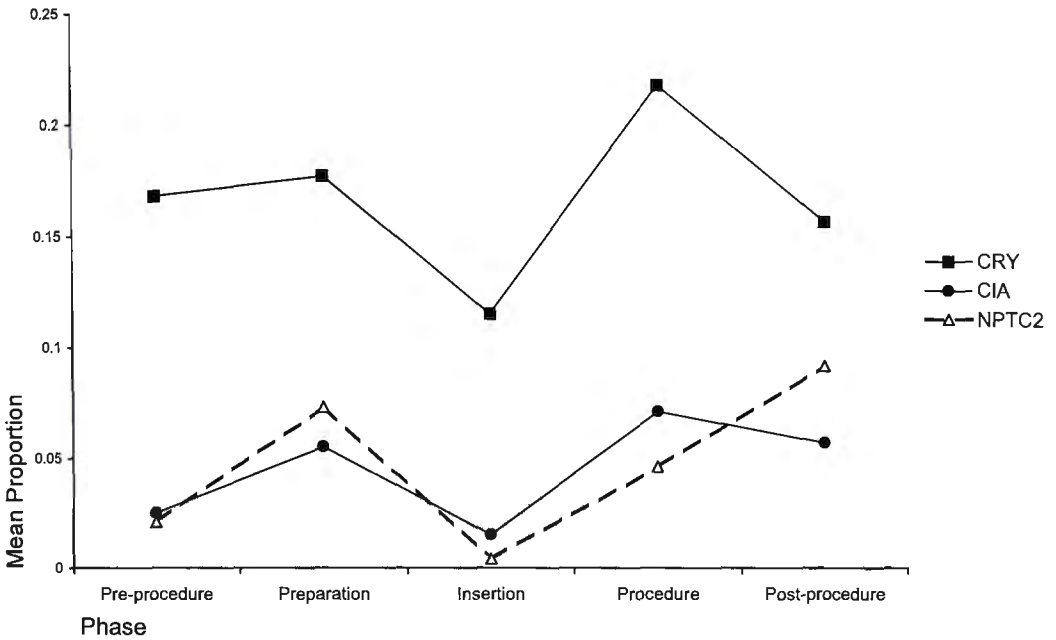


Figure 4-1: Mean proportion of CRY, CIA and NPTC2 in each phase of the procedure

Behavioural interest (BINT) and Information-seeking (INSEK) also had low occurrences in phase 3 (Figure 4-2 on page 96) with higher occurrences in phase 1 (Pre-procedure) than phases 4 (Procedure) and 5 (Post-procedure).

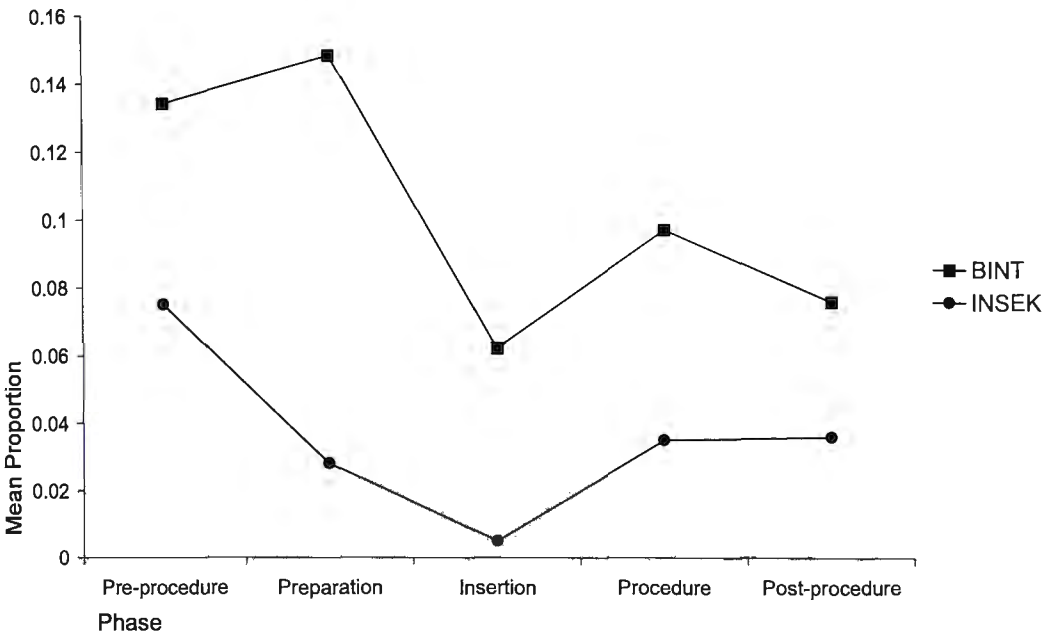


Figure 4-2: Mean proportion of BINT and INSEK in each phase of the procedure

Pain (PAIN), Scream (SCRM) and Emotion (EMOT) shared similar patterns of occurrences (Figure 4-3) with the highest proportions in the Insertion phase and the lowest occurrences in the first and last phases.

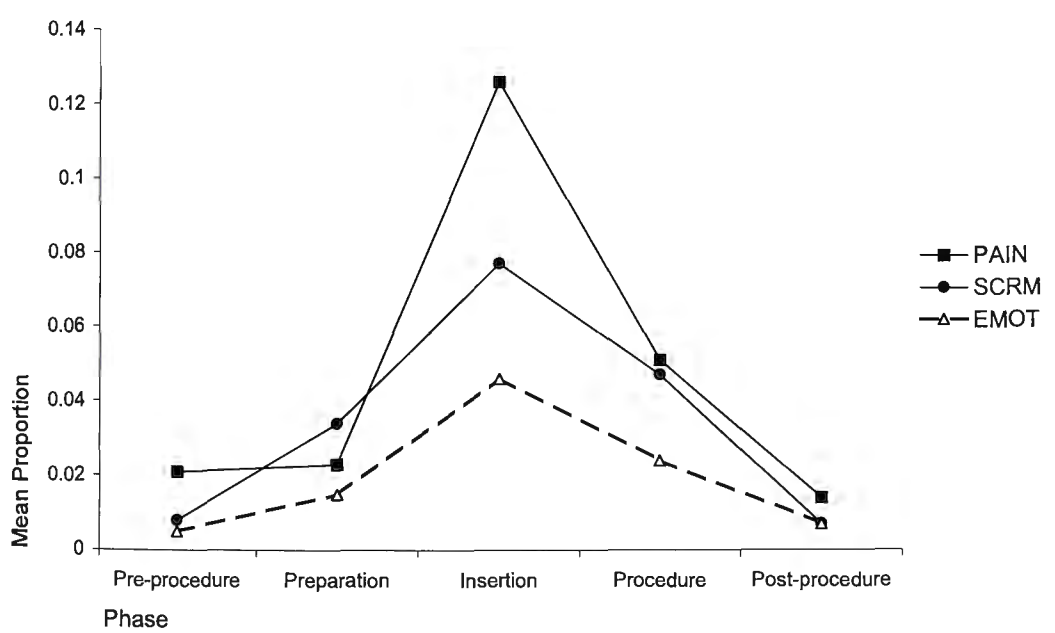


Figure 4-3: Mean proportion of PAIN, SCRM and EMOT in each phase of the procedure

Behaviour cooperation (BCOOP) and Behaviour relaxed (BREL) changed as a function of phase of the procedure (Figure 4-4 on page 97) with a higher occurrence in phase 3

(Insertion) compared to phases 2 (Preparation) and 4 (Procedure). Makes coping statement (MCOP) occurred least frequently in the Pre-procedure phase and most frequently in the Post-procedure phase.

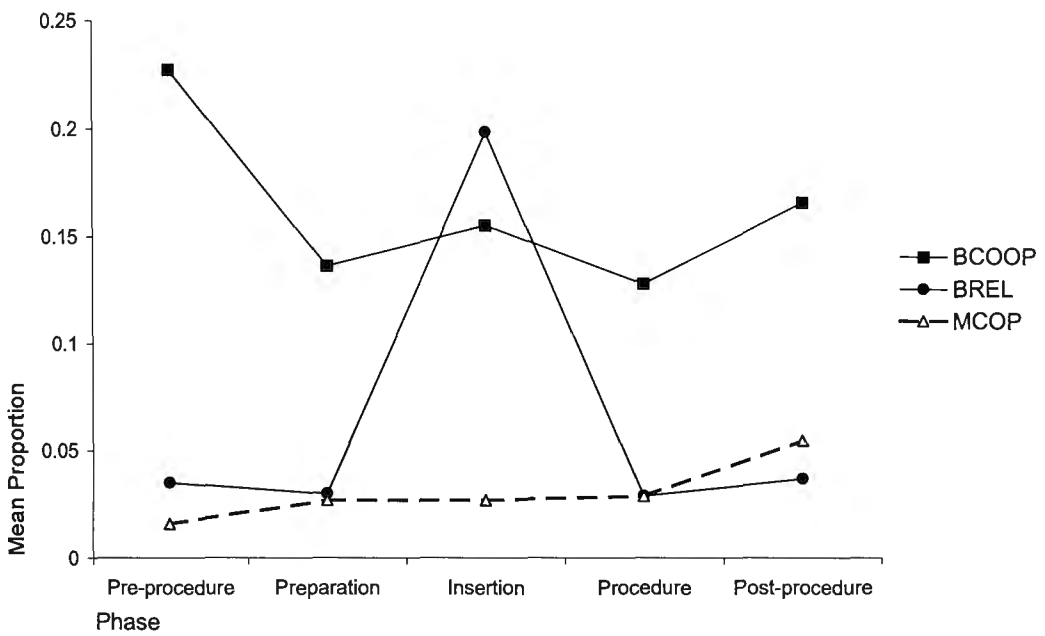


Figure 4-4: Mean proportion of BCOOP, BREL and MCOP in each phase of the procedure

4.4.1.1 Summary of child behaviours in each phase of the procedure

Certain child behaviours varied significantly across phase of procedure. Behaviours that had the highest occurrence during phase 1 (the Pre-procedure phase) were Information-seeking (INSEK) and Behaviour cooperation (BCOOP). Behavioural interest (BINT) occurred most frequently in phase 2 (Preparation phase). Behaviours that had the highest occurrence during phase 3 (Insertion phase) were Scream (SCRM), Pain (PAIN), Emotion (EMOT) and Behaviour relaxed (BREL). Behaviours that had the lowest occurrence in phase 3 were Cry (CRY), Information-seeking (INSEK), Child informs about status (CIA), Non-procedural talk by child (NPTC2), Behaviour cooperation (BCOOP) and Behavioural interest (BINT). Child informs about status had its highest occurrence in phase 4 (Procedure phase). Makes coping statement and Non-procedural

talk by child had their highest occurrences in phase 5 (Post-procedure phase). Behaviours that did not significantly change across phase of procedure were Resistance (RES), Requests emotional support (EMSUP) and Behaviour ignoring adult (BIGNC).

4.4.2 Parental Behaviours

Table 4-8 (on page 99) presents the proportion of parental codes used in each phase. Phase 1 behaviours are presented in descending order and behaviours ranked for each phase of the procedure. Reassurance (REASU) was the most common behaviour in all phases. Other high occurring behaviours were Child's general condition-related talk (CGCTA) and Non-procedural talk to child (NPTC) in phases 1 (Pre-procedure) and 2 (Preparation). In phase 3 (Insertion) the most common behaviours included Praise (PRAS) and Non-procedural talk to child (NPTC). In phases 4 (Procedure) and 5 (Post-procedure) the most common behaviours included Non-procedural talk to child (NPTC), Non-procedural talk to adult (NPTA) and Behavioural command to child (BCC).

To identify changes in behaviours by phase of procedure single factor, repeated measures ANOVAs were performed on the proportions of each of the highest occurring behaviours (those which had proportions of occurrences >3.0% in each phase). The low-occurring behaviours not analysed were Humour to adult (HMA), Behaviour ignoring child (BIGNA), Criticism (CRIT), Painful procedural behaviour (BPAPR), Apology (APOL), Procedural talk to child (PTAC), Humour to child (HMC) and Other (OT). In these ANOVAs the Huyhn-Feldt corrected test of significance was used to avoid problems with sphericity (Norusis, 1993).

Table 4-8: Proportion of CAMPIS-CT Codes used by Parents in each Phase of the Procedure

Behaviour	Phase 1		Phase 2		Phase 3		Phase 4		Phase 5	
	Prop	Rank	Prop	Rank	Prop	Rank	Prop	Rank	Prop	Rank
REASU	.279	1	.286	1	.534	1	.370	1	.304	1
CGCTA	.144	2	.073	3	.000	13	.042	6	.092	5
NPTC	.100	3	.176	2	.086	3	.118	2	.151	2
NPTA	.077	4	.049	6	.000	13	.037	7	.103	3
BCC	.063	5	.061	4	.052	5	.097	3	.095	4
PTA	.061	6	.041	8	.000	13	.031	9	.039	7
NPC	.037	7	.027	11	.000	13	.013	14	.005	15
BPROC	.031	8	.014	17	.000	13	.004	18	.008	13
BIGNA	.030	9	.011	18	.017	7	.027	11	.012	12
HMA	.024	10	.027	11	.000	13	.018	13	.020	11
CST	.024	10	.044	7	.069	4	.055	5	.055	6
EMP	.024	10	.017	13	.017	7	.033	8	.022	10
CCS	.022	13	.055	5	.034	6	.029	10	.005	15
CPA	.020	14	.032	9	.017	7	.025	12	.003	19
GCC	.020	14	.015	15	.000	13	.009	16	.033	9
CRIT	.017	16	.015	15	.017	7	.012	15	.005	15
PRAS	.015	17	.032	9	.121	2	.068	4	.036	8
APOL	.006	18	.006	19	.000	13	.003	19	.003	19
HMC	.004	19	.016	14	.017	7	.007	17	.006	14
OT	.002	20	.001	20	.017	7	.001	20	.005	15
BPAPR	.002	20	.001	20	.000	13	.000	22	.000	21
PTAC	.000	22	.001	20	.000	13	.001	20	.000	21

The results of the ANOVAs that returned significant *p* values are presented in Table 4-9 (on page 100). Of the 14 codes analysed only six returned significant values. The non-significant behaviours were Command to engage in procedural activity (CPA), Checking child's status (CST), Child's general condition-related talk (CGCTA), Empathy (EMP), Behavioural command to child (BCC), Giving control to child (GCC), Procedural talk to adult (PTA) and Notice of procedure to come (NPC).

A number of behaviours did not occur during Phase 3 and therefore had zero variance. The behaviours with zero variance were: Behavioural command to child (BCC), Non-painful procedural behaviour (BPROC), Child's general condition-related talk (CGCTA), Giving control to child (GCC), Non-procedural talk to adult (NPTA), Procedural talk to adult (PTA) and Notice of procedure to come (NPC). The behaviours with zero variance were analysed using repeated measures ANOVAs over four phases only, that is phases 1, 2, 4 and 5.

Table 4-9: Results of ANOVAs for Significant Parent CAMPIS-CT Codes over Phase

Behaviour	Source of Variation	*SS*	*df*	*MS*	*F*	*p*
CCS	Between phase	0.13	2.60	0.03	6.48	.001
	Error	1.33	166.17	0.01		
NPTC	Between phase	0.49	3.38	0.12	5.09	.001
	Error	6.18	216.58	0.02		
PRAS	Between phase	0.19	1.68	0.05	4.09	.025
	Error	2.95	107.58	0.01		
REASU	Between phase	1.20	2.44	0.30	3.65	.021
	Error	21.02	162.84	0.08		
BPROC[1]	Between phase	0.02	2.10	0.01	3.78	.024
	Error	0.34	134.14	0.00		
NPTA[1]	Between phase	0.46	2.08	0.15	6.04	.003
	Error	4.90	133.12	0.03		

Note: Huynh-Feldt Test of Significance used. [1]Analysis only performed over 4 phases.

Reassurance (REASU) and Praise (PRAS) had similar patterns of occurrences (Figure 4-5 on page 101) increasing up to the Procedure phase and decreasing in the Post-procedure phase.

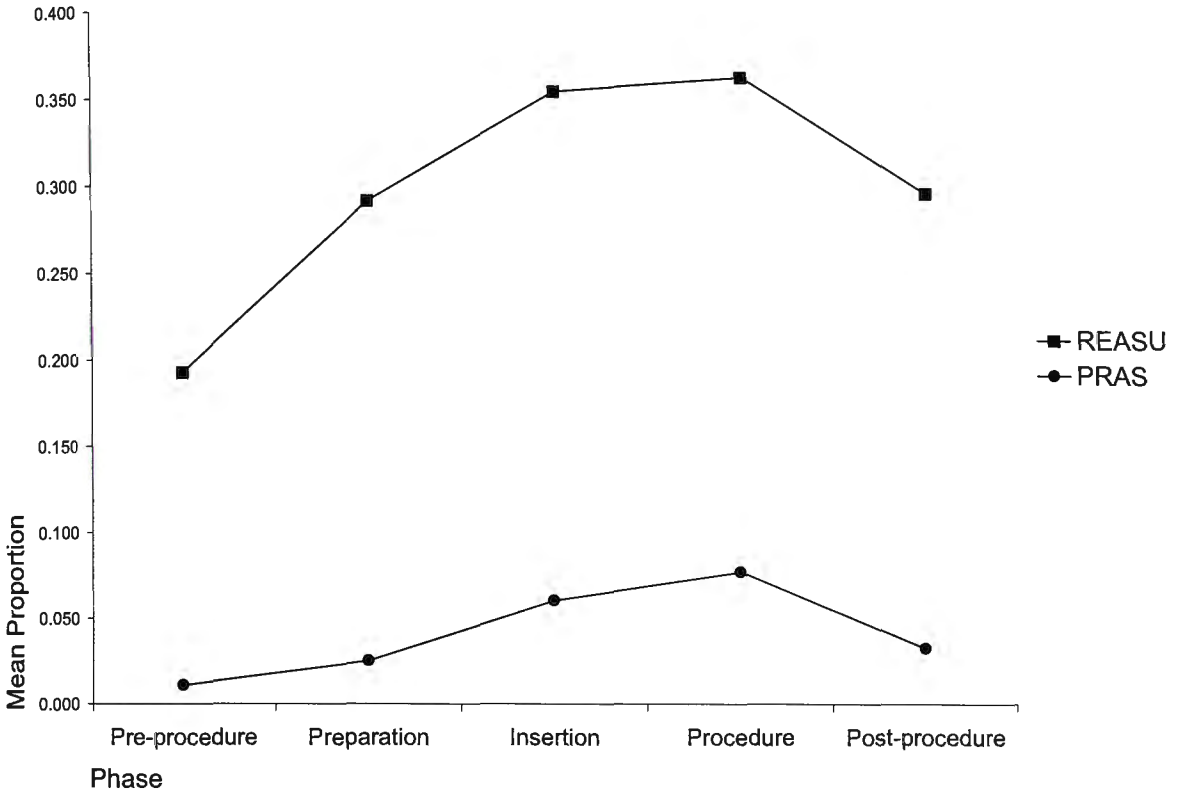


Figure 4-5: Mean proportion of REASU and PRAS in each phase of the procedure

Non-painful procedure (BPROC) and Non-procedural talk to adult (NPTA) changed as a function of phase of the procedure, both having very low occurrences in the Insertion phase. Non-procedural talk to adult (NPTA) had a high occurrence in the Post-procedure phase whilst Non-painful procedural behaviour (BPROC) had its highest occurrence during the Pre-procedure phase (Figure 4-6 on page 102).

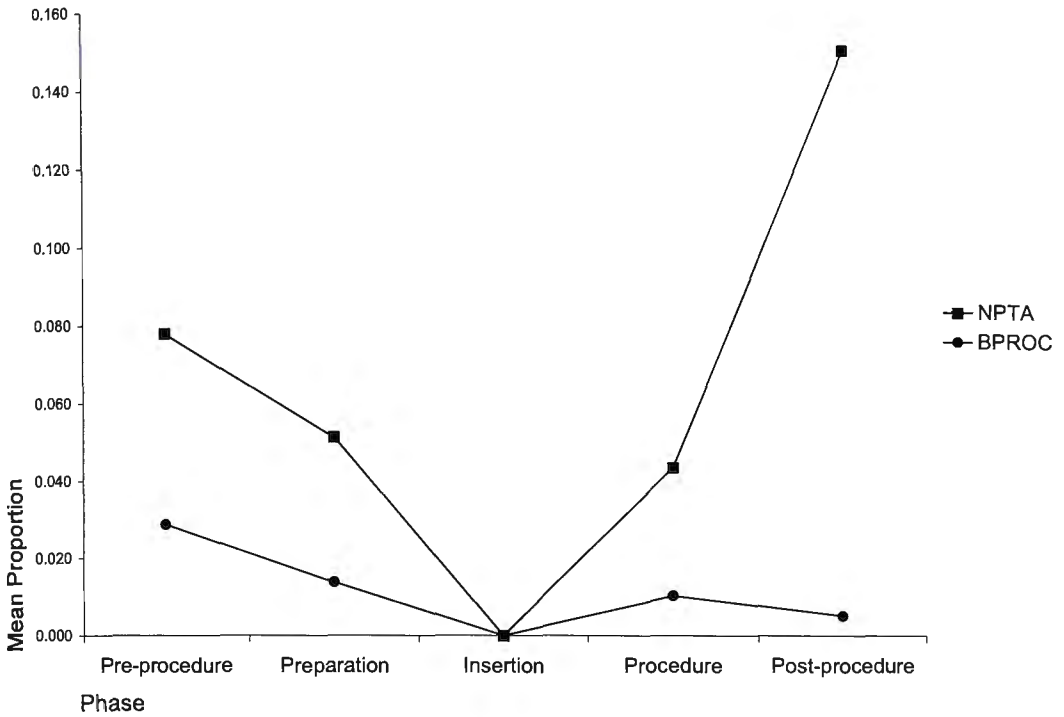


Figure 4-6: Mean proportion of NPTA and BPROC in each phase of the procedure

Command to use coping strategy (CCS) and Non-procedural talk to child (NPTC) both shared similar patterns of occurrences (Figure 4-7 on page 103), occurring least frequently during the Insertion phase after an increase in occurrence from phase 1 to phase 2. After the Insertion phase Non-procedural talk to child increased in occurrence to the Post-procedure phase whereas Command to use coping strategy decreased in occurrence from the Insertion phase.

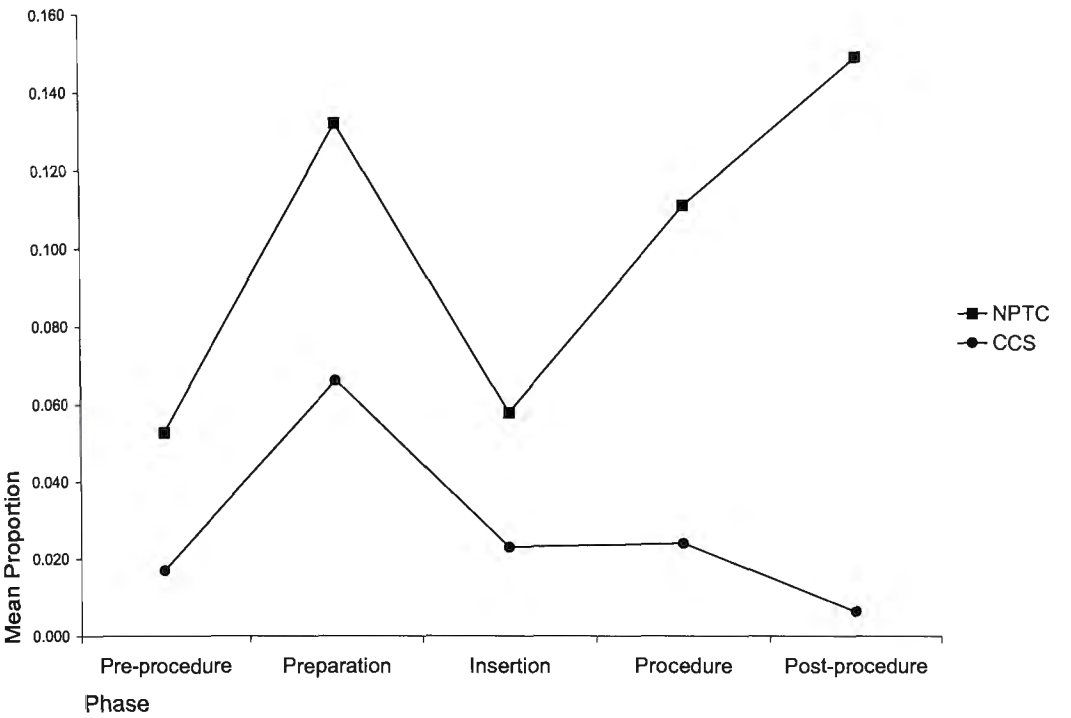


Figure 4-7: Mean proportion of NPTC and CCS in each phase of the procedure

4.4.2.1 Summary of parental behaviours in each phase of the procedure

Certain parent behaviours varied significantly across phase of procedure. Non-painful procedure occurred more highly in phase 1 (Pre-procedure) than any other phase. Command to use coping strategy (CCS) occurred most often in phase 2 (Preparation), Praise more highly in phase 4 (Procedure), and Non-procedural talk to both adults and child in phase 5 (Post-procedure). From the significant results no behaviour had its highest occurrence in phase 3 although many had their lowest occurrence during this phase, for example Non-painful procedural behaviour (BPROC) and Non-procedural talk to adult (NPTA). Non-procedural talk to child (NPTC) had low occurrences in phases 1 and 3 and high occurrences in phases 2 and 5.

4.5 Comparison of Child Behaviours by Number of Cannulation Attempts

Differences in child behaviours due to the effects of cannulation attempt were explored. In 20 out of the total 66 cases (30.3%) children experienced more than one attempt at cannulation, 2 children experienced 3 attempts, one child experienced 4 attempts and the rest experienced 2 attempts. Paired *t*-tests were conducted on the proportions of all child behaviours occurring during each cannulation attempt. As only 3 out of 20 children experienced more than 2 cannulation attempts the comparison of behaviours were confined to the first (n=42) and second (n=24) attempts. The results returned significant results for only two behaviours, Cry ($t(19)=2.90$, $p=<.01$) and Makes coping statement ($t(19)= -2.53$, $p<.05$). The results are displayed using boxplots in Figure 4-8 and Figure 4-9 (on page 105).

Cry (CRY)

In Figure 4-8 the mean proportional use of Cry (CRY) decreased during the second attempt at cannulation (Attempt 2) compared to the first attempt.

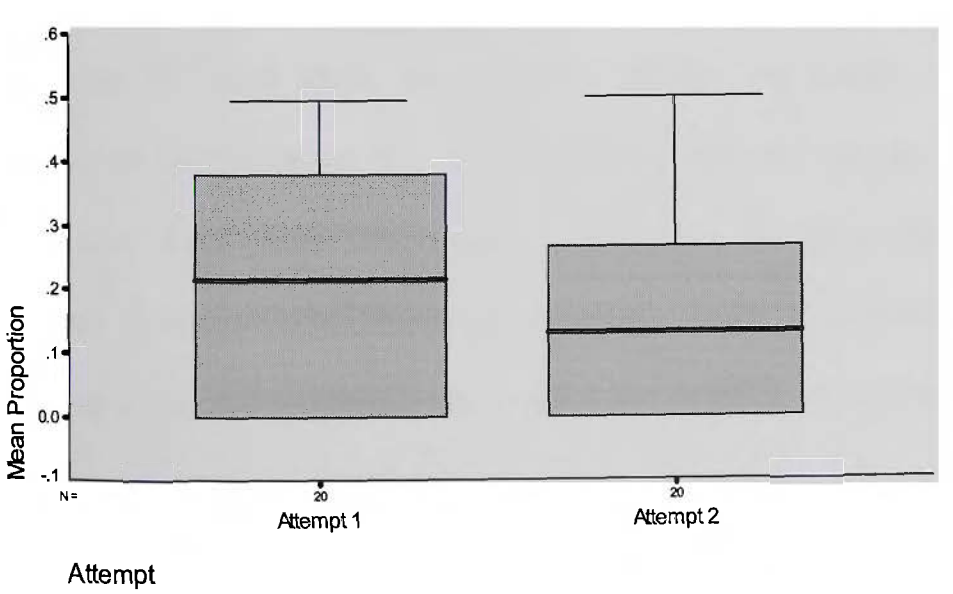


Figure 4-8: Boxplot of CRY for Attempt at Cannulation

Makes coping statement (MCOP)

In Figure 4-9 the mean proportional use of Makes coping statement (MCOP) increased during the second attempt at cannulation compared to the first attempt. There were two outliers for attempt 1 (cases 54 and 78), and one outlier for attempt two (case 78).

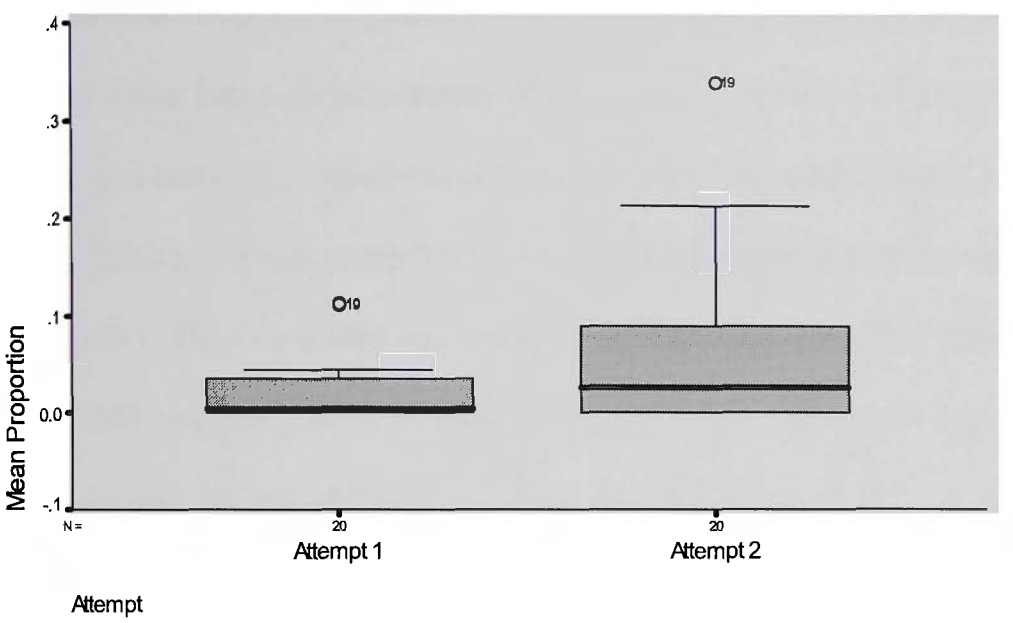


Figure 4-9: Boxplot of MCOP for Attempt at Cannulation

4.6 Effect Of Child Characteristics

The extent to which child characteristics of age and gender influences children's responses to venepunctures was examined. Child age was initially categorised into five age groups: 3-4.9 years, 5-6.9 years, 7-8.9 years, 9-10.9 years, and 11-11.9 years, according to Piaget's child development theory (Piaget & Inhelder, 1966/1969). In the age group of 11-11.9 years only 100 codes were displayed out of 7099. Therefore, the two oldest age groups were combined into one age group of 9-11.9 years, giving a total of 4 age groups for analysis. The proportions of behavioural (CAMPIS-CT) codes for child age and gender by phase of the procedure were calculated and analysed.

4.6.1 Child Age and Child Behaviours

In Table 4-10 (on page 107) the codes for each child age group are displayed with the rank order of child code proportions for each age group. The most frequently occurring behaviour in the two younger age groups was Cry (CRY), and the two oldest age groups had Behaviour cooperation (BCOOP) as the highest occurring behaviour. The youngest age groups also had high proportions of Behaviour cooperation. The youngest age group (3-4.9 years) had high proportions of Behaviour ignoring adult (BIGNC) and Behavioural interest (BINT). The age group 5-6.9 years had high proportions of Resistance (RES) and Pain (PAIN). The two oldest age groups had high occurrences of Child informs about status (CIA) and Cry (CRY). In addition the age group 7-8.9 years had high proportions of Behavioural interest (BINT) whilst the oldest age group (9-11.9 years) had a high occurrence of Child informs about status (CIA) and Non-procedural talk (NPTC2). Each age group differed in the number of coping behaviours that occurred over 3.0%. The 3-4.9 years age group had 10 behaviours occurring higher than 3.0%, age group 5-6.9 years 13, age group 7-8.9 years 11 and 9-11.9 years age group had 9 behaviours greater than 3.0%.

To identify changes in behaviours across different child age groups ANOVAs were performed on the proportions of each of the highest occurring behaviours (those which had proportions of occurrences >3.0% in each age-level group) for each case. Behaviours occurring less than 3.0% in all age groups were: Requests relief from non-procedural discomfort (RRD), Deep breath (BRTH), Child's general condition-related talk (CGCTC), Fear (FEAR), Humour by child (HUM) and Procedural talk by child (PTC). The Other code (OT) was also omitted.

Table 4-10: Proportions (Prop) of Child CAMPIS Codes for each Child Age Group, in Descending Order of Occurrence

Behaviour	3-4.9 yrs		5-6.9 yrs		7-8.9 yrs		9-11.9 yrs	
	Prop	Rank	Prop	Rank	Prop	Rank	Prop	Rank
CRY	.304	1	.274	1	.090	4	.094	3
BCOOP	.097	2	.083	3	.158	1	.181	1
BIGNC	.086	3	.061	6	.064	8	.068	8
BINT	.084	4	.070	5	.158	1	.094	3
RES	.073	5	.092	2	.006	17	.003	20
SCRM	.071	6	.047	9	.006	17	.003	20
NPTC2	.060	7	.038	12	.045	9	.094	3
EMSUP	.050	8	.040	10	.019	12	.013	15
EMOT	.039	9	.049	8	.011	13	.005	18
CIA	.037	10	.040	10	.100	3	.095	2
PAIN	.026	11	.081	4	.079	5	.029	10
MCOP	.023	12	.032	13	.039	11	.091	6
BREL	.020	13	.011	14	.077	6	.049	9
RRD	.008	14	.003	17	.011	13	.009	16
INSEK	.007	15	.057	7	.066	7	.080	7
APV	.006	16	.005	16	.043	10	.028	11
BRTH	.003	17	.003	17	.002	20	.004	19
CGCTC	.002	18	.008	15	.009	15	.022	12
FEAR	.002	18	.003	17	.006	17	.016	13
HUM	.000	20	.001	20	.009	15	.016	13
PTC	.000	20	.001	20	.002	20	.006	17

Of the 15 codes analysed four returned non-significant results, that is Non-procedural talk by child (NPTC2), Requests emotional support (EMSUP), Behaviour ignoring adult (BIGNC) and Behavioural interest (BINT). The results of those behaviours returning significant results are given in Table 4-11 (on page 108).

Table 4-11: Significant Results of ANOVAs for CAMPIS-CT Codes for Child Age

Behaviour	Source of Variation	*SS*	*df*	*MS*	*F*	*p*
CRY	Age effect	0.446	3	0.149	5.799	.001
	Residual Error	1.588	62	0.026		
SCRM	Age effect	0.035	3	0.012	3.250	.028
	Residual Error	0.223	62	0.004		
RES	Age effect	0.068	3	0.023	9.581	<.001
	Residual Error	0.146	62	0.002		
PAIN	Age effect	0.022	3	0.007	3.120	.032
	Residual Error	0.148	62	0.002		
EMOT	Age effect	0.013	3	0.004	4.571	.006
	Residual Error	0.061	62	0.001		
INSEK	Age effect	0.056	3	0.019	9.913	<.001
	Residual Error	0.116	62	0.002		
CIA	Age effect	0.037	3	0.012	6.779	.001
	Residual Error	0.114	62	0.002		
MCOP	Age effect	0.019	3	0.006	4.958	.004
	Residual Error	0.078	62	0.001		
APV	Age effect	0.007	3	0.002	3.851	.014
	Residual Error	0.037	62	0.001		
BCOOP	Age effect	0.092	3	0.031	4.291	.008
	Residual Error	0.444	62	0.007		
BREL	Age effect	0.044	3	0.015	3.831	.014
	Residual Error	0.238	62	0.004		

Cry (CRY), Scream (SCRM), Resistance (RES) and Emotion (EMOT)

From the results several patterns emerged. The first pattern was where the youngest age groups had high occurrences of behaviours Cry, Scream, Resistance and Emotion compared to the two oldest age groups. The results are displayed in Figure 4-10 (on page 109).

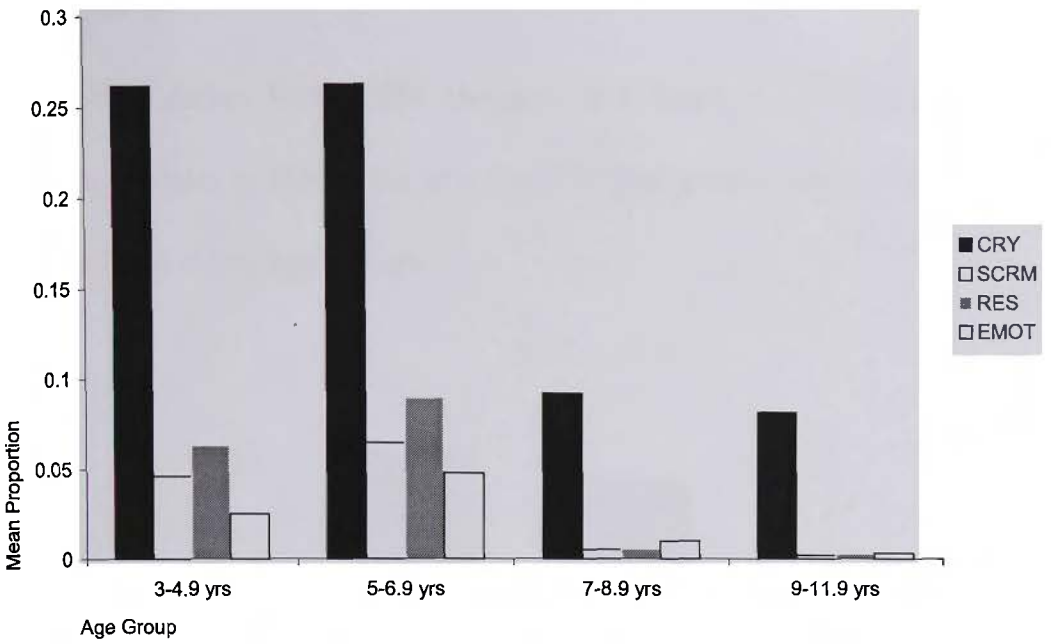


Figure 4-10: Mean proportion of CRY, SCRM, RES and EMOT in each age group

Assertive procedural verbalisation (APV), Child informs about status (CIA) and Behaviour relaxed (BREL)

Assertive procedural verbalisation (APV), Child informs about status (CIA) and Behaviour relaxed (BREL) all displayed similar patterns (Figure 4-11) where the two oldest age groups had high occurrences compared to the two youngest age groups.

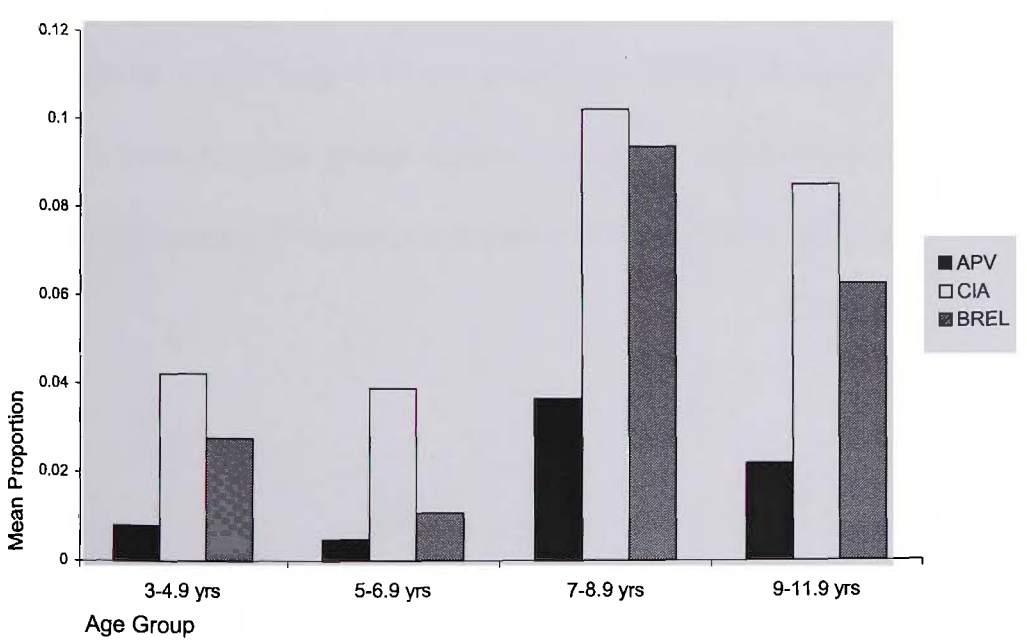


Figure 4-11: Mean proportion of APV, CIA and BREL in each age group

Pain (PAIN)

Figure 4-12 shows how PAIN changed as a function of child age. The age groups of children 5 years to 8.9 years displayed higher proportions of Pain behaviour than the youngest and oldest age groups.

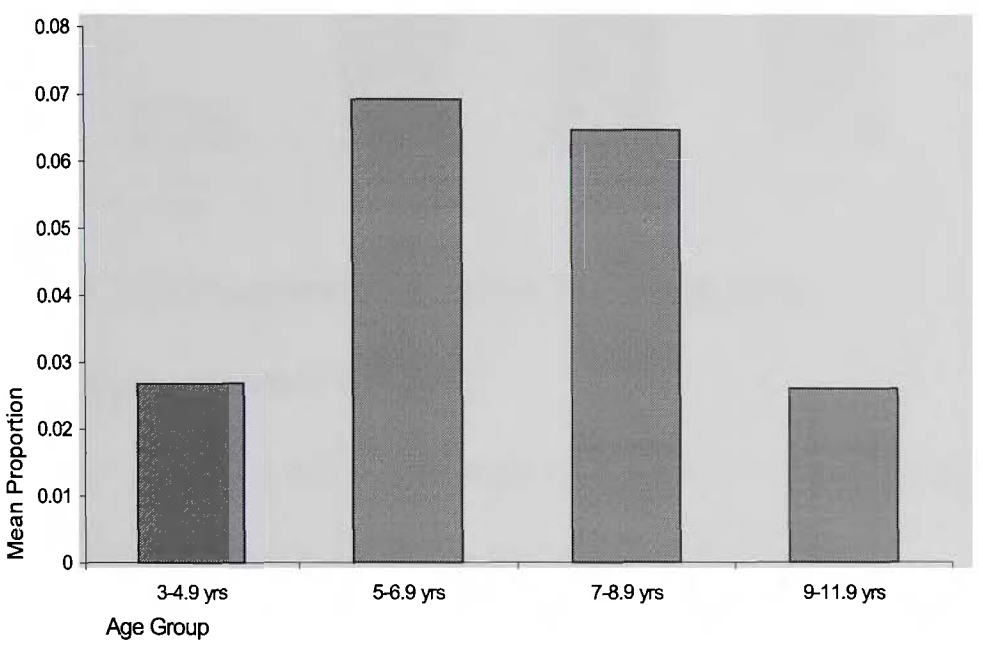


Figure 4-12: Mean proportion of PAIN in each age group

Information-seeking (INSEK)

As can be seen in Figure 4-13 (on page 111) INSEK changed as a function of child age with the youngest age group (under 5 years of age) displaying a low occurrence of Information-seeking behaviour compared to the older age groups.

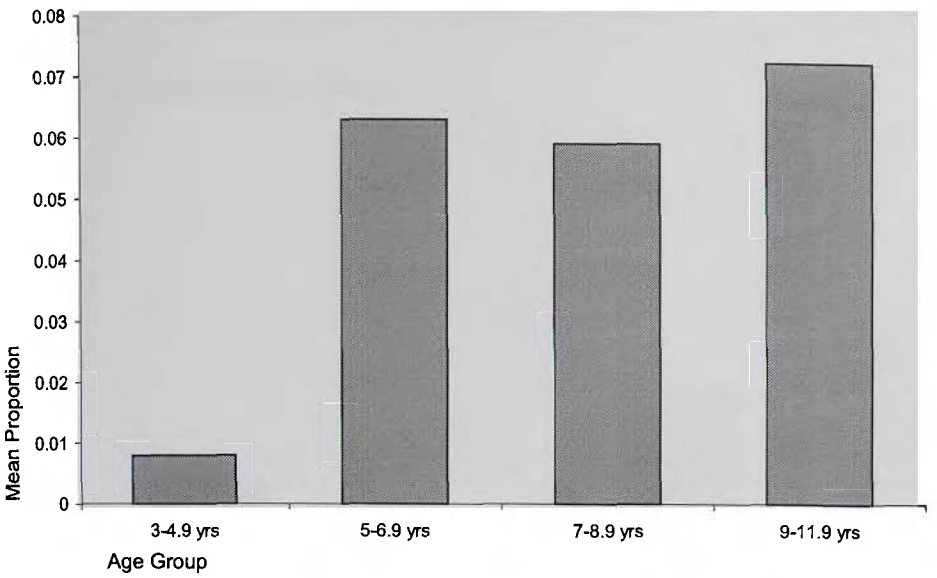


Figure 4-13: Mean proportion of INSEK in each age group

Makes coping statement (MCOP)

MCOP changed as a function of child age (Figure 4-14) with the proportions of Makes coping statement increasing progressively with each age group.

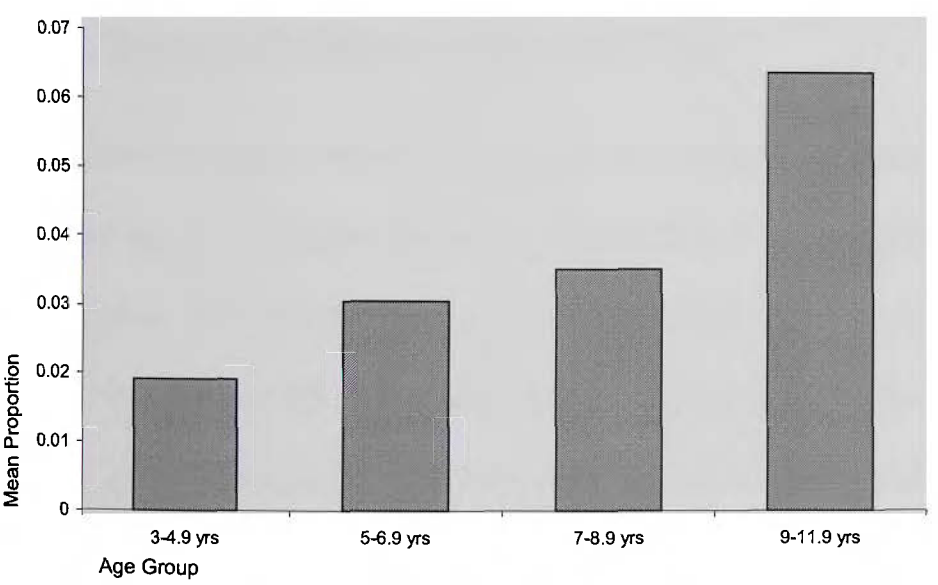


Figure 4-14: Mean proportion of MCOP in each age group

Behaviour cooperation (BCOOP)

BCOOP changed as a function of child age with the two oldest age groups (7 years of age and over) displaying higher proportions of Behaviour cooperation than the two youngest

age groups (Figure 4-15). The age group 5-6.9 years displayed a lower proportion of BCOOP than any other group.

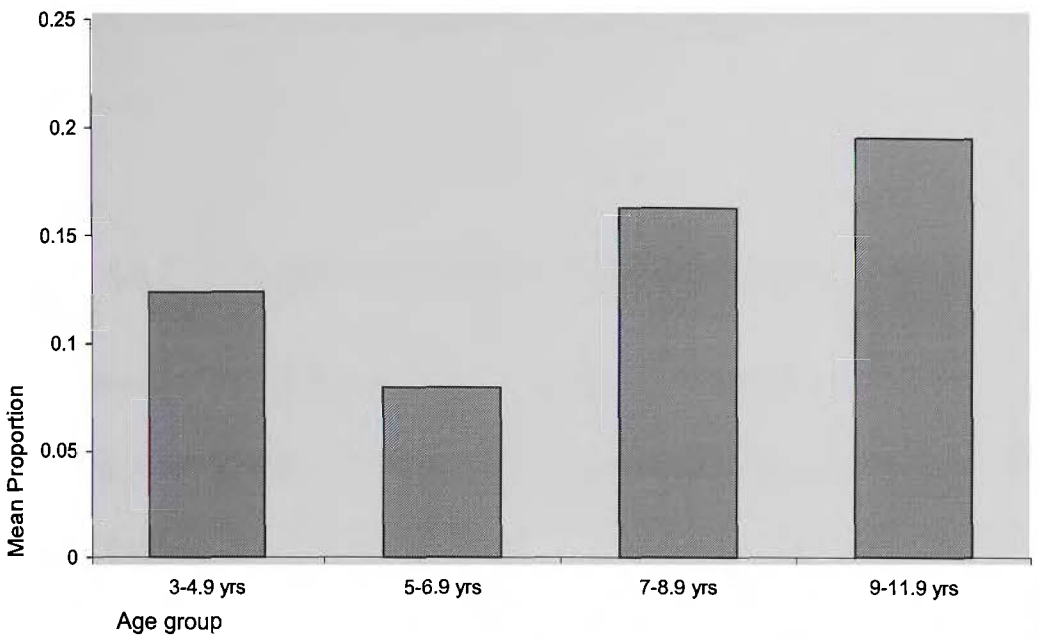


Figure 4-15: Mean proportion of BCOOP in each age group

4.6.1.1 Summary of child behaviours and child age

Many child behaviours varied significantly as a function of child age group. In children under the age of 7 years the behaviours Cry (CRY), Scream (SCRM), Resistance (RES), and Emotion (EMOT) had higher proportions of occurrence than the two older age groups. Conversely the behaviours Assertive procedural verbalisation (APV), Child informs about status (CIA) and Behaviour relaxed (BREL) had higher proportions of occurrence in the two older age groups. Behaviour cooperation (BCOOP) occurred least frequently in the age group 5-6.9 years. Makes coping statement (MCOP) occurred least frequently in the age group 3-4.9 years and increased with age group. Pain (PAIN) was most common in the two middle age groups aged 5-8.9 years.

4.6.2 Child Age and Demographic Characteristics

Results from Chi-square analyses returned no significant results for child age group and concurrent medical condition (yes/no), previous painful medical procedures (yes/no) and child gender.

4.6.3 Comparison of Child Behaviours by Age for Phase of Procedure

The proportions of child CAMPIS-CT behaviours used by each child across each phase according to age group were investigated. The results are presented in Table 4-12 to Table 4-16 (on page 115).

Table 4-12: Proportions (Prop) of Child CAMPIS-CT Codes by Child Age for Phase 1

Behaviour	3-4.9 yrs		5-6.9 yrs		7-8.9 yrs		9-11.9 yrs	
	Prop	Rank	Prop	Rank	Prop	Rank	Prop	Rank
CRY	.332	1	.278	1	.023	9	.139	3
BCOOP	.121	2	.087	5	.326	1	.152	1
RES	.096	3	.157	2	.023	9	.000	16
BIGNC	.089	4	.130	3	.023	9	.057	7
BINT	.080	5	.070	6	.163	2	.082	6
BREL	.048	6	.009	11	.047	6	.013	13
EMSUP	.042	7	.130	3	.023	9	.006	15
NPTC2	.035	8	.009	11	.000	14	.152	1
SCRM	.032	9	.000	15	.000	14	.000	16
INSEK	.029	10	.043	7	.093	3	.108	4
CIA	.019	11	.017	9	.070	5	.095	5
EMOT	.019	11	.017	9	.000	14	.000	16
MCOP	.016	13	.000	15	.047	6	.051	9
RRD	.016	13	.000	15	.000	14	.019	11
APV	.006	13	.000	15	.093	4	.057	7
FEAR	.006	13	.000	15	.000	14	.038	10
PAIN	.006	13	.009	11	.000	14	.013	13
BRTH	.003	18	.000	15	.000	14	.000	16
OT	.003	18	.009	11	.000	14	.000	16
CGCTC	.000	20	.035	8	.047	6	.019	11
HUM	.000	20	.000	15	.023	9	.000	16
PTC	.000	20	.000	15	.000	14	.000	16

Table 4-13: Proportions (Prop) of Child CAMPIS-CT Codes by Child Age for Phase 2

Behaviour	3-4.9 yrs		5-6.9 yrs		7-8.9 yrs		9-11.9 yrs	
	Prop	Rank	Prop	Rank	Prop	Rank	Prop	Rank
CRY	.243	1	.308	1	.046	9	.047	7
BINT	.121	2	.076	5	.217	1	.109	2
BCOOP	.100	4	.087	3	.149	2	.238	1
BIGNC	.100	3	.068	6	.080	4	.047	7
RES	.085	5	.093	2	.006	15	.004	17
NPTC2	.084	6	.057	7	.074	6	.107	3
SCRM	.060	7	.032	10	.000	18	.000	20
EMSUP	.053	8	.032	10	.017	12	.009	16
EMOT	.037	9	.032	10	.000	18	.000	20
CIA	.035	10	.038	9	.063	7	.100	4
BREL	.020	12	.004	16	.103	3	.027	12
MCOP	.020	11	.032	10	.034	10	.053	6
PAIN	.015	13	.078	4	.034	10	.024	14
RRD	.008	14	.000	20	.000	18	.000	20
APV	.006	15	.006	14	.080	4	.038	9
INSEK	.004	16	.040	8	.057	8	.085	5
BRTH	.003	17	.004	16	.000	18	.002	18
CGCTC	.002	20	.006	14	.017	12	.038	9
FEAR	.002	18	.004	16	.006	15	.027	12
OT	.002	18	.000	20	.000	18	.002	18
HUM	.001	21	.000	20	.011	14	.031	11
PTC	.000	22	.002	19	.006	15	.011	15

Table 4-14: Proportions (Prop) of Child CAMPIS-CT Codes by Child Age for Phase 3

Behaviour	3-4.9 yrs		5-6.9 yrs		7-8.9 yrs		9-11.9 yrs	
	Prop	Rank	Prop	Rank	Prop	Rank	Prop	Rank
CRY	.171	1	.163	2	.045	5	.023	7
BCOOP	.137	2	.093	5	.318	1	.163	3
BREL	.137	2	.070	7	.227	2	.256	1
PAIN	.120	4	.209	1	.091	3	.209	2
SCRM	.103	5	.093	5	.091	3	.000	13
BIGNC	.077	6	.023	9	.000	11	.047	5
BINT	.077	6	.047	8	.045	5	.023	8
EMOT	.051	8	.116	4	.045	5	.023	8
EMSUP	.051	8	.023	9	.045	5	.023	8
RES	.034	10	.140	3	.000	11	.000	13
BRTH	.017	11	.000	12	.000	11	.023	8
FEAR	.009	12	.000	12	.000	11	.000	13
MCOP	.009	12	.000	12	.045	5	.140	4
NPTC2	.009	12	.000	12	.000	11	.000	13
APV	.000	15	.000	12	.000	11	.000	13
CGCTC	.000	15	.000	12	.000	11	000	13
CIA	.000	15	.023	9	.045	5	.047	5
HUM	.000	15	.000	12	.000	11	.000	13
INSEK	.000	15	.000	12	.000	11	.023	8
OT	.000	15	.000	12	.000	11	.000	13
PTC	.000	15	.000	12	.000	11	.000	13
RRD	.000	15	.000	12	.000	11	.000	13

Table 4-15: Proportions (Prop) of Child CAMPIS-CT Codes by Child Age for Phase 4

Behaviour	3-4.9 yrs		5-6.9 yrs		7-8.9 yrs		9-11.9 yrs	
	Prop	Rank	Prop	Rank	Prop	Rank	Prop	Rank
CRY	.348	1	.269	7	.152	1	.128	2
SCRM	.093	2	.312	6	.004	16	.007	17
BCOOP	.080	3	.321	3	.123	5	.126	3
BIGNC	.074	4	.174	10	.061	7	.094	5
BINT	.068	5	.248	8	.131	4	.094	5
RES	.068	5	.349	2	.004	16	.000	21
EMSUP	.049	7	.092	12	.008	14	.019	11
EMOT	.046	8	.321	3	.020	11	.012	12
NPTC2	.042	9	.037	14	.025	10	.061	8
CIA	.041	10	.193	9	.135	2	.102	4
PAIN	.033	11	.358	1	.139	2	.029	10
MCOP	.024	12	.101	11	.041	8	.148	1
BREL	.008	13	.046	13	.041	8	.063	7
RRD	.007	14	.028	15	.016	12	.012	12
APV	.005	15	.028	15	.012	13	.010	14
INSEK	.005	15	.321	3	.074	6	.061	8
CGCTC	.003	17	.009	19	.000	19	.010	14
BRTH	.002	18	.018	17	.004	16	.007	17
FEAR	.001	19	.018	17	.000	19	.002	20
OT	.001	19	.000	20	.000	19	.000	21
HUM	.000	21	.000	20	.008	14	.010	14
PTC	.000	21	.000	20	.000	19	.005	19

Table 4-16: Proportions (Prop) of Child CAMPIS-CT Codes by Child Age for Phase 5

Behaviour	3-4.9 yrs		5-6.9 yrs		7-8.9 yrs		9-11.9 yrs	
	Prop	Rank	Prop	Rank	Prop	Rank	Prop	Rank
CRY	.284	1	.174	1	.021	13	.124	2
BCOOP	.151	2	.006	7	.146	1	.200	1
NPTC2	.107	3	.010	2	.104	4	.124	2
BIGNC	.102	4	.004	10	.083	6	.076	5
RES	.055	5	.002	11	.000	14	.010	13
EMSUP	.052	6	.005	8	.063	7	.010	13
BINT	.047	7	.008	4	.125	2	.076	5
CIA	.047	7	.005	8	.104	4	.067	7
MCOP	.044	9	.009	3	.042	9	.067	7
BREL	.023	10	.002	11	.125	2	.057	9
EMOT	.018	11	.001	15	.000	14	.000	16
APV	.016	12	.000	18	.042	9	.029	10
PAIN	.013	13	.008	4	.000	14	.000	16
SCRM	.013	13	.002	11	.000	14	.000	16
INSEK	.010	15	.008	4	063	7	.114	4
OT	.008	16	.000	18	.000	14	.000	16
RRD	.008	16	.001	15	.042	9	.019	11
CGCTC	.003	18	.002	11	.000	14	.019	11
BRTH	.000	19	.000	18	.000	14	.000	16
FEAR	.000	19	.000	18	.042	9	.000	16
HUM	.000	19	.001	15	.000	14	.010	13
PTC	.000	19	.000	18	.000	14	.000	16

To identify changes in the proportion of behaviours by phase of procedure and age group, Two factor, mixed design ANOVAs were performed for the highest occurring behaviours (those that had proportions of occurrences >3.0% in each phase and each age group). The low occurring behaviours not included in the analyses were: Other (OT), Deep breath (BRTH) and Procedural talk by child (PTC). All analyses used the Huyhn-Feldt corrected test of significance to avoid problems with sphericity. From the 19 behaviours analysed, only two returned significant *p* values, Emotion (EMOT) and Behaviour relaxed (BREL). The significant results are displayed in Table 4-17 and Table 4-18 (on page 117).

Emotion (EMOT)

Table 4-17: Results of ANOVA for EMOT over Phase by Age

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Age	0.06	3	0.02	4.20	.009
Error	0.28	62	0.00		
Phase	0.11	1.70	0.03	8.94	.001
Age x Phase	0.10	5.10	0.01	2.67	.025
Error	0.74	105.50	0.00		

Note: Huynh-Feldt Test of Significance used.

Table 4-17 shows EMOT changed as a function of age over phase of the procedure. In Figure 4-16 (on page 117) it can be seen that a pattern of emotional behaviour occurred in the two youngest age groups commencing at a low level in phase 1, increasing to a peak in phase 3 and then decreasing to a low level in phase 5. The 5-6.9 years age group had the highest occurrence of Emotion and this occurred in the Insertion phase. The two oldest age groups (seven years and older) exhibited Emotion only during the Insertion and Procedure phase.

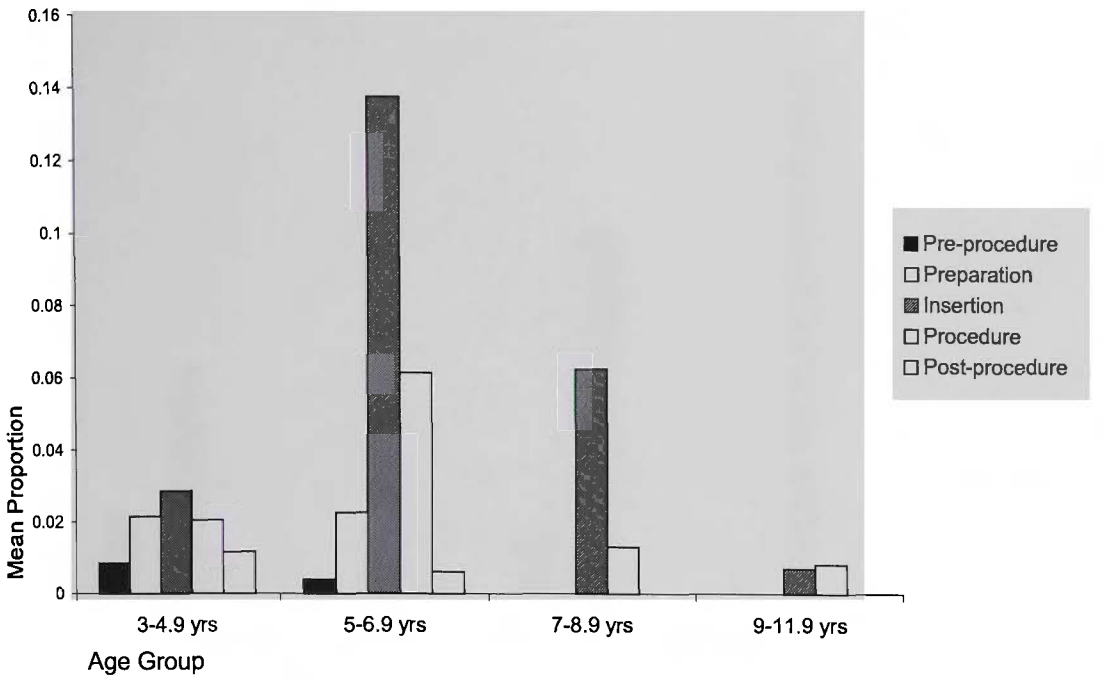


Figure 4-16: Mean of proportions of EMOT in each age group over phase of procedure

Behaviour relaxed (BREL)

Table 4-18: Results of ANOVA for BREL over Phase by Age

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Age	0.30	3	0.10	3.63	.018
Error	1.73	62	0.03		
Phase	1.28	1.75	0.32	23.45	.000
Age x Phase	0.46	5.26	0.04	2.83	.018
Error	3.37	108.68	0.01		

Note: Huynh-Feldt Test of Significance used.

Table 4-18 shows Behaviour relaxed changes as a function of child age over phase. In Figure 4-17 (on page 118) Behaviour relaxed occurred most frequently during the Insertion phase in all age groups and the proportions of the behaviour generally increased with age. The 5-6.9 years age group had the lowest occurrence of Behaviour relaxed across phase of procedure than any other age group whilst the oldest age group (9-11.9 years) had the highest occurrence of the behaviour.

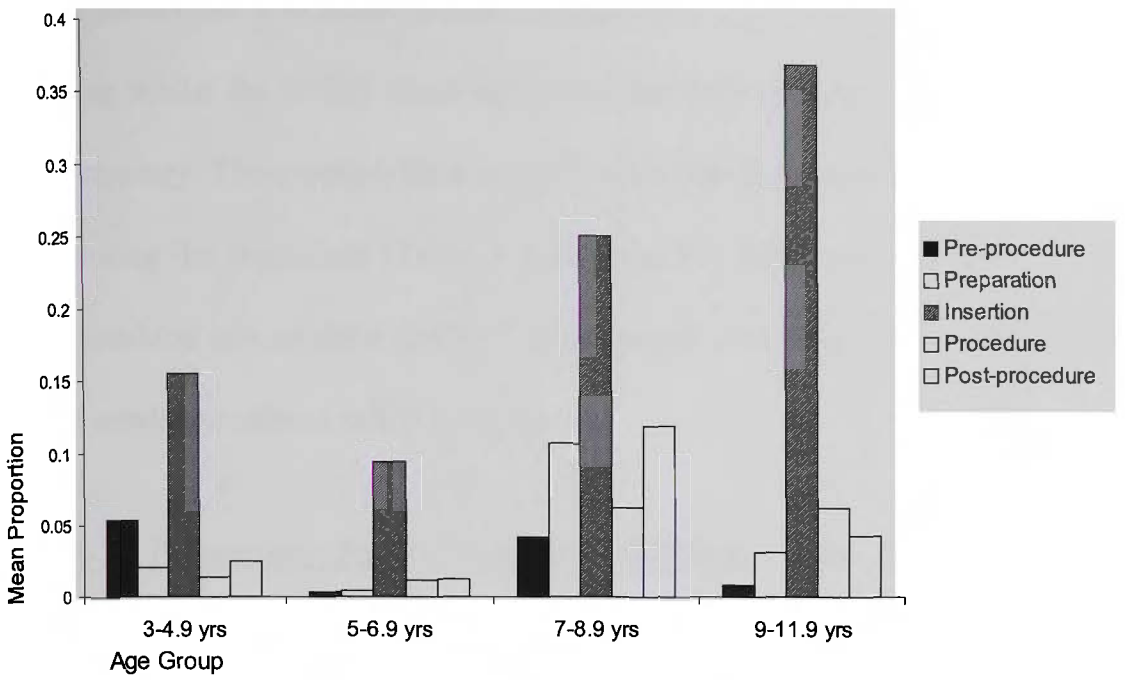


Figure 4-17: Mean of proportions of BREL in each age group over phase of procedure

4.6.4 Parental Behaviours and Child Age

To investigate the relationship between child age and parental behaviour the proportions and rank order of each parental behaviour for each age group were calculated and are displayed in Table 4-19 (on page 119). Reassurance (REASU) had the highest proportions of occurrence in all child age groups, in particular the groups under seven years of age. The parental behaviours in the two youngest age groups (under 7 years of age) had high occurrences of Non-procedural talk to child (NPTC), Behavioural command to child (BCC), Child's general condition-related talk (CGCTA) and Praise (PRAS). The age group 3-4.9 years had higher occurrences of Child's general condition-related talk (CGCTA) than the 5-6.9 years age group. The 5-6.9 years age group also had higher occurrences of Checking child's status than the youngest age group. Parental behaviours in the two oldest age groups (over the age of 7 years) showed high proportions of Non-procedural talk to adult, Non-procedural talk to child (NPTC) and Child's general condition-related talk (CGCTA). The 7-8.9 years age group had higher proportions of the

parental behaviour Procedure-related talk to adult (PTA) compared to the 9-11.9 years age group whilst the 9-11.9 years age group had higher proportions of Command to use coping strategy. These proportions coincide with the most common parental CAMPIS-CT codes during the procedure (Table 4-5 on page 91) which were Reassurance (REASU), Non-procedural talk to child (NPTC), Behavioural command to child (BCC) and Child's general condition-related talk (CGCTA).

Table 4-19: Proportions (Prop) of Parental CAMPIS-CT codes for each Child Age Group

Behaviour	3-4.9 yrs		5-6.9 yrs		7-8.9 yrs		9-11.9 yrs	
	Prop	Rank	Prop	Rank	Prop	Rank	Prop	Rank
REASU	.327	1	.423	1	.264	1	.254	1
NPTC	.161	2	.087	2	.068	5	.146	2
BCC	.101	3	.064	3	.038	8	.033	9
CGCTA	.061	4	.044	6	.128	2	.097	4
PRAS	.051	5	.051	5	.021	15	.039	7
NPTA	.049	6	.029	10	.094	3	.074	5
CST	.045	7	.054	4	.055	6	.049	6
PTA	.039	8	.023	12	.079	4	.022	11
EMP	.025	9	.029	10	.030	10	.019	13
CCS	.020	10	.037	7	.026	13	.100	3
CPA	.020	10	.032	9	.028	12	.031	10
NPC	.018	12	.017	14	.030	10	.016	15
HMA	.015	13	.015	15	.049	7	.038	8
GCC	.015	13	.014	16	.015	16	.017	14
BIGNA	.014	15	.035	8	.032	9	.022	11
BPROC	.012	16	.011	17	.004	18	.009	18
CRIT	.011	17	.023	12	.009	17	.013	16
HMC	.009	18	.003	19	.026	13	.013	16
APOL	.004	19	.004	18	.002	19	.006	19
BPAPR	.000	20	.001	20	.000	21	.000	21
PTAC	.000	20	.001	20	.002	19	.002	20

To examine for differences in the proportions of parental behaviours by age group ANOVAs were performed on the proportions of each of the highest occurring parental behaviours (those which had proportions of occurrences >3.0% across all age groups). The behaviours not analysed were Empathy (EMP), Notice of procedure to come (NPC), Giving control to child (GCC), Non-painful procedural behaviour (BPROC), Criticism (CRIT), Humour to child (HMC), Apology (APOL), Painful procedural behaviour (BPAPR) and Procedural talk to child (PTAC). Only Behaviour ignoring child (BIGNA)

returned significant results from the 13 behaviours analysed. The results are given in Table 4-20.

Table 4-20: Results of ANOVA for BIGNA by Age

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Age	0.014	3	0.005	3.085	.034
Residual Error	0.095	61	0.002		

In Figure 4-18 the mean proportion of Behaviour ignoring child (BIGNA) is highest in the age groups 5-6.9 years and 9-11.9 years and lowest in the 7-8.9 years group.

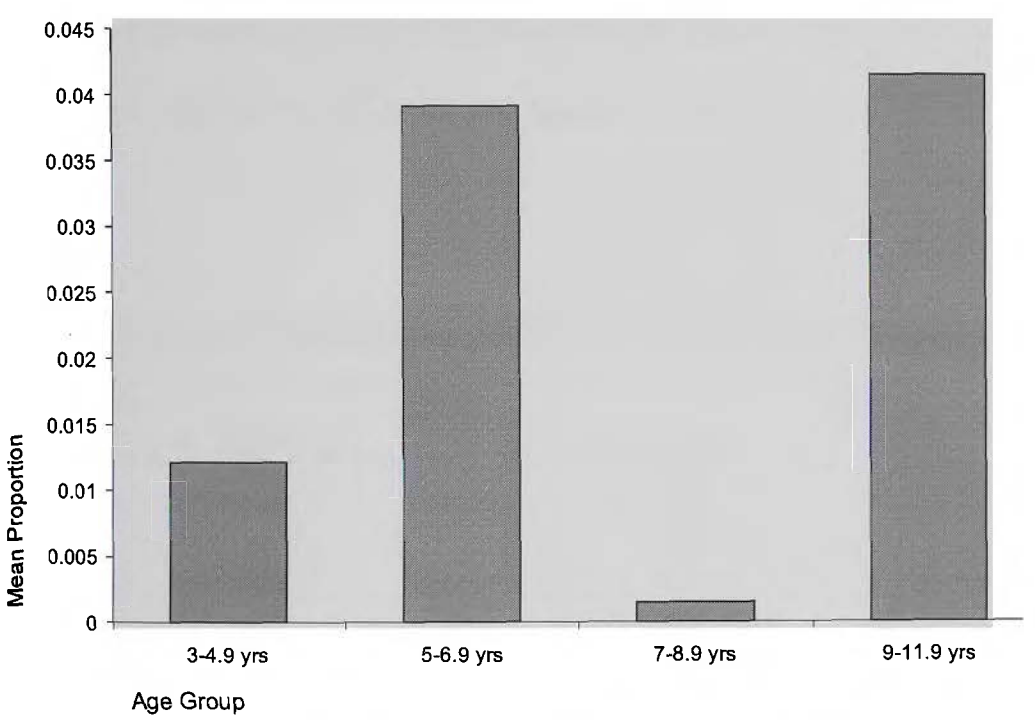


Figure 4-18: Mean proportion of BIGNA in each age group

4.6.5 Parental Behaviour, Child Age and Phase of the Procedure

The results for the effects of phase of procedure and child age for all parental behaviours were not significant. The previous results for the effects of child age on parental behaviours were significant for Behaviour ignoring child (BIGNA), however a Two-factor, mixed design ANOVA (Huynh-Feldt Test of Significance used) for the effect of

child age and phase on the proportion of Behaviour ignoring returned no significant results ($F(8.52, 61) = 1.59, p = .127$).

4.6.6 Child Gender

There were 30 girls (45.5%) and 36 boys (54.5%) in the study. Out of all the child CAMPIS-CT codes (n = 7099), the mean number of CAMPIS-CT codes used by girls was 111.8 (n=3353, SD=191.7) and 104.1 for boys (n=3746, SD=198.8). Proportions and ranks for each child behaviour by gender are given in Table 4-21. The first four highest-ranking behaviours for both genders were the same, that is Cry (CRY), Behaviour cooperation (BCOOP), Behavioural interest (BINT) and Behaviour ignoring adult (BIGNC).

Table 4-21: Proportions (Prop) of CAMPIS-CT Codes for Girls and Boys

Behaviour	Girls		Boys	
	Prop	Rank	Prop	Rank
CRY	.258	1	.239	1
BCOOP	.124	2	.103	2
BINT	.085	3	.092	3
BIGNC	.067	4	.085	4
NPTC2	.065	5	.056	7
CIA	.059	6	.045	9
RES	.058	7	.061	5
EMSUP	.050	8	.031	13
SCRM	.043	9	.058	6
MCOP	.037	10	.037	11
BREL	.031	11	.024	14
PAIN	.030	12	.049	8
INSEK	.027	13	.036	12
EMOT	.019	14	.045	9
APV	.014	15	.011	15
RRD	.010	16	.005	17
CGCTC	.007	17	.007	16
FEAR	.004	18	.005	18
HUM	.004	18	.004	19
BRTH	.003	20	.003	20
OT	.002	21	.001	22
PTC	.000	22	.002	21

In order to identify differences in the proportions of child behaviours by gender independent groups *t*-tests were performed. Behaviours that occurred less than 3.0% for both genders were excluded from the analyses. The low occurring behaviours not analysed were Assertive procedural verbalisation (APV), Requests relief from non-procedural discomfort (RRD), Child's general condition-related talk by child (CGCTC), Fear (FEAR), Humour (HUM), Deep breath (BRTH), Procedural talk (PTC) and Other (OT). The findings from the analyses for the remaining 14 behaviours were not significant.

4.6.6.1 Child gender and parental behaviour

Parental use of CAMPIS-CT codes for each child gender group was explored to determine if parental behaviour changed with child gender (Table 4-22 on page 123). The highest proportion of parental codes for both girls and boys were Reassurance (REASU) and Non-procedural talk to child (NPTC). Other high occurring behaviours for both genders were Child's general condition-related talk (CGCTC) and Behavioural command to child (BCC).

Table 4-22: Proportions (Prop) of Parent CAMPIS-CT Codes and Child Gender

Behaviour	Girls		Boys	
	Prop	Rank	Prop	Rank
REASU	.318	1	.333	1
NPTC	.122	2	.155	2
CGCTA	.081	3	.060	4
BCC	.067	4	.092	3
NPTA	.062	5	.046	7
PTA	.056	6	.023	9
CCS	.046	7	.023	10
PRAS	.043	8	.050	6
CST	.040	9	.055	5
EMP	.028	10	.022	11
BIGNA	.026	11	.015	16
HMA	.023	12	.020	12
CPA	.022	13	.026	8
NPC	.019	14	.019	13
GCC	.013	15	.017	15
BPROC	.013	15	.009	18
HMC	.009	17	.010	17
CRIT	.007	18	.018	14
APOL	.005	19	.003	19
OT	.001	20	.003	20
BPAPR	.000	21	.000	22
PTAC	.000	21	.002	21

In order to identify differences in the proportions of parental behaviours by gender independent groups *t*-tests were performed. Behaviours that occurred less than 3.0% for both genders were excluded from the analyses. The low-occurring behaviours not analysed were Empathy (EMP), Behaviour ignoring child (BIGNA), Humour to adult (HMA), Command to engage in procedural activity (CPA), Notice of procedure to come (NPC), Giving control to child (GCC), Non-painful procedural behaviour (BPROC), Humour to child (HMC), Apology (APOL), Painful procedural behaviour (BPAPR), Procedural talk (PTAC) and Other (OT). The findings were not significant for any of the remaining 8 behaviours.

4.6.7 Child Pain

Sixty children completed the Faces Pain Scale (Bieri et al., 1990) and six did not. Of the six missing values, three children were unable to understand and use the Faces scale. These children were all under the age of five years. Two children were asleep almost immediately after the procedure and one child was too upset to use the scale. Of the remaining scores the most common score was zero (40%), followed by the extreme score of six (18.3%). The results are presented in Figure 4-19.

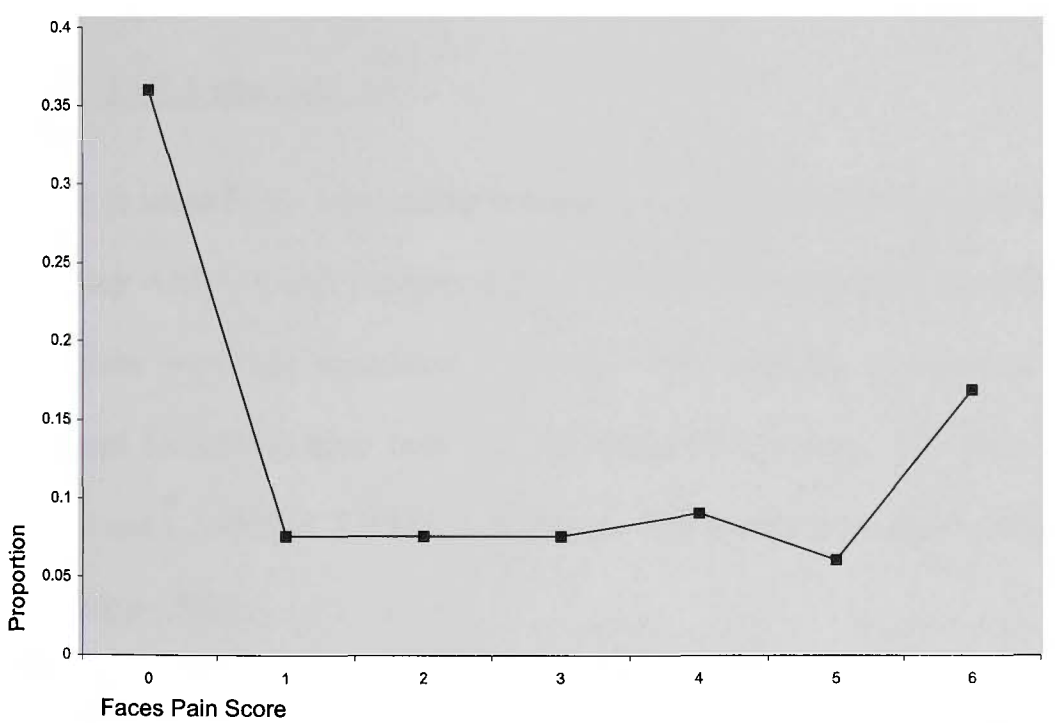


Figure 4-19: Proportion of Faces Pain Scale scores

4.6.7.1 Child age and Faces Pain score

In order to determine the effect of child age on Faces Pain score a one-way ANOVA was performed for child age (in years) and Faces Pain score group however the results were not significant ($F(6, 53) = .347, p = .909$).

4.6.7.2 Correlation between Faces Pain score and CAMPIS-CT PAIN code

Two methods of assessing child pain were used, the Faces Pain Scale (Bieri et al., 1990) and the CAMPIS-CT PAIN code. Correlation between the two measures was investigated using Spearman rank correlation coefficients. The Faces Pain score and the proportion of total CAMPIS-CT PAIN codes used in each case were examined and the results were significant, indicating a moderate correlation between the two measures was found (r_s=.317, n=60, p = .014).

4.6.7.3 EMLA and child pain

In order to identify the relationship between length of EMLA application and pain scores a one-way ANOVA was performed for EMLA time (in minutes) and Faces Pain score. The results were not significant (F(6, 42)=.754, p=.610). A one-way ANOVA was performed for EMLA time (less than 60 mins, 60-119 mins, 120 mins and above, no EMLA) and CAMPIS-CT PAIN proportions. The results were also non-significant (F(3, 50)=.696, p=.559).

4.6.8 Demographic Characteristics

Demographic characteristics of the child included concurrent medical condition, previous experience with painful medical procedures and attendance at preschool/ childcare. To identify the effect of concurrent medical condition on child behaviour one-way ANOVAs were performed on the proportions of each child behaviour and children grouped as having no medical condition and those with a medical condition. The analyses produced no significant results for any child behaviour. To examine the effect of previous painful medical procedures (excluding immunisations) on child behaviour one-way ANOVAs

were also employed on the proportions of each child behaviour and children grouped as having no previous experience or as having one or more previous experiences. The analyses produced no significant results for any child behaviour. One-way ANOVAs were conducted on child behaviours between those not attending school with no preschool/child care and those with at least one day a week preschool or child care. This should identify the effects of parent versus parent plus other adults childcare (preschool or child care) on children's behaviour. The analyses produced no significant results for any child behaviour. In summary, concurrent medical condition, previous painful medical procedures and type of childcare had no significant effect on child behaviours.

4.7 Effect of Parental Characteristics

There were several parental characteristics explored in the study, parental anxiety, age and prediction of child's reaction to the venepuncture. Analyses were performed to determine the effects of these characteristics on child behaviour.

4.7.1 Parental Anxiety

Parental anxiety was examined by the state and trait form of Spielberger's State-Trait Anxiety Inventory [Form Y] (1983). Six mothers and four fathers did not fully complete the inventory, omitting approximately four questions for each inventory, so their responses had to be discarded as the scores would not be reliable (Spielberger, 1983). Reasons for omission varied, from no response to "I didn't realise" and "I didn't think it was important". The minimum score possible on both forms of the anxiety inventory was 20 and the maximum score possible was 80. The state anxiety scores had a mean of 45.16 and a standard deviation of 12.44 (n=57), whilst the trait anxiety scores had a mean of

37.17 and a standard deviation of 8.85 (n=56). Appropriate normative data, such as age group and stressful condition, were not available by Spielberger (1983) for comparison.

4.7.1.1 Parental anxiety and child behaviours

The parents' state and trait anxiety scores were categorised into low, moderate or high anxiety groups. The scores greater than one standard deviation below the mean were categorised as low scores, those greater than one standard deviation above the mean as high and all other scores were categorised as moderate. In order to determine the effect of parental state and trait anxiety levels on child behaviour the proportions of each parental behaviour in each anxiety level for each case were calculated and are given in Table 4-23 (on page 128). The most frequently occurring proportions of CAMPIS-CT codes for each parental state anxiety level were Cry (CRY) and Behaviour cooperation (BCOOP). Other codes varied in their occurrence between groups. The children in the low parental anxiety group had high use of Non-procedural talk by child (NPTC2) and Child informs about status (CIA). The moderate anxiety group had high use of Behaviour ignoring adult (BIGNC), Resistance (RES), and Behavioural interest (BINT). Children in the high parental anxiety group had higher use of Behavioural interest and Behaviour ignoring adult.

Table 4-23: Proportions (Prop) of Child CAMPIS-CT Codes for Parental Levels of State Anxiety

Child Behaviour	Parent State Anxiety Level					
	Low		Moderate		High	
	Prop	Rank	Prop	Rank	Prop	Rank
CRY	.152	1	.276	1	.303	1
BCOOP	.112	2	.098	2	.168	2
BINT	.096	3	.073	4	.096	3
NPTC2	.084	4	.052	7	.040	6
CIA	.083	5	.047	9	.046	5
INSEK	.072	6	.029	13	.022	13
PAIN	.056	7	.031	12	.037	7
MCOP	.048	8	.039	10	.026	10
APV	.048	8	.009	15	.003	17
RES	.044	10	.073	4	.034	9
BREL	.036	11	.012	14	.036	8
BIGNC	.030	12	.084	3	.090	4
EMSUP	.026	13	.049	8	.024	12
EMOT	.026	13	.039	10	.025	11
SCRM	.025	15	.069	6	.020	14
FEAR	.015	16	.004	17	.005	16
CGCTC	.014	17	.004	17	.018	15
HUM	.012	18	.002	19	.001	20
RRD	.009	19	.007	16	.003	17
PTC	.008	20	.000	22	.000	21
BRTH	.003	21	.002	19	.000	21
OT	.000	22	.001	21	.003	17

In order to examine the effects of parental state and trait anxiety levels on child behaviour the proportions for each case were calculated and analysed using one-way ANOVAs for each behaviour. Comments upon the decision not to use post-hoc analyses and the effects upon Type I and Type II errors are given on page 84. There were no significant results from the analyses on trait anxiety. Only one behaviour for state anxiety produced a significant *p* and that was Information-seeking (INSEK). The results are given in Table 4-24.

Table 4-24: Significant Result of One-Way ANOVA for INSEK by State Anxiety Level

Variation	*SS*	*df*	*MS*	*F*	*p*
Anxiety	0.025	2	0.013	5.053	.001
Residual Error	0.133	53	0.003		

The children in the parental state low-anxiety group had higher rates of Information-seeking (INSEK) than children in the higher anxiety level groups (shown in Figure 4-20 below).

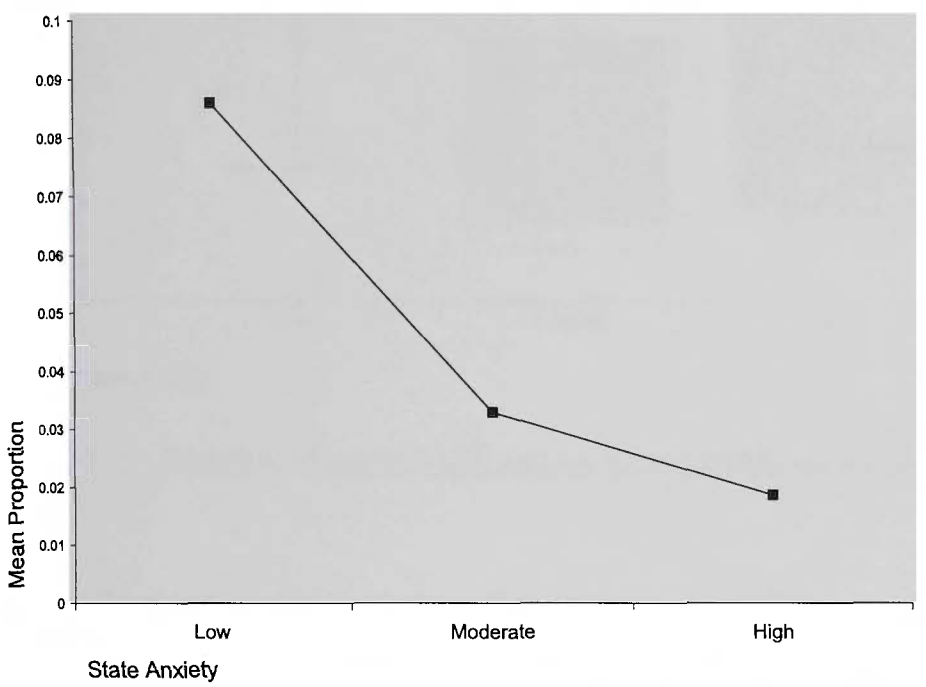


Figure 4-20: Mean of proportions of INSEK for each state anxiety level

4.7.2 Parental Anxiety Levels and Child Age

To determine the effect of child age on parental state and trait anxiety levels one-way ANOVAs were performed. The results of the analyses were significant for state anxiety level ($F(2, 53)=4.046$, $p=.023$) but not trait anxiety level ($F(2, 54)=1.424$, $p=.250$). A boxplot of the distribution of child age and state anxiety level is presented in Figure 4-21 (on page 130). Parents with moderate to high state anxiety scores had children with a lower mean age than parents with low state anxiety levels.

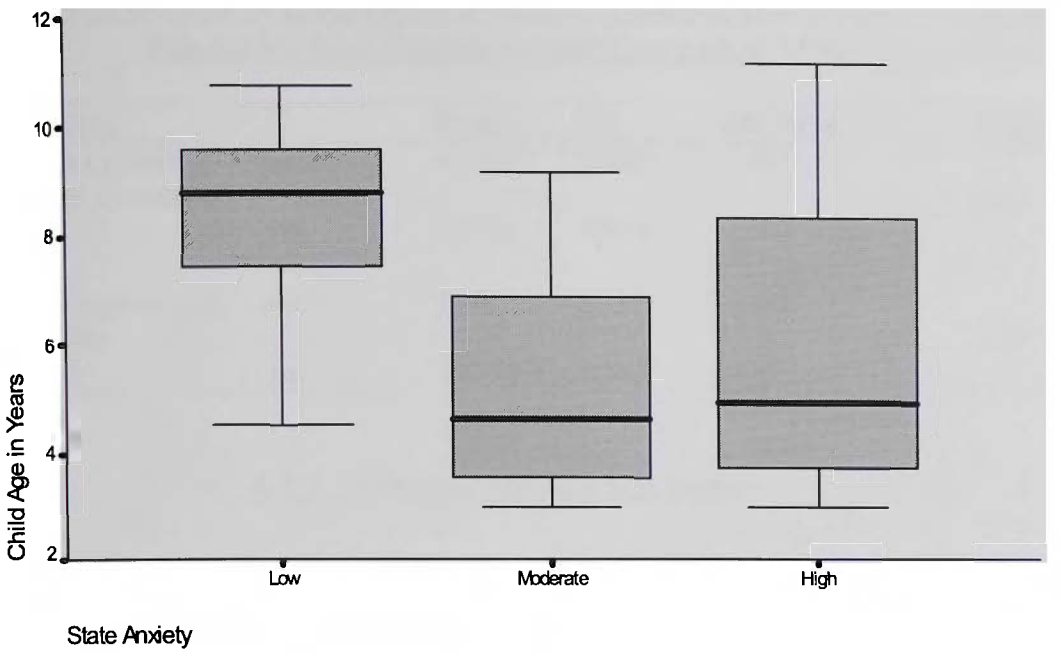


Figure 4-21: Boxplot; Mean of child age (in years) and level of parental state anxiety

4.7.2.1 Parental anxiety and child demographic characteristics

Independent groups *t*-tests were conducted to identify the differences in parental state and trait anxiety related to the child's concurrent medical condition and previous painful experiences. Results showed significantly higher trait anxiety for parents of children who had not previously had a painful medical procedure and did not have a significant medical condition (Table 4-25 on page 131). No group differences were identified for state anxiety.

Independent groups *t*-tests were performed to determine the effect of child gender on parental state and trait anxiety scores. The results were not significant for either state ($t(54)=.88$, $p=.380$) or trait anxiety ($t(55)=-.80$, $p=.428$).

Table 4-25: Results of Independent t-tests for Parental Trait Anxiety Score and Previous Painful Medical Procedures and Concurrent Medical Condition

Condition		Mean	*SD*	*SE* Mean	*df*	*t*-value	*p*
Previous painful medical procedures	no	41.046	9.383	2.001	55	2.38	.021
	yes	35.543	7.913	1.337			
Concurrent medical condition	no	39.442	8.972	1.368	55	2.81	.007
	yes	32.214	5.912	1.58			

4.7.3 Parental Anxiety and Parental Behaviours

The proportions of occurrence of each code for each anxiety-level group were calculated. The results for proportions of parental behaviours for state and trait anxiety level groups are given in Table 4-26 (on page 132) and Table 4-27 (on page 132). The most frequently occurring CAMPIS-CT codes for all levels of state and trait anxiety groups were Reassurance (REASU) and Non-procedural talk to child (NPTC).

To examine for changes in the frequency of parental behaviours across different parental anxiety-level groups, one-way ANOVAs were performed on the proportions of each of the highest occurring behaviours (occurrences >3.0% in each state and trait anxiety-level group) for each case. Low occurring behaviours not analysed were Giving control to child (GCC), Notice of procedure to come (NPC), Humour to child (HMC), Criticism (CRIT), Non-painful procedural behaviour (BPROC), Apology (APOL), Other (OT) and Painful procedural behaviour (BPAPR). Of the 14 behaviours analysed no behaviours were found to significantly differ across state or trait anxiety level groups.

Table 4-26: CAMPIS-CT Codes for Parental Level of State Anxiety

Behaviour	State Anxiety Level		
	Low	Moderate	High
REASU	.270	.341	.355
NPTC	.192	.124	.136
CGCTA	.075	.055	.073
NPTA	.071	.052	.043
BCC	.060	.096	.060
PTA	.048	.040	.026
BIGNA	.038	.016	.015
CST	.032	.047	.068
PRAS	.030	.051	.060
EMP	.028	.025	.033
CCS	.026	.037	.026
GCC	.024	.016	.013
HMC	.022	.008	.005
CRIT	.022	.013	.005
CPA	.020	.024	.023
NPC	.016	.017	.025
HMA	.014	.020	.020
BPROC	.006	.013	.010
APOL	.004	.004	.003
PTAC	.002	.001	.002
BPAPR	.000	.001	.000

Table 4-27: CAMPIS Codes for Parental Level of Trait Anxiety

Behaviour	Trait Anxiety Level		
	Low	Moderate	High
REASU	.318	.339	.329
NPTC	.162	.127	.120
BCC	.084	.088	.079
CGCTA	.082	.051	.068
NPTA	.052	.051	.070
PTA	.045	.040	.023
CST	.043	.048	.061
PRAS	.042	.052	.048
EMP	.037	.024	.013
GCC	.024	.015	.009
CCS	.020	.042	.025
NPC	.017	.017	.030
BIGNA	.016	.016	.038
HMC	.014	.008	.005
CPA	.011	.029	.023
HMA	.010	.022	.025
CRIT	.009	.015	.013
BPROC	.009	.012	.016
APOL	.003	.004	.004
OT	.001	.000	.002
BPAPR	.000	.001	.000
PTAC	.000	.001	.000

4.7.4 Parental Anxiety and Parent Demographic Characteristics

One-way ANOVA's were performed on state and trait anxiety scores by parental age groups. The analyses returned non-significant results for both state ($F(2, 52)=1.983$, $p=.148$) and trait anxiety ($F(2, 53)=.007$, $p=.994$). There were very few valid responses from fathers for both state ($n=5$) and trait ($n=5$) anxiety. Therefore anxiety levels between mothers and fathers were not compared.

4.7.5 Parent's Prediction of Child's Reaction to the Procedure

Each parent was asked to predict the behaviour of his or her child during the venepuncture, specifically the child's level of cooperation. The three categories were 'cooperates completely', 'unwilling, complains, but will not fight, kick or resist treatment', and 'uncooperative, fights, kicks, and/or resists treatment'. Two parents did not complete this section. Twenty-four parents (37.5% of respondents) stated that their child would cooperate completely, 30 (46.9%) stated they would be unwilling, and 10 (15.6%) stated the children would be uncooperative. Of the youngest child age group 80% of parents predicted their child would cooperate, 93.8% of parents from the child 5 to 8.9 years age groups and 100% of parents from the child 9 to 11.9 years age group predicted their children would cooperate.

The proportions of Behaviour cooperation and a combined Resistance/Emotion category were calculated. The children were classified into three categories of cooperative behaviour (low, moderate and high), and three categories of Resistance/Emotion behaviour (low, moderate and high). Cases under one standard deviation of the mean for each behaviour were categorised as low, and those over one standard deviation above the mean were categorised as high. The remaining cases were categorised as moderate.

Spearman correlation analyses were performed on parent prediction of reaction, cooperation category (low, moderate or high) and Resistance/Emotion category (low, moderate or high). Parents' prediction of reaction was moderately correlated ($r_s(2)=.450$, $p<.001$) with child Resistance/Emotion and weakly inversely correlated with child Behaviour cooperation ($r_s(2)=-.305$, $p=.014$).

Correlational analysis was performed between the parents' predicted child reaction and the sum of the child's previous painful medical experiences. Spearman rank correlation coefficients were obtained but the results were not significant ($r_s(64)=.225$, $p=.079$).

4.8 Summary

This chapter has presented the descriptive statistics and results from analyses for a variety of child and parent characteristics. Child and parent demographic characteristics included age, gender, concurrent medical condition, previous painful medical experiences, parent occupation and education. The total proportions of each child and parent behaviour were given, the most common child behaviour was Cry and the most commonly occurring parental behaviour was Reassurance. Phase of procedure was found to have an effect on the proportion of occurrences of some child and parent behaviours, such as Cry and Reassurance. Child behaviour also changed between the first and second cannulation attempts.

The effects of child age on child and parent behaviours were explored and a distinct pattern of child behaviours emerged, children under the age of 7 years had higher occurrences of distress behaviours. Children over the age of 7 years had higher occurrences of cooperation and relaxed behaviours. When the effect of phase of

procedure was taken into account only a few child behaviours significantly changed with age, Emotion and Makes coping statement, and only one parent behaviour of ignoring the child.

Some variables returned no significant results such as the effects of child gender upon child and parent behaviours, EMLA application and pain measures and child age and faces pain score. The Faces Pain score and CAMPIS-CT Pain occurrence were moderately correlated. The effects of parental state and trait anxiety on child behaviours were also investigated and returned significant results for only one behaviour, children whose parents reported low state anxiety had higher use of Information-seeking. No parental behaviours were found to significantly change as an effect of state or trait parental anxiety. The effect of state and trait parental anxiety on child demographic characteristics such as concurrent medical condition, previous painful medical procedures, child age and child gender returned significant results in only a few instances. Parental trait anxiety level was significantly related to child concurrent medical condition and previous painful medical procedures and child age. Parents' prediction of child reaction to the venepuncture was positively moderately correlated to the occurrences of Resistance/Emotion behaviours and weakly inversely correlated with Behaviour cooperation.

The implications of the results on child and parent behaviours and future research will be explored in the discussion chapter. Parent-child interaction was analysed using sequential analysis techniques and will be presented in the following chapter.

CHAPTER - 5 SEQUENTIAL ANALYSIS

To explore the nature of parent and child interaction more precisely, each occurrence of child behaviour needs to be viewed in the context of the surrounding and consequent parental behaviours. This was achieved by using a specialised technique called sequential analysis. Sequential analysis uses the sequence of behaviours in a venepuncture and determines the probability of a behaviour preceding or following a specific behaviour of interest, such as crying. This analysis is not commonly used, therefore the procedure will be described by applying each step of the process to the research study. Patterns of relationships between child and adult behaviours will be identified in this chapter and parental influences on child coping examined. The discussion and implications of the results for future research will be given in the following discussion chapter.

The venepuncture involves staff, parent and child behaviours in an interwoven and reciprocal interaction. During venepunctures children are continually responding to parents and staff during the procedure and staff form an integral part of the interaction. Therefore, parent and child behavioural sequences cannot be analysed in isolation from those of the staff. When using sequential analysis a large number of behavioural codes are needed. If parent and staff were to be differentiated in the interaction incorporating the 43 codes of the CAMPIS-CT, and particularly if phase of procedure was also considered, the study would need to be very large in scope. As this study is exploratory in nature, parent and staff behaviours will be collapsed in the interaction sequence to form adult category

codes and the behaviours will be collapsed across phases. This will identify the sequential relationships between adult (parents, doctors and nurses) and child behaviours.

5.1 Introduction to Sequential Analysis

The aim of sequential analysis is to identify and predict probable patterns of behaviour or responses in a given situation. The procedure is based upon conditional probabilities and the significance of the corresponding *Z*-scores. Blount et al. (1989) used sequential analysis on data from parent-child interactions during bone marrow aspirations and lumbar punctures. Other studies using sequential analysis can be found in the fields of marital interaction (Gottman, 1979; Jacob & Leonard, 1992), behavioural psychology (Sackett, 1979), and child psychology (Bakeman & Brownlee, 1980; Fletcher, Fischer, Barkley, & Smallish, 1996; Yoder & Davies, 1990). The data sequences for sequential analysis can be based on event or time sequences. In event sequences the behaviours (events) are recorded when there is a change in behaviour (change of event). This study considered adult and child behavioural sequences as event sequences. A lag sequential analysis is where there has been a difference (lag) in time or event between one behaviour and another in the sequence, that is, there may be an intervening event between the two behaviours. This form of analysis is very useful in identifying patterns of behaviours, for example analysing 5 lags forward can give a sequence of 5 behaviours that follow the original behaviour of interest.

5.1.1 Conditional and Transitional Probabilities

Conditional and transitional probabilities form the basis of lag sequential analysis. Conditional probabilities describe the probability that an event or behaviour will occur

given that a particular event also occurred. Using the example of thunderstorms, "the probability [p] of a thunderstorm [T] occurring, *given* that it was a rainy [R] day can be written as p(T/R)" (Bakeman & Gottman, 1986, p. 123). Thunderstorm is considered the target event and rainy day is the given event (also known as the criterion event in some literature). Transitional probability is a special form of conditional probability where a lag in event occurs between the target and the given event or behaviour (Bakeman & Gottman, 1986).

Lag sequential analysis treats each behaviour, in turn, as the behaviour of interest (given behaviour). Therefore, sequences are obtained for every given behaviour consisting of the behaviours preceding and following each given behaviour. A common convention used is where lag 0 is the behaviour of interest (given behaviour) and lag 1 is the following behaviour/event (the target behaviour). For example, a researcher may wish to know the probability of behaviour B (target behaviour at lag 1) occurring immediately following behaviour A (the given behaviour at lag 0). This can be written as the probability of behaviour B occurring given behaviour A [p(B/A)] (Bakeman & Gottman, 1986). For example the given behaviour may be Cry (by child) and the analysis identifies the transitional probability of a specific parental behaviour such as Reassurance preceding or following Cry. A reverse lag indicates behaviours or events preceding the event of interest. This study used 5 lags forward and reverse in the analyses in order to compare to Blount et al.'s (1989) study. An additional rationale for using 5 lags was that the most immediate patterns of interaction were of primary interest in this exploratory study. When analysing 5 lags forward and reverse for each given behaviour the 5 behaviours in the sequence immediately preceding (reverse lags) and following (forward lags) the given

behaviour are identified. An example of forward and reverse lags is given in Table 5-1 (below).

Table 5-1: Example of Forward and Reverse Lags

Reverse LAG 1	Lag 0	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
REASU	CRY	REASU	CRY	REASU	CRY	REASU

5.2 Determining Lags and Behavioural Chains

Analysis of the study's data was performed using guidelines by Gottman (1979) for Sackett's (1974) lag sequential analysis procedure. The following steps were identified and applied to the study data.

5.2.1 Step 1: Computing Transitional Probabilities and Identifying Probable Behaviour Chains for Each Code.

Adult-child interaction was coded using a CAMPIS-CT measure that gave 21 adult codes, 21 child codes and one shared code, which resulted in a sequential behavioural sequence for each case. Before computing transitional probabilities for each code, a contingency table of pairs of coded behaviours needed to be produced. This was achieved in the following manner: the first code to occur (A) was selected along with the code (B) immediately following the first code, A. This produces a pair of codes. The latter code (B) was then treated as a first initial code and was paired with the code that followed (the third code in the sequence, A). Therefore, the first three codes produced two pairs of codes or behaviours (AB, BA) as shown in Figure 5-1 (on page 140). This procedure was followed for every code in the sequence for all adult and child codes for every case, which gave a total of 19,710 pairs of codes.

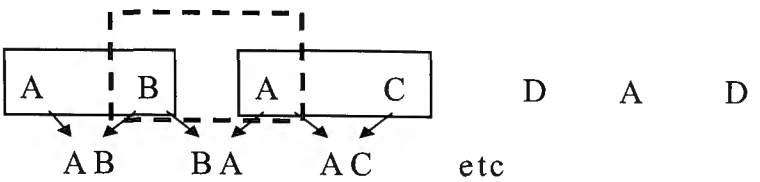


Figure 5-1: Example of selecting code pairs for codes A, B, C and D.

Each pair of codes was then plotted on a contingency table (see example in Appendix K on page 275). Sequences from all cases were plotted on the same contingency table. The rows were designated to the first code in every pair (called lag 0 behaviours) and the columns designated to the second code in the pairs (lag 1 behaviours). This followed a common convention for constructing contingency tables in sequential analysis (Bakeman et al., 1989; Sackett, 1979). Contingency tables were obtained using SPSS (1997) by arranging data to obtain lag 0 and lag 1 sequences of behaviours and using the SPSS sub-program "Crosstabs" to create the contingency tables as output. To obtain transitional probabilities each cell count was divided by the row total. This was achieved by using the formula function of Microsoft Excel after importing the contingency tables from SPSS. The maximum score, that is the highest transitional probability, was calculated for each given behaviour (see example in Table 5-2).

Table 5-2: Example of Highest Transitional Probability of some CAMPIS-CT codes at Lag 1

Behaviour at Lag 0	**Highest Transitional Probability at Lag 1**	
	Behaviour	**Transitional probability**
CRY	REASU	.246
NPTC2	NPTC	.599
CGCTC	CGCTA	.471
EMSUP	REASU	.248

An example of a transitional probability table is given in Appendix L (on page 276). The whole process of obtaining contingency tables and transitional probabilities for one lag (lag 1) was repeated nine times to obtain 5 forward lags and 5 reverse lags for the 19,710 pairs of codes. This then gave a chain (sequence) of the highest transitional probabilities for 5 forward and 5 reverse lags for the 43 given (lag 0) behaviours. Table 5-3 (on page 142) and Table 5-4 (on page 143) display the adult and child behaviours with the highest transitional probabilities for 5 forward lags for the given behaviours, and Table 5-5 (on page 144) and Table 5-6 (on page 145) display the reverse lags. The highest transitional probability chains form the basis of potentially significant patterns of behaviours surrounding each given behaviour. There was sometimes more than one behavioural chain for a given behaviour as some given behaviours had following or preceding behaviours that shared the highest transitional probability values.

The behavioural codes in the following tables are presented in order of occurrence in the CAMPIS-CT measure except the code Other, which was omitted as it consists of utterences that cannot be recognised as any other behavioural category. The code Other was, however, included in all sequential analyses as it formed a part of the interaction, which gave 43 given codes for analysis. If two or more behaviours share the same highest transitional probability value only the code numbers for those behaviours are shown to conserve space. Note that at this point in the analysis procedure no decisions are made regarding the significance of the initial behavioural chains. The decisions on significance are made at a later stage. Abbreviations are given for each code in the tables and an explanation of the abbreviated codes provided in Table 4-4 (on page 89) and in Appendix C (on page 256).

Table 5-3: Behavioural Chains of Highest Transitional Probabilities for Forward Lags - Child Codes (excluding other code)

Lag 0	Code #	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
CRY	18	REASU	CRY	REASU	CRY	REASU
		.246	.266	.185	.237	.181
SCRM	19	REASU	SCRM	REASU	CRY	REASU
		.224	.177	.188	.169	.175
RES	20	REASU	REASU	REASU	REASU	CRY
		.229	.172	.165	.177	.158
EMSUP	21	REASU	REASU	REASU	REASU	REASU
		.312	.241	.199	.216	.184
FEAR	22	REASU	REASU	REASU	BCC	REASU
		.429	.143	.257	.143	.143
PAIN	23	REASU	REASU	CRY	REASU	REASU
		.222	.225	.116	.208	.190
EMOT	24	REASU	REASU	REASU	REASU	REASU
		.248	.188	.184	.175	.209
INSEK	25	REASU	REASU	REASU	REASU	REASU
		.561	.268	.263	.228	.206
CIA	26	REASU	REASU	REASU	REASU	REASU
		.258	.158	.168	.141	.130
RRD	27	REASU	RRD	REASU	REASU	REASU
		.327	.192	.212	.192	.192
MCOP	28	REASU	REASU	REASU	REASU	MCOP
		.213	.152	.141	.129	.099
NPTC2	29	NPTC	NPTC2	NPTC	NPTC	NPTC
		.599	.289	.352	.193	.254
APV	30	REASU	REASU	REASU	REASU	PRAS
		.213	.157	.124	.169	.146
BRTH	31	CST	CIA	REASU	REASU	REASU
		.190	.286	.143	.238	.238
HUM	32	HMC	5,6	NPTC2	NPTC	6,9,12,26, 28,29,30
		.269	.154	.115	.192	.077
CGCTC	38	CGCTA	CGCTC	CGCTA	CGCTA	CGCTA
		.471	.196	.294	.176	.118
BIGNC	39	NPTC	REASU	REASU	REASU	REASU
		.110	.125	.110	.125	.101
BCOOP	40	PRAS	REASU	REASU	REASU	REASU
		.160	.095	.134	.123	.130
BINT	41	REASU	REASU	REASU	REASU	REASU
		.132	.116	.132	.119	.105
BREL	42	BCOOP	REASU	REASU	NPTC	REASU
		.130	.119	.130	.098	.098
PTC	43	PTAC	37,40	CGCTA	CPA	INSEK
		.444	.222	.222	.222	.222

Table 5-4: Behavioural Chains of Highest Transitional Probabilities for Forward Lags - Adult Codes (excluding other code)

Lag 0	Code #	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
HMA	1	HMA	HMA	HMA	REASU	REASU
		.249	.120	.087	.091	.112
NPTA	2	NPTA	NPTA	NPTA	NPTA	NPTA
		.487	.340	.259	.229	.201
PTA	3	PTA	PTA	PTA	PTA	PTA
		.441	.318	.238	.213	.192
CGCTA	4	CGCTA	CGCTA	CGCTA	CGCTA	CGCTA
		.458	.361	.266	.249	.221
HMC	5	HMC	NPTC	NPTC	NPTC	NPTC
		.198	.124	.119	.136	.130
NPTC	6	NPTC2	NPTC	NPTC	NPTC	NPTC
		.226	.350	.229	.260	.211
CCS	7	BCOOP	CCS	CCS	REASU	18,7
		.230	.166	.172	.131	.099
CPA	8	BCOOP	CPA	REASU	REASU	REASU
		.245	.134	.135	.161	.150
PRAS	9	PRAS	REASU	REASU	REASU	REASU
		.138	.136	.123	.123	.143
CRIT	10	CRY	REASU	REASU	REASU	REASU
		.207	.230	.161	.195	.195
NPC	11	REASU	REASU	REASU	REASU	REASU
		.149	.148	.164	.148	.173
REASU	12	12,18	REASU	REASU	REASU	REASU
		.168	.235	.195	.189	.190
GCC	13	APV	REASU	REASU	REASU	REASU
		.169	.174	.151	.137	.137
APOL	14	REASU	REASU	CRY	REASU	PTA
		.163	.175	.125	.188	.175
BCC	15	REASU	REASU	REASU	REASU	REASU
		.167	.163	.167	.181	.177
CST	16	CIA	REASU	REASU	REASU	REASU
		.274	.177	.132	.166	.140
EMP	17	REASU	REASU	REASU	REASU	REASU
		.224	.156	.156	.156	.128
BPROC	34	BINT	REASU	REASU	REASU	REASU
		.163	.173	.153	.111	.128
BPAPR	35	PAIN	BCOOP	REASU	REASU	REASU
		.286	.198	.231	.198	.209
BIGNA	36	PTA	PTA	REASU	REASU	REASU
		.156	.117	.156	.164	.172
PTAC	37	PTAC	PTAC	PTAC	REASU	CGCTA
		.167	.238	.119	.190	.095

Table 5-5: Behavioural Chains of Highest Transitional Probabilities for Reverse Lags - Child Codes (excluding other code)

Lag 0	Code #	RevLag 1	RevLag 2	RevLag 3	RevLag 4	RevLag 5
CRY	18	REASU	CRY	REASU	CRY	REASU
		.261	.266	.194	.237	.180
SCRM	19	REASU	SCRM	REASU	SCRM	CRY
		.222	.177	.166	.166	.183
RES	20	CRY	REASU	CRY	REASU	REASU
		.203	.149	.158	.163	.160
EMSUP	21	CRY	REASU	REASU	REASU	REASU
		.280	.206	.184	.170	.177
FEAR	22	REASU	REASU	12,6	REASU	REASU
		.286	.143	.114	.200	.143
PAIN	23	REASU	REASU	REASU	12,18	REASU
		.141	.155	.127	.130	.148
EMOT	24	19,18	REASU	REASU	REASU	CRY
		.209	.214	.162	.197	.158
INSEK	25	REASU	REASU	REASU	REASU	REASU
		.211	.175	.180	.197	.127
CIA	26	CST	CIA	REASU	REASU	REASU
		.394	.130	.130	.139	.141
RRD	27	NPTC	RRD	NPTC	REASU	CRY
		.154	.192	.154	.135	.154
MCOP	28	REASU	REASU	REASU	REASU	REASU
		.202	.133	.137	.160	.118
NPTC2	29	NPTC	NPTC2	NPTC	NPTC	NPTC
		.681	.289	.350	.203	.235
APV	30	GCC	REASU	REASU	REASU	REASU
		.416	.157	.146	.101	.124
BRTH	31	BCOOP	REASU	BCOOP	PRAS	CGCTA
		.238	.238	.143	.143	.143
HUM	32	NPTC	6,12	HMC	NPTC	NPTC
		.269	.115	.115	.192	.192
CGCTC	38	CGCTA	CGCTC	CGCTA	REASU	CGCTA
		.608	.196	.255	.157	.176
BIGNC	39	6,12	REASU	REASU	REASU	REASU
		.161	.106	.137	.126	.154
BCOOP	40	CPA	REASU	REASU	REASU	REASU
		.165	.124	.102	.135	.137
BINT	41	REASU	REASU	REASU	REASU	REASU
		.110	.132	.152	.121	.114
BREL	42	BPAPR	PTA	NPC	REASU	3,12
		.113	.108	.103	.113	.098
PTC	43	PTAC	4,7,18,2930, 37,40,42,43	PTAC	12,42	BCOOP
		0.444	.111	.222	.222	.222

Table 5-6: Behavioural Chains of Highest Transitional Probabilities for Reverse Lags - Adult Codes (excluding other code)

Lag 0	Code #	RevLag 1	RevLag 2	RevLag 3	RevLag 4	RevLag 5
HMA	1	HMA	NPTA	NPTC	NPTC	NPTC
		.249	.124	.121	.104	.117
NPTA	2	NPTA	NPTA	NPTA	NPTA	NPTA
		.487	.341	.259	.230	.202
PTA	3	PTA	PTA	PTA	PTA	PTA
		.441	.318	.238	.213	.192
CGCTA	4	CGCTA	CGCTA	CGCTA	CGCTA	CGCTA
		.458	.361	.265	.248	.220
HMC	5	HMC	NPTC	NPTC	NPTC	6,5
		.198	.153	.147	.113	.102
NPTC	6	NPTC	NPTC	NPTC	NPTC	NPTC
		.202	.350	.229	.260	.211
CCS	7	REASU	CCS	CCS	REASU	REASU
		.143	.166	.172	.132	.161
CPA	8	REASU	CPA	REASU	REASU	REASU
		.154	.134	.109	.139	.115
PRAS	9	BCOOP	REASU	REASU	REASU	REASU
		.156	.134	.150	.128	.133
CRIT	10	CRY	12,18	CRY	REASU	REASU
		.138	.126	.161	.161	.149
NPC	11	REASU	REASU	REASU	REASU	REASU
		.178	.153	.145	.159	.133
REASU	12	REASU	REASU	REASU	REASU	REASU
		.168	.235	.195	.189	.190
GCC	13	REASU	REASU	REASU	REASU	REASU
		.142	.155	.155	.169	.169
APOL	14	PAIN	BCOOP	REASU	REASU	REASU
		.150	.100	.113	.113	.150
BCC	15	REASU	REASU	REASU	REASU	REASU
		.208	.147	.186	.164	.153
CST	16	REASU	REASU	REASU	REASU	REASU
		.136	.160	.138	.145	.155
EMP	17	CIA	CRY	REASU	REASU	REASU
		.200	.120	.136	.152	.144
OT	33	CRY	CST	REASU	CRY	REASU
		.192	.154	.192	.231	.346
BPROC	34	NPC	REASU	REASU	REASU	REASU
		.202	.126	.138	.119	.143
BPAPR	35	NPC	NPC	REASU	REASU	REASU
		.264	.121	.187	.143	.132
BIGNA	36	REASU	REASU	PTA	PTA	REASU
		.102	.156	.141	.133	.133
PTAC	37	INSEK	PTAC	INSEK	NPC	NPC
		.214	.238	.190	.119	.167

5.2.2 Step 2: Test the Probable Sequences.

Once the probable behaviour chains have been identified then the next step is to test the chains to identify sequences that would most likely be significant. Statistical significance of each chain is tested at a later stage. The chains of behaviours (the highest transitional probabilities) for each given behaviour for 5 lags forward and 5 lags reverse were then tested following guidelines given by Gottman (1979). "To test the sequence C-A-B [C is the given behaviour, at lag 0], make A the criterion behaviour and see if the transitional probability of behaviour B with respect to A at lag 1 from A shows a peak [that is, above the transitional probabilities for other codes]" (Gottman, 1979, p. 40).

This can be explained using the following example in Table 5-7 to test the sequence CRY (lag 0) – REASU (lag 1) – CRY (lag 2). The aim is to test the probabilities of the relationships between behaviours. To test the lag 1 and lag 2 behaviours in the given example the relationship between the two behaviours is compared to their relationship at lag 0 and lag 1. Therefore, if REASU (lag 1 behaviour) is considered when it is in the lag 0 position then CRY has the highest transitional probability for REASU at lag 0. The lag 2 behaviour being tested is also CRY, therefore the chain CRY-REASU-CRY is considered a probable occurring chain. The transitional probabilities for CRY at lag 2 given CRY and at lag 1 given REASU are not considered as it is the probable relationships that are being tested. Significance of the connections between behaviours in the chain will be tested later using Z-score techniques.

Table 5-7: Example of transitional probability testing.

Lag 0	Lag 1	Lag 2
CRY	REASU	CRY
REASU	CRY	

If CRY at lag 1 given REASU at lag 0 was not the highest transitional probability for REASU then CRY would be discarded from the behavioural chain being tested, following the Lag One Connection Rule (Gottman, 1979). To test the relationship between lag 2 and lag 3 behaviours the process is repeated, with the lag 2 and lag 3 behaviours considered in the lag 0 and lag 1 positions. This process was performed for each behavioural chain of the 43 codes for 5 forward and 5 reverse lags. The resulting behavioural chains from this process are given in Table 5-8 to Table 5-11 (on page 149). The given behaviours are displayed in order of appearance in the CAMPIS-CT tool, however they are organised into adult and child behaviours for clarity.

Table 5-8: Probable Behavioural Chains for Child: Forward Lags

Lag 0	**Lag 1**	**Lag 2**	**Lag 3**	**Lag 4**	**Lag 5**
CRY	REASU	CRY	REASU	CRY	REASU
SCRM	REASU				
RES	REASU	REASU	REASU	REASU	CRY
EMSUP	REASU	REASU	REASU	REASU	REASU
FEAR	REASU	REASU	REASU		
PAIN	REASU	REASU	CRY	REASU	REASU
EMOT	REASU	REASU	REASU	REASU	REASU
INSEK	REASU	REASU	REASU	REASU	REASU
CIA	REASU	REASU	REASU	REASU	REASU
RRD	REASU				
MCOP	REASU	REASU	REASU	REASU	
NPTC2	NPTC	NPTC2	NPTC		
APV	REASU	REASU	REASU	REASU	
BRTH	CST	CIA	REASU	REASU	REASU
HUM	HMC	HMC			
CGCTC	CGCTA				
BIGNC	NPTC				
BCOOP	PRAS				
BINT	REASU	REASU	REASU	REASU	REASU
BREL	BCOOP				
PTC	PTAC	PTAC			

Table 5-9: Probable Behavioural Chains for Adult: Forward Lags

Lag 0	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
HMA	HMA	HMA	HMA		
NPTA	NPTA	NPTA	NPTA	NPTA	NPTA
PTA	PTA	PTA	PTA	PTA	PTA
CGCTA	CGCTA	CGCTA	CGCTA	CGCTA	CGCTA
HMC	HMC				
NPTC	NPTC2	NPTC			
CCS	BCOOP				
CPA	BCOOP				
PRAS	PRAS				
CRIT	CRY	REASU			
NPC	REASU				
REASU	REASU	REASU	REASU	REASU	REASU
REASU	CRY	REASU	REASU	REASU	REASU
GCC	APV	REASU	REASU	REASU	REASU
APOL	REASU	REASU	CRY	REASU	
BCC	REASU	REASU	REASU	REASU	REASU
CST	CIA	REASU	REASU	REASU	REASU
EMP	REASU	REASU	REASU	REASU	REASU
BPROC	BINT	REASU	REASU	REASU	REASU
BPAPR	PAIN				
BIGNA	PTA	PTA			
PTAC	PTAC	PTAC	PTAC		

Table 5-10: Probable Behavioural Chains for Child: Reverse Lags

Lag 0	RevLag 1	RevLag 2	RevLag 3	RevLag 4	RevLag 5
CRY	REASU				
SCRM	REASU				
RES	CRY	REASU			
EMSUP	CRY	REASU	REASU	REASU	REASU
FEAR	REASU	REASU	REASU	REASU	REASU
PAIN	REASU	REASU	REASU	REASU	REASU
EMOT	CRY	REASU	REASU	REASU	
EMOT	SCRM	REASU	REASU	REASU	
INSEK	REASU	REASU	REASU	REASU	REASU
CIA	CST				
RRD	NPTC				
MCOP	REASU	REASU	REASU	REASU	REASU
NPTC2	NPTC				
APV	GCC	REASU	REASU	REASU	REASU
BRTH	BCOOP				
HUM	NPTC	NPTC			
CGCTC	CGCTA				
BIGNC	NPTC	REASU	REASU	REASU	REASU
BCOOP	CPA	REASU	REASU	REASU	REASU
BINT	REASU	REASU	REASU	REASU	REASU
PTC	PTAC				

Table 5-11: Probable Behavioural Chains for Adult: Reverse Lags

Lag 0	RevLag 1	RevLag 2	RevLag 3	RevLag 4	RevLag 5
HMA	HMA				
NPTA	NPTA	NPTA	NPTA	NPTA	NPTA
PTA	PTA	PTA	PTA	PTA	PTA
CGCTA	CGCTA	CGCTA	CGCTA	CGCTA	CGCTA
HMC	HMC				
NPTC	NPTC	NPTC	NPTC	NPTC	NPTC
CCS	REASU				
CPA	REASU				
PRAS	BCOOP				
CRIT	CRY	REASU			
NPC	REASU	REASU	REASU	REASU	REASU
REASU	REASU	REASU	REASU	REASU	REASU
GCC	REASU	REASU	REASU	REASU	REASU
APOL	PAIN				
BCC	REASU	REASU	REASU	REASU	REASU
CST	REASU	REASU	REASU	REASU	REASU
EMP	CIA				
BPROC	NPC				
BPAPR	NPC				
BIGNA	REASU				
PTAC	INSEK				

5.2.3 Step 3: Test that the Sequences Obtained are Significant

The transitional probabilities measure the probability of the chains occurring whereas the *Z*-scores measure the connections between the behaviours in the chains (Gottman, 1979). There were two stages in determining the significance of the connections in the behavioural chains. The first was to determine if there were sufficient data to justify significance and the second was the calculation of *Z*-scores.

5.2.3.1 How much data are needed to justify significance?

Bakeman and Gottman (1986) discuss the widely used rule of thumb by Siegel (1956), where:

NP(1-P) must be at least 9

N = number of two-event sequences (the total from a cross-tabulation of lag 0 x lag 1)

P = the absolute probability for a particular two-event sequence. For repeatable codes P is the simple probability of the first event multiplied by the second event

If the result is greater than 9, the amount of data available for the sequences of CAMPIS-CT codes is sufficient to assign significance levels for *Z*-scores.

In this study:

N = 19710 (all codes),

P=1/43 x 1/43 (repeatable codes)= .02325 x .02325 (to 5 decimal places) = .00054

NP(1-P) = 19710 x .00054(1-.00054) = 10.6534

The result is greater than 9 so the amount of data obtained was sufficient to assign significance levels for *Z*-scores.

5.2.3.2 Obtaining *Z*-scores

There has been some discussion in the literature over which *Z*-score to use when describing sequential data. For the purposes of this study the Allison and Liker (1982) formula was used, as described by Bakeman and Gottman (1986), to compute the differences between conditional and unconditional *Z*-scores. A brief explanation of the Z-score selection process with formulae is given in Appendix M (on page 280). In order to

calculate the appropriate *Z*-scores the data were transformed in a series of calculations using Microsoft Excel to obtain the final *Z*-scores. Using this method the results for only one given behaviour could be calculated at one time, so the process was repeated for the 43 behaviours ten times each (5 forward and 5 reverse lags).

All *Z*-scores over the value 1.96 and below the value -1.96 for all behaviours in the chains are considered significant, that is, obtained from chains that did not occur by chance. Target behaviours with positive *Z*-scores are considered as occurring more than expected, and those with negative scores are considered occurring less than expected (Sackett, 1979). Any target behaviours with non-significant *Z*-scores were deleted from the behavioural chain, and any behaviours following the deleted behaviour were also omitted from the chain. To illustrate this point, in Table 5-12 the following probable chain of behaviours following RES (Resistance) based on the highest transitional probabilities identified was: REASU-REASU-REASU-REASU-CRY. The *Z*-scores were calculated (given in parentheses) for all behaviours in the chain. REASU at lag 1 was significant (5.354) and was retained in the chain, however REASU at lag 2 was not significant (1.954) and deleted from the chain. As there was a break in the chain at lag 2 the significance of the connections to the remaining lag behaviours (lags 3 to 5) are in doubt, even though some of those behaviours had significant Z-scores. This then left a behavioural chain of RES-REASU only.

Table 5-12: Deleting non-significant behaviours from behavioural chains

Lag 0	**Lag 1**	**Lag 2**	**Lag 3**	**Lag 4**	**Lag 5**
RES	REASU (5.354)	REASU (1.954)	REASU (1.528)	REASU (2.236)	CRY (5.009)

Z-scores were calculated for all 43 codes (behaviours) for 5 lags forward and reverse. The significant behavioural chains with corresponding *Z*-scores for forward lags are displayed in Table 5-13 and Table 5-14 and reverse lags displayed in Table 5-16 and Table 5-17.

Table 5-13: Behavioural Chains based on Significant *Z*-scores for Child: Forward Lags

Lag 0	**Lag 1**	**Lag 2**	**Lag 3**	**Lag 4**	**Lag 5**
CRY	REASU	CRY	REASU	CRY	REASU
	13.48	27.281	5.698	22.727	5.191
SCRM	REASU				
	4.689				
RES	REASU				
	5.354				
EMSUP	REASU	REASU	REASU**	REASU	REASU*
	8.414	4.953	2.876	3.741	2.183
FEAR	REASU				
	4.936				
PAIN	REASU	REASU			
	4.026	4.198			
EMOT	REASU	REASU*	REASU*		
	4.805	2.149	1.959		
INSEK	REASU	REASU	REASU	REASU	REASU**
	18.482	5.604	5.412	3.874	2.913
CIA	REASU				
	6.622				
RRD	REASU				
	3.902				
MCOP	REASU				
	3.453				
NPTC2	NPTC	NPTC2	NPTC		
	45.101	38.356	24.207		
APV	REASU*				
	2.015				
BRTH	CST	CIA			
	4.637	9.045			
HUM	HMC	HMC			
	14.076	7.835			
CGCTC	CGCTA				
	16.264				
BIGNC	NPTC				
	4.232				
BCOOP	PRAS				
	17.121				
BREL	BCOOP				
	6.285				
PTC	PTAC	PTAC			
	28.782	14.321			

Table 5-14: Behavioural Chains based on Significant *Z*-scores for Adult: Forward Lags

Lag 0	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
HMA	HMA	HMA	HMA		
	33.646	15.364	10.675		
NPTA	NPTA	NPTA	NPTA	NPTA	NPTA
	65.527	44.227	32.281	27.971	23.858
PTA	PTA	PTA	PTA	PTA	PTA
	54.892	36.016	23.748	20.067	16.763
CGCTA	CGCTA	CGCTA	CGCTA	CGCTA	CGCTA
	61.354	47.195	33.266	30.735	26.625
HMC	HMC				
	26.74				
NPTC	NPTC2	NPTC			
	51.999	42.733			
CCS	BCOOP				
	17.948				
CPA	BCOOP				
	24.351				
PRAS	PRAS				
	14.123				
CRIT	CRY	REASU			
	3.852	7.481			
REASU	REASU	REASU	REASU	REASU	REASU
	4.609	15.517	9.113	7.985	8.161
REASU	CRY	REASU	REASU	REASU	REASU
	15.354	27.281			
GCC	APV				
	36.497				
BCC	REASU*				
	2.045				
CST	CIA	REASU*			
	43.949	2.54			
EMP	REASU				
	3.873				
BPROC	BINT				
	15.143				
BPAPR	PAIN				
	21.767				
BIGNA	PTA**				
	3.057				
PTAC	PTAC	PTAC	PTAC		
	23.148	33.196	16.448		

*p<.05, **p<.01, All other values were at the p< .001 level

There were many codes that occurred more frequently than expected by chance following lag 0 behaviours. Some behavioural chains were repetitions of the given behaviour: Humour by adult (HMA), Non-procedural talk by adults (NPTA), Procedural talk by adult (PTA), Child's general condition-related talk by adult CGCTA), Humour to child

(HMC), Praise (PRAS), Reassurance (REASU) and Procedural talk by adult to child (PTAC).

Several adult behaviours elicited a similar response in the child: Non-procedural talk to child (NPTC) and Non-procedural talk to adult (NPTC2), Giving control to child (GCC) and Assertive procedural vocalisation (APV), Checking child's status (CST) and Child informs about status (CIA) and Painful procedural behaviour (BPAPR) followed by Pain (PAIN). Other adult behaviours and their following responses include Command to use coping strategy (CCS) and Command to engage in procedural activity (CPA) followed by Behaviour cooperation (BCOOP), Criticism (CRIT) and Reassurance (REASU) by Cry (CRY), Behavioural command to child (BCC) and Empathy (EMP) followed by Reassurance (REASU), Non-painful procedural behaviour (BPROC) by Behavioural interest (BINT) and Behaviour ignoring child (BIGNA) followed by Procedural talk by adult to adult (PTA).

Several child behaviours elicited similar responses in the adult: Non-procedural talk by child (NPTC2) was followed by Non-procedural talk by adult (NPTC), Humour by child (HUM) by Humour to child (HMC), Child's general condition-related talk by child (CGCTC) followed by the same adult behaviour (CGCTA) and Procedural talk by child was followed by Procedural talk by adult to child (PTAC). Deep breath (BRTH) was followed by Checking child's status (CIA), Behaviour ignoring adult (BIGNC) was followed by Non-procedural talk to child (NPTC), Behaviour cooperation (BCOOP) followed by Praise (PRAS) and Behaviour relaxed (BREL) was followed by Behaviour cooperation (BCOOP). All other child behaviours were followed by Reassurance, which was the most commonly occurring adult behaviour code.

Table 5-15: Behavioural Chains based on Significant *Z*-Scores for Child: Reverse Lags

RevLag 0	RevLag 1	RevLag 2	RevLag 3	RevLag 4	RevLag 5
CRY	REASU				
	15.354				
SCRM	REASU				
	4.535				
FEAR	REASU*				
	2.496				
EMOT	SCRM				
	21.929				
INSEK	REASU**				
	3.107				
CIA	CST				
	43.949				
RRD	NPTC*				
	2.571				
MCOP	REASU**				
	2.915				
NPTC2	NPTC				
	51.999				
APV	GCC				
	36.497				
BRTH	BCOOP				
	4.585				
HUM	NPTC				
	4.194				
CGCTC	CGCTA				
	21.421				
BIGNC	NPTC				
	9.139				
BCOOP	CPA				
	24.351				
BINT	REASU*				
	-2.216				
BREL	BPAPR				
	22.461				
PTC	PTAC				
	28.782				

Table 5-16: Behavioural Chains based on Significant *Z*-Scores for Adult: Reverse Lags

RevLag 0	RevLag 1	RevLag 2	RevLag 3	RevLag 4	RevLag 5
HMA	HMA				
	33.646				
NPTA	NPTA	NPTA	NPTA	NPTA	NPTA
	65.527	44.228	32.281	27.971	23.858
PTA	PTA	PTA	PTA	PTA	PTA
	54.892	36.017	23.748	20.067	16.763
CGCTA	CGCTA	CGCTA	CGCTA	CGCTA	CGCTA
	61.354	47.197	33.266	30.735	26.625
HMC	HMC				
	26.74				
NPTC	NPTC	NPTC	NPTC	NPTC	NPTC
	20.441	47.734	24.503	29.263	21.831
PRAS	BCOOP				
	17.121				
NPC	REASU**				
	3.269				
REASU	REASU	REASU	REASU	REASU	REASU**
	4.609	15.517	9.133	7.985	2.862
APOL	PAIN				
	10.197				
BCC	REASU				
	5.059				
EMP	CIA				
	21.316				
BPROC	NPC				
	15.95				
BPAPR	NPC				
	10.384				
PTAC	INSEK				
	12.299				

*p<.05, **p<.01, All other values were at the p<.0001 level.

The major difference between the results for forward and reverse lags is that the reverse lags had fewer extended significant behavioural chains. Most reverse lag chains only extended to one lag. Many reverse lag chains were similar to their corresponding forward lag chains. Some adult chains consisted of a single repeated behaviour, these were: Humour to adult (HMA), Non-procedural talk to adult (NPTA), Procedural talk to adult (PTA), Child's general condition-related talk (CGCTA), Humour to child (HMC), Non-procedural talk to child (NPTC) and Reassurance (REASU). Behaviour cooperation (BCOOP) preceded Praise (PRAS), Pain (PAIN) preceded Apology (APOL), Child informs about status (CIA) preceded Empathy (EMP), Information-seeking (INSEK)

preceded Procedural talk by adult to child (PTAC) and Notice of procedure to come (NPC) preceded Painful (BPRAPR) and Non-painful (BPROC) procedural behaviours. All other behaviours were preceded by Reassurance (REASU).

Reciprocal behaviours preceding some child behaviours were: Checking child's status (CST) preceded Child informs about status (CIA), Non-procedural talk to child (NPTC) preceded Non-procedural talk by child (NPTC2), Giving control to child (GCC) preceded Assertive procedural verbalisation (APV), Child's general condition-related talk by adults (CGCTA) preceded Child's general condition-related talk by child (CGCTC), Command to engage in procedural activity (CPA) preceded Behaviour cooperation (BCOOP) and Procedural talk by adult to child (PTAC) preceded Procedural talk by child (PTC). Other lag 1 and lag 0 chains were: Scream (SCRM) preceded Emotion (EMOT), Behaviour cooperation (BCOOP) preceded Deep breath (BRTH) and Painful procedural behaviour (BPAPR) preceded Behaviour relaxed (BREL). Non-procedural talk to child (NPTC) preceded three behaviours: Requests relief from non-procedural discomfort (RRD), Humour by child (HUM) and Behaviour ignoring adult (BIGNC). All other behaviours were preceded by Reassurance (REASU).

5.2.4 Summary of Behavioural Chains between Adults and Children

Behavioural chains between adult and child across two lags or longer for forward lags are shown in Table 5-17 (on page 158). The preceding (reverse lag 1) behaviours are shown on the far left. In chapter 4 (Table 4-5 on page 91) Criticism (CRIT) was identified as a low occurring behaviour infrequently used by parents (0.013%) and staff (0.003%). Therefore, the results of the behavioural chain involving criticism must be used with caution.

Table 5-17: Behavioural Chains between Adult and Child Two lags or longer

RevLag 1	Lag 0	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
NPTC	→ NPTC	→ NPTC2	→ NPTC →			
REASU	→ REASU	→ CRY	→ REASU →	REASU →	REASU →	REASU
	CST	→ CIA	→ REASU →			
REASU	→ CRY	→ REASU	→ CRY →	REASU →	CRY →	REASU
NPTC	→ NPTC2	→ NPTC	→ NPTC2 →	NPTC		
	CRIT	→ CRY	→ REASU →			

There were extended chains for some adult behaviours in the reverse lags, which were repetitions of the given behaviour: Non-procedural talk to adult (NPTA), Procedural talk to adult by adult (PTA), Child's general condition-related talk, Non-procedural talk to child and Reassurance. There were no extended behavioural chains at the reverse lags for child behaviours.

5.3 Adult Behaviours and Child Coping Behaviours

From the study's results, and patterns of adult-child interaction, some adult behaviours affect child behaviours. To compare results to other studies, and clarify the effects of adult and child coping behaviours, child behaviours were classified according to coping type. The coping categories were derived from the literature and Lazarus and Folkman's (1984) stress-coping theory and are distress, information-exchange, distraction, control and coping-other (displayed in Table 5-18 on page 159). The child distress coping category includes Cry (CRY), Scream (SCRM), Resistance (RES), Fear (FEAR), Pain (PAIN) and Emotion (EMOT) (Blount et al., 1989, 1991; Jay et al., 1983; Katz et al., 1980). The information-exchange coping category describes child behaviours that give or seek information (Caty et al., 1984; Ellerton et al., 1994; Katz et al., 1980): Information-seeking (INSEK), Behavioural interest (BINT), Child's general condition-related talk (CGCTC), Child informs about status (CIA) and Procedural talk (PTAC). The remaining two categories are distraction (Ellerton et al., 1994; Gonzalez et al., 1993; Kleiber &

Harper, 1999; Ryan-Wenger, 1996) and control (Broome et al., 1990; Ryan-Wenger, 1996; Weisz et al., 1994; Worchel et al., 1987). Distraction coping behaviours include Non-procedural talk to adult (NPTC2) and Behaviour ignoring adult (BIGNC). Control coping behaviours include Assertive procedural verbalisation (APV) and Requests relief from non-procedural discomfort (RRD). All other coping behaviours were categorised as coping-other: Behaviour cooperation (BCOOP), Behaviour relaxed (BREL), Makes coping statement (MCOP), Deep breath (BRTH), Requests emotional support (EMSUP) and Humour (HUM). Table 5-18 identifies child codes for each coping category and presents behaviours in alphabetical order. Behaviours occurring with a frequency less than 3.0% are presented in italics and the Other category has been excluded.

Table 5-18: Categories of Child Coping Behaviours

Type of Coping	**Child Behaviour**
Distress	Cry
	Emotion
	Fear
	Pain
	Resistance
	Scream
Information-exchange	Behavioural interest
	Child informs about status
	Child's general condition-related talk
	Information seeking
	Procedural talk by child
Control	*Assertive procedural verbalisation*
	Requests relief from non-procedural discomfort
Distraction	Non-procedural talk to adult
	Behaviour ignoring adult
Coping-other	*Deep breath*
	Behaviour cooperation
	Behaviour relaxed
	Humour to adult
	Makes coping statement
	Requests emotional support

Note: All code proportions with less than 3.0% total child occurrences are shown in italics.

To clarify the relationships between child and adult coping behaviours, adult behaviours were also classified according to child coping categories: distress promoting, information/exchange promoting, distraction-promoting, control-promoting and coping-other promoting. The allocation of adult behaviours into categories was based upon results of the significant behavioural chains for forward and reverse lags. Table 5-19 (on page 161) presents a summary of adult coping categories and adult behaviours. Distress promoting behaviours included Criticism, Painful procedural behaviour and Reassurance. Behaviours promoting information-exchange were Checking child's status, Child's general condition-related talk, Non-painful procedural behaviour, Procedural talk to child and Reassurance. Distraction promoting behaviour was Non-procedural talk to child. Control promoting behaviours were Giving control to child and Non-procedural talk to child. Finally, coping-other behaviours were Command to engage in procedural activity, Command to use coping strategy, Painful procedural behaviour, Non-procedural talk to child and Reassurance. The remaining adult behaviours that did not fall into child coping-promoting categories either did not elicit significant child behaviours or elicited an adult response. These neutral behaviours were Behavioural command to child (BCC), Empathy (EMP), Humour to adult (HMA), Humour to child (HMC), Behaviour ignoring child (BIGNA), Notice of procedure to come (NPC), Praise (PRAS) and Procedural talk to adult (PTA).

Table 5-19: Adult Behaviours Promoting Child Coping Behaviours

Type of Coping-Promoting	Parent Behaviour
Distress Promoting	*Criticism*
	Painful procedural behaviour
	Reassurance
Information-exchange Promoting	*Checking child's status*
	Child's general condition-related talk
	Non-painful procedural behaviour
	Procedural talk to child
	Reassurance
Distraction Promoting	Non-procedural talk to child
Control Promoting	*Giving control to child*
	Non-procedural talk to child
Coping-other Promoting	Command to engage in procedural activity
	Command to use coping strategy
	Painful procedural behaviour
	Non-procedural talk to child
	Reassurance

Note: All code proportions with less than 3.0% in adult occurrences are shown in italics.

5.3.1 Clarification of the Role of Reassurance and Non-Procedural Talk to Child

Results of the sequential analyses have identified significant behavioural chains for child and adult behaviours. From the behavioural chains, adult behaviours promoting specific child coping behaviours were identified. However, the relationships of several behaviours remains unclear from the results as several adult behaviours promoted different types of child coping behaviours. Reassurance promoted distress, information-exchange and coping-other child behaviours. Non-procedural talk to child promoted distraction, control and coping-other behaviours, and Painful procedural behaviour promoted distress and coping-other behaviours. Further investigation was warranted to clarify the relationships of these adult behaviours to child coping behaviours.

Bivariate correlations were performed to examine the relationships of the proportions of Reassurance and Non-procedural talk to the proportions of the child coping categories.

Painful procedural behaviour occurred in more than one category but was not analysed as it was a low occurring behaviour (.007% of total adult behaviours). Due to low occurrences of child control behaviours (.02% of total child behaviours) the control category was collapsed into the coping-other category, and the adult control promoting category was collapsed into the coping-other promoting category. This gave four child coping categories for analysis: distress, information-exchange, distraction and coping-other; and four adult coping promoting categories. The proportions of Reassurance and Non-procedural talk to child to the total CAMPIS-CT codes for mother, father, doctor and nurse categories were calculated for the correlational analyses. Results of the analyses are displayed in Table 5-20 (on page 163) and Table 5-21 (on page 164).

The strength of a relationship from correlational analysis has been traditionally described as weak ($.1 < r > .3$), moderate ($.3 < r > .5$) or strong ($r > .5$) (Burns & Grove, 1987), and will be used as a guide for assigning the strength of relationships. Pearson's product-moment correlations were obtained from the analyses. Reassurance (REASU) was positively correlated with distress and negatively correlated with all other child coping categories (refer to Table 5-20 on page 163). Maternal Reassurance was moderate to strongly correlated with child distress (.544) whilst doctor Reassurance moderately correlated (.356) and nurse Reassurance weakly correlated (.297). The 95% confidence intervals around the correlation coefficients for maternal (.274, .436) and doctor Reassurance (.097, .169) do not overlap and neither do those for maternal and nurse (0.129, 0.218) Reassurance. This indicates that maternal Reassurance is more strongly correlated with child distress than doctor and nurse Reassurance. However, there is overlap of confidence intervals for nurse Reassurance (.129, .218) and doctor Reassurance (.097, .169), and maternal (.274, .436) and paternal Reassurance (.188, .332).

Maternal Reassurance was negatively correlated with information exchange, but the correlations with other person categories were not significant. There were weak inverse correlations between maternal and nurse Reassurance and distraction. Reassurance by mother, doctor and nurse were inversely correlated to coping-other in a weak (nurse) to moderate relationship (mother and doctor). Distress was strongly inversely correlated to all other child coping categories (-.512 to -.773), and information-exchange and coping-other were positively correlated (.409).

Table 5-20: Correlations between Proportional Use of REASU and Child Coping Category by Person (Pearson's *r*)

	Child Coping Category				Adult Behaviour			
	Distress	**Info-Exchange**	**Distract**	**Coping-other**	**Mother REASU**	**Father REASU**	**Doctor REASU**	**Nurse REASU**
Distress	1	-.758***	-.5124***	-.773***	.544***	.368	.356*	.297*
Infoexch	-.758***	1	.1097	.409***	-.404***	-.269	-.143	-.126
Distract	-.512***	.110	1	.086	-.262*	-.305	-.208	-.286*
Cop-oth	-.773***	.409***	.0864	1	-.447***	-.284	-.379**	-.227

*p≤.05, **p≤.01, ***p≤.001

Non-procedural talk to child (NPTC) was moderately correlated (.341 to .419) with child distraction by all person categories. In the other child coping categories father Non-procedural talk to child was moderately correlated with information-exchange (.418) and moderately inversely correlated with distress (-.431). The 95% confidence intervals around the correlation coefficients maternal (.057, .160), doctor (.029, .079) and nurse (.030, .128) Non-procedural talk to child overlapped, and father behaviour (.106, .220) overlapped with maternal and nurse behaviour. The amount of overlap indicates that the effect of individual person categories upon distraction are unclear for Non-procedural talk to child. Non-procedural talk to child for any person category was not significantly correlated with the coping-other categories, and only father Non-procedural talk to child was correlated with information-exchange. The results of the correlational analyses for Non-procedural talk to child are given in Table 5-21 (on page 164).

Table 5-21: Correlations between Proportional Use of NPTC and Child Coping Category by Person (Pearson's *r*)

	Child Coping Category				Adult Behaviour			
	Distress	**Info-Exchange**	**Distract**	**Coping-other**	**Mother NPTC**	**Father NPTC**	**Doctor NPTC**	**Nurse NPTC**
Distress	1	-.758***	-.512***	-.773***	-.114	-.431*	-.233	-.128
Infoex	-.758***	1	.110	.409***	-.008	.418*	.071	-.052
Distract	-.512***	.110	1	.086	.419***	.413*	.341**	.404***
Copoth	-.773	.409	.086	1	-.084	.151	.111	-.023

*p≤.05, **p≤.01, ***p≤.001

5.4 **Summary**

Parent and child interaction was analysed using sequential lag analysis. Each parent-child pair of codes in an interaction sequence was plotted on a contingency table and transitional probabilities were calculated for 5 lags forward and reverse. Probable chains of behaviours were identified for each parent and child behaviour and Z-scores obtained to assign significance. The results obtained at each step in the process of sequential analysis were displayed. Several extended behavioural chains were identified, Cry and Reassurance were in complementary chains, Non-procedural talk by adult and by child alternated in a chain, Checking child's status was followed by Child informs about status and Reassurance and Criticism was followed by Cry and Reassurance. From the results parental behaviours were categorised related to child coping categories: distress promoting, information-exchange promoting, distraction promoting and coping other promoting. Three parental behaviours were found to promote more than one type of coping: Reassurance, Non-procedural talk to the child and Painful procedural behaviour. Correlational analyses were performed separately on Reassurance and Non-procedural talk to child, by each person category, with child coping behaviour categories to clarify relationships. Painful procedural behaviour was not analysed due to its overall low occurrence. Maternal Reassurance was positively correlated with distress. Discussion of results and implications for future research will be explored in the following chapter.

CHAPTER - 6 DISCUSSION OF PARENTAL INFLUENCES ON CHILD COPING BEHAVIOURS

A major assumption in this study was that children utilise parents as part of their coping resources due to the children's dependent relationship with parents, although the precise nature of parental influence and effects upon children's behaviour is unclear. The three main aims for the study were to describe parent and child behaviours during each phase of a venepuncture, to examine the relationships between parent and child characteristics, and finally, to identify and explore the interactions of specific parental behaviours and child coping behaviours. Analyses of child and parent behaviours across phase and child and parent characteristics were performed using ANOVAs. To clarify the relationships between parent and child behaviours parent-child interaction was analysed using sequential analysis. In this chapter the results of the study will be critically discussed and explored, referring to previous studies and literature.

This study used Lazarus' (1980) stress-coping theory as a conceptual basis. Therefore, all child behavioural responses to a stressor were considered as coping behaviours, including all interactions with parents and staff. A major concept of the stress-coping theory is that coping changes over time, and this study measured changes over time by identifying differences in parent and child behaviour across phases of the venepuncture. The contextual nature of coping proposed by the stress-coping theory was addressed by utilising an observational design in a natural setting (an Emergency Department) thus allowing recording of actual responses to 'real' stressors in a specific situation. A

descriptive design was chosen due to the paucity of studies investigating parental influences on children's coping during a venepuncture in acutely ill children and due to inconclusive results from previous related studies.

Influencing factors upon coping behaviours, according to Lazarus and Folkman (1984), include person and environmental factors. Person factors analysed in this study included child behaviour, child age and gender. Environmental factors included parental characteristics such as level of anxiety and parental behaviours, number of cannulation attempts and application of EMLA (a local anaesthetic cream). The results of the effects of person and environmental variables upon child behaviours will be discussed in this chapter. The limitations of the study, directions for future research and application to practice will be explored in the following chapter.

6.1 Study Population

The study population of 36 boys and 30 girls, the high number of children under the age of 5 years and the nature of the presenting medical condition reflected the general paediatric hospital population found in Australia (Farrell & Wraight, 1993). The rate of asthma in the study population was also consistent with national health survey results (Australian Bureau of Statistics, 1995). The spread of parental income was weighted towards the middle and high-income groups, however this may reflect dual income families rather than socioeconomic status. The income, language used and occupational status reflected the general State and Australian population (Ethnic Affairs Commission of NSW, 1998; McLennan, 1998). These characteristics support the generalisability of the findings to the Australian urban population. However, this study population differs from other study populations as it provides a unique investigation of acutely ill but otherwise

well children in an Emergency Department, focusing on parent-child interaction during venepunctures. Previous research has mostly focused on chronically ill populations, such as children with cancer, and fewer still have investigated child coping within an Emergency Department.

6.2 General Child Behaviours

A modified observational tool, the Child-Adult Medical Procedure Interaction Scale-CT (CAMPIS-CT), was used to record verbal and non-verbal child and parent behaviours. Proportions of occurrences of each CAMPIS-CT code for child and parent were calculated so data obtained were not dependent on length of procedure or number of codes used in each case. The overall occurrence of CAMPIS-CT codes for child and parent will be discussed in this section. Later sections will discuss results from more detailed analyses investigating the effects of other variables upon child behaviours, such as child age and phase of procedure.

The most commonly occurring behaviours for children in descending order were Cry, Behaviour cooperation, Behavioural interest and Behaviour ignoring adult. Cry has been observed as a frequent behaviour in some other studies (Blount et al., 1989; Gonzalez et al., 1993; Jacobsen et al., 1990; Katz et al., 1980) although the procedures differed. Some children in the present study exhibited Cry and Behaviour cooperation in the same venepuncture. Explanations for the high use of Cry and Behaviour cooperation may be due to effects of child age or timing (phase of procedure), and these effects will be discussed in later sections. Behavioural interest reflects information-seeking activities by the child and has been noted as a commonly occurring behaviour in other studies (Bush et al., 1986; Gonzalez et al., 1989; Ritchie et al., 1988). The investigation of Behaviour

ignoring adult by child in previous studies is scant. It is possible that this behaviour is used as a form of control in uncontrollable situations, or that the child is trying to engage in cognitive strategies to deal with the situation. Possible effects of age will be discussed in a later section.

The results from this study supported Lazarus and Folkman's (1984) contention that coping varies according to the situational context. Findings for children 5 years and older involving venepunctures were compared to a study (Appendix N, Tables A-1 and A-2, on page 281) involving bone marrow aspirations that had a similar methodology (Blount et al., 1989). In the current study children aged 5 years and over had high uses of Cry and information-exchange behaviours (Behaviour cooperation, Behavioural interest, Child informs about status, Information-seeking) whilst Blount et al.'s study had high use of Cry and other distress behaviours (Verbal pain, Requests emotional support, Verbal resistance). The high level of distress behaviours in Blount et al.'s study may reflect the higher pain level of that procedure as bone marrow aspirations are very painful compared to venepunctures (Wong & Baker, 1988) and generally are of longer duration. Methodological differences could also account for these results, such as study populations (acute versus chronic illness, different age groups), phases of procedure and observational tools as Blount et al. only measured verbal behaviours. Blount et al.'s CAMPIS measure did not include cooperation or ignoring behaviours by the child. Blount et al. based the tool, in part, on a modified Procedure Behavioural Rating Scale used during bone marrow aspirations (Jay et al., 1983) on which the item 'stoic silence' (ignoring adult) had previously been eliminated due to low occurrence (Katz et al., 1980). As child coping seems to differ according to the medical procedure this may explain, in part, the divergent results from previous studies related to child distress (Broome & Endsley, 1989; Bush et

al., 1986; Ellerton et al., 1994; Jay et al., 1983; LaMontagne et al., 1996). This has implications for child coping research in the selection of measuring instruments. For example, the commonly used Observational Scale of Behavioural Distress (OSBD; Jay & Elliott, 1984; Jay, et al., 1983) deleted some behaviours found to occur in venepunctures (Ellerton et al., 1994; Hodgkins & Lander, 1997) such as hit, kick, curse and verbal hostility due to low occurrence. Therefore measuring instruments need to be devised and tested on different populations and situations to ensure reliability and validity of the measures across situations.

Folkman and Lazarus (1984) state that both problem and emotion-focused coping would be used in stressful situations. The CAMPIS-CT enabled both types of coping to be identified, for example Behaviour ignoring adult, Resistance and Non-procedural talk reflect emotion-focused coping whilst Assertive procedural verbalisation, Makes coping statement and Requests relief from non-procedural discomfort reflect problem-focused coping. Results showed that both problem- and emotion-focused behaviours were used although emotion-focused behaviours were predominant. A higher use of emotion-focused behaviours has been reported in other studies during painful procedures (Broome et al., 1990; Caty et al., 1984; Stevens, 1989). Child age and controllability of the stressor may account for the low occurrence of problem-focused behaviours. The goodness of fit hypothesis (Conway & Terry, 1992) proposes that the effectiveness of coping strategies depend upon the perceived controllability of the stressor. This study supports this hypothesis as little control was given to the child and few control behaviours were used by the child, which is supported by other studies (Compas et al., 1988; Weisz et al., 1994). Child age is an important factor in the child's ability to appraise situations and will be discussed in Section 6.5 (on page 177).

6.3 Child Behaviour and Demographic Variables

Analyses of the effects of concurrent medical condition, previous painful medical procedure and amount of childcare on child behaviours returned no significant results. In this study the most frequent chronic illness reported was asthma, and findings support Olson et al. (1993) where no differences were found between coping strategies used by children with asthma and "healthy" children.

The effect of previous experience in children's habituation to venepunctures from the literature is also unclear (Blount et al., 1989; Ellerton et al., 1990; Jay et al., 1983; Rodriguez & Boggs, 1998). Jay et al. (1983) suggest that young children may need at least 12 exposures to a bone marrow aspiration, and older children somewhat less, to habituate to the procedure. This may explain the lack of significant results in this study as no child experienced more than five previous painful medical experiences (excluding immunisations). It is possible that fewer repeated exposures are necessary to habituate to venepunctures as the procedure is less stressful than bone marrow aspirations but this study did not support this contention.

Young children can be influenced by adults other than parents as they are more likely to depend upon adults for coping resources than older children (Peterson, 1989; Vygotsky, 1896-1934/1978). In this present study the attendance at childcare reflected children's exposure to non-family adults and was thought to assist in increasing children's coping repertoires (Luthar, 1991; Masten et al., 1999; Thompson, 1998), however, this was not supported by this study. A possible explanation may be that the nature of the stressful procedure blocks other cognitions previously learned, which may also explain why

habituation did not occur. Young children may also not have the ability to utilise coping strategies even if exposed to them.

6.4 Child Behaviour and Phase of the Procedure

To investigate changes in child behaviour over time the venepuncture was divided into five phases: Pre-procedure, Preparation, Insertion, Procedure and Post-procedure. Phase of procedure was found to have a significant effect on the occurrence of some child behaviours during venepunctures. This supports Lazarus and Folkman's (1984) stress-coping theory where it can be expected that as stressors change during a procedure so will children's responses.

Changes in child behaviours could partly be explained by the influences of the level of threat in each phase of the procedure and the type of anxiety that may be encountered at each level of threat. Lazarus and Folkman (1984) stated that the period of anticipation, impact (needle insertion) and post-impact each has its own stressors and level of anxiety. It can be expected that anxiety would increase towards insertion, be highest during insertion then decrease towards the final phase. In this study anxiety was considered within the definition of distress. Katz et al. (1980) defined anxiety as distress behaviours and Blount et al. (1990) described a sub-set of distress behaviours as apprehensive distress. It is possible that behaviours other than distress may also reflect anxiety, such as information seeking (Blount et al., 1989; Katz et al., 1980). However, the pattern of distress behaviours (Scream, Pain and Emotion) in this study followed the predicted pattern for anxiety. This suggests that children may react to the same stimuli with both anxious and overt distress behaviours. Cry had a low occurrence in the Insertion phase

probably because the behaviour was replaced by more overt distress behaviours such as Scream and Emotion.

As the threat to the children's integrity increased from the first Pre-procedure phase to the next phase (Preparation) the study found that children changed coping strategies to manage the situation. Cooperation decreased markedly and self-distraction (Non-procedural talk to adult) and information-exchange behaviours (Child informs about status, Behavioural interest) were utilised. Alterations in behaviours support the notion that children cognitively appraise the situation and respond to the level of perceived threat. Rudolph et al. (1995) suggest that appraisal may fluctuate across phases resulting in differences in behaviours across phase of procedure.

Lazarus and Folkman (1984) proposed that a function of coping with anticipatory anxiety is to gain some control in the situation, so the use of information-exchange behaviours, distraction and decreased cooperation during phase 2 may reflect this attempt. Rudolph et al. (1995) suggest that children's attending behaviours, for example Information-seeking, may be more effective when stress is controllable. The phases of the procedure most amenable to control would be those prior to the procedure, phases 1 and 2. Control behaviours (Assertive procedural verbalisation and Requests relief from procedural discomfort) over phases occurred too infrequently to return significant results. However, the pattern of occurrences for control behaviours across phase showed the behaviours most common during phase 1, decreased to nil occurrence in phase 3, and rose in phases 4 and 5. Lack of perceived control can be expected from phase 2 onwards as children are given little control from parents and staff during the procedure due to the children's age and necessity for the procedure, and the results support this supposition. This is also supported by studies where children were less distressed and anxious when they

perceived they had control in the situation (Band & Weisz, 1988; Carpenter, 1990) and the use of controlling behaviours increased with age (Band & Weisz, 1988; Ritchie et al., 1988). It is also possible that emotion-focused behaviours such as Emotion and distraction are considered as control behaviours by the child, and by utilising coping behaviours the child affects a degree of control in an almost uncontrollable situation. Therefore, the child's appraisal of coping behaviours used may differ from those of an observer. The changes in behaviours also suggest that coping may be layered (Rudolph et al., 1995), where children employ a preferred coping strategy and then if appraised as unsuccessful utilise a less-preferred coping strategy.

It was expected that during the Insertion phase children would focus on the invasive nature of the procedure and employ less of other coping behaviours such as Information-seeking. This was supported in this study where Information-seeking, Child informs about status and Behavioural interest were all low occurring behaviours. Although the majority of children had EMLA (a local anaesthetic cream) applied many were extremely distressed during the Insertion phase and the results showed no correlation between application of EMLA and Pain occurrence or Faces Pain score. These results support other studies (Cohen et al., 1999; Lal et al., 2001) where children were distressed despite the application of a local anaesthetic cream, indicating that aspects of the situation produce distress behaviours other than pain. Behaviour relaxed was the most common occurring behaviour during the Insertion phase although low in all other phases. Other high occurring behaviours were Pain, Behaviour cooperation and Cry. Child age may be a factor in the use of relaxed and cooperative behaviours and will be discussed in a later section.

The Procedure phase was characterised by Cry, information-exchange (Behavioural interest, Child informs about status and Information-seeking) and distraction behaviours (Non-procedural talk to child). Behaviour cooperation and Behaviour relaxed decreased in occurrence. An explanation for the high levels of Cry in phase 4 is stimulus generalisation (Mussen et al., 1979), where the child has previously been exposed to a similar stressful situation and then generalised this experience to the current situation. Therefore, the child may perceive the behaviours and characteristics of phase 3, such as staff actions and parental behaviours, as similar in the following procedural phase as staff are still concentrating on the cannula site and parental Reassurance remains high. It suggests that children may consider phase 4 equivalent in threat to the Insertion phase although the Procedure phase is not usually painful.

The Post-procedure phase was characterised by low rates of distress and Information-seeking and high rates of coping-other behaviours as expected, such as Non-procedural talk to adult. However, there was an unexpected high occurrence of Makes coping statement. It would have been expected that Makes coping statement would occur more often in previous phases rather than after the procedure was completed. This may indicate that children use a limited range of coping strategies during a threatening and harmful situation and the range increases once anxiety levels decrease. There has been some support for this view in the literature where fewer coping strategies were used in high stress situations such as painful medical procedures than low stress situations (Carson & Bittner, 1994; Katz et al., 1980; Ritchie et al., 1988). This form of coping may also emotionally comfort and reassure the child and assist in regaining some control of the situation. This may suggest that in the interpretation of children's coping behaviours researchers cannot assume that all coping behaviours are used in the same way, for

example to minimise harm or threat. Further investigation is also needed to clarify the relationships between anxiety, appraisal and coping strategies.

It could be expected that children would demonstrate a high level of fear during venepunctures as it was a novel situation for many children. However, the study's results indicated a low use of Fear behaviour, which was a similar finding in other studies (Blount et al., 1989; Broome et al. 1990). One explanation is that the CAMPIS-CT code may not adequately measure the construct of fear. Previous studies do not clarify the construct of fear as some studies equate fear with distress (Carpenter, 1990) or pain (Jacobsen et al., 1990). Fear may be a multiple construct including anger, anxiety and a feeling of loss of control, hence non-verbal indicators of fear may be reflected in other behaviours such as Cry, Emotion and Scream. Another reason for the low occurrence of Fear could be the presence of the parent that may provide the child with a sense of safety in a threatening situation, although minimal research has investigated this idea. This contention implies that the younger the child the more they would involve the parent as part of their coping processes and would therefore exhibited fewer fear behaviours than older children. This was supported by the study as the proportion of Fear increased with age, although the results were not significant. There is a need for further research to investigate the construct of fear so that its effects on child coping can be determined.

Resistance behaviours (pushing away, "no I don't want it") by the child did not vary significantly according to phase of procedure. This may indicate that Resistance is either a general non-specific coping response or it may not be indicative of distress, as the behaviour did not increase during the Insertion phase. In this study and in a study by Blount et al. (1990) Resistance was categorised as distress. Resistance may be more appropriately categorised as an attempt to gain control in situations, as it has been

categorised as a problem-focused behaviour in some studies (refer to Section 6.2 on page 167 for previous discussion). However, it is difficult to verify the rationales underlying children's use of behaviours during venepunctures, especially in younger children. The role of gender in Resistance behaviour is unclear as this present study found no differences in child behaviours related to gender, which was supported by some studies (Hubert, Jay, Saltoun, & Hayes, 1988; Jacobsen et al., 1994), yet others found girls self-reported greater resistance behaviours (Jay et al., 1983) compared to boys.

Other behaviours that did not change according to phase of procedure included Behaviour ignoring adult, Requests emotional support and Child's general condition-related talk. An explanation for behaviours remaining unchanged is that children may have a set of responses that is common to all medical procedures, forming a behavioural baseline. This observation may be useful in further research where significant behaviours may be specific to the type of procedure and phase of procedure, therefore specific strategies can be identified for each situation.

There has been a general assumption that providing information before a procedure will decrease a child's anxiety during medical procedures (Egbert et al., 1964; Janis, 1958; Miller, 1980). The child's use of information seeking behaviours and interest in the procedure could indicate the preparedness of the child to receive information. The results showed a high use of Information-seeking in phases 1 and 5, a decrease in phase 2 and 3 and an increase in phase 4. Therefore this study supports the provision of information during the Pre-preparation phase, the Procedure phase and the Post-procedure phase. The study does not support the provision of information during the painful phase (Insertion) as the child does not seem receptive to such strategies and is probably concentrating on managing the actual harm. There is evidence that the arousal state of distressed children

may sensitise them to be more receptive to information (Melamed, 1982). However, this would only apply to mild to moderate arousal as severe distress would probably block channels to communication as emotion would overwhelm cognitive processes (Litt, 1995).

In summary, the level of threat inherent in each phase of a venepuncture is thought to influence the expression of child behaviour that changed across phase of medical procedure. Patterns of behaviours emerged where information-exchange behaviours were predominant in the anticipatory anxiety phases to possibly gain some control in the situation. Distress and relaxed behaviours were common during the Insertion phase, unrelated to EMLA application, and maintained during the Procedure phase then replaced by distraction and coping-other strategies Post-procedure. Some of the differences in behaviours could be explained by child age and appraisal of the threat. Fear occurrence was low and may be related to the multidimensional nature of fear. Some behaviours did not vary significantly across phase which could indicate children's general baseline responses common to painful medical procedures.

6.5 Child Age and Child Behaviour

It was expected that child age might have an effect on child behaviours during venepunctures. The age groups used in this study were based on Piaget (Piaget & Inhelder, 1966/1969) and Vygotsky's (1866-1934/1978) cognitive development theories, which gave four groups, 3-4.9 years, 5-6.9 years, 7-8.9 years and 9-11.9 years. The present study supported other research findings that child behaviour (the proportion of occurrence of CAMPIS-CT child codes) differed between age groups. There was a distinct difference in patterns of behaviours for children under the age of seven years

compared to children seven years and older, which supports the developmental view of children's coping (Piaget & Inhelder, 1969). Children under seven years of age were generally highly distressed (Cry, Scream, Emotion, Resistance) and uncooperative (low occurrence of Behaviour cooperation) during venepunctures compared to older children. Children seven years and older were generally cooperative (Behaviour cooperation), relaxed (Behaviour relaxed), assertive (Assertive procedural verbalisation), sought information (Information-seeking) and had a higher use of Makes coping statement. This supports other findings in the literature where young children have been found to exhibit higher levels of distress than older children (Jay et al., 1983; Katz et al., 1980; Kazak et al., 1996; LeBaron & Zeltzer, 1984; Malone, 1996; Melamed et al., 1983; Rudolph et al., 1995). Explanations for higher distress behaviours in young children include the disinhibiting effect of parental presence on young children's behaviours (Ainsworth, 1964), young children's lower impulse control (Carson & Bittner, 1994) and the tendency to relinquish control to adults (Peterson, 1989). These explanations may also explain the lower level of cooperation in younger children.

Some studies suggest that young children have a narrower range of coping strategies than older children (Murphy & Moriarty, 1976; Weisz et al., 1994), however, this was only slightly supported by this study. The youngest age group (ages 3-4.9 years) did not display any occurrence of Humour to adult and Procedural talk, whereas all other age groups displayed all behaviours. Younger children may have been generally too distressed to display humour or formulate procedural questions. Studies have shown that older children use more cognitive coping (e.g., wishful thinking, humour, non-procedural talk, ignoring) and control strategies than younger children (Band & Weisz, 1988; Rudolph et al., 1995). This was partly supported by this study where Assertive procedural

verbalisation varied significantly across age groups, with children over 7 years of age having higher occurrences than younger children. Conversely, Behaviour ignoring adult occurred often in the youngest age groups although the results showed no significant effects. The presence of Behaviour ignoring adult does not necessarily presume the child is engaging in cognitive distraction, for it may serve other purposes such as young children punishing their parents for submitting them to venepunctures as they may consider the venepuncture as their punishment (Bibace & Walsh, 1980; Carson et al., 1992).

The two highest occurring behaviours across all age groups were Cry and Behaviour cooperation, which often occurred in the same case. Cry behaviour may serve several purposes for the child, including relieving tension and eliciting support from the parent (Rudolph et al., 1995), explaining its widespread use amongst children of all ages and across all phases. There may also be a stimulus-response relationship between cry and parental behaviours, where Cry elicits specific parental behaviours which then act as cues for the Cry response. Parental behaviours may also positively reinforce child distress behaviours (Dahlquist, 1992), for example screaming may be used by the child to gain control and stop the procedure as it may have been an effective strategy used in non-medical situations. It is likely that child distress is a combination of all factors, resulting in a complex response involving developmental and psychosocial factors. The high use of Behaviour cooperation in all ages may reflect young children's reliance on the parent for coping support (Peterson, 1989) and older children's cognitive reasoning and understanding (Piaget & Inhelder, 1966/1969) that cooperation will speed the procedure.

Results from the present study suggest that individual age groups have distinct levels of behaviours. In the two youngest age groups, 3-4.9 years and 5-6.9 years, the 5-6.9 years

group displayed higher levels of overt distress behaviours (Scream, Resistance, Emotion) and Pain and less Behaviour cooperation than the youngest group. The disinhibiting effect of the parent may be more important in the 5-6.9 years age group than the younger group. The younger group's greater attachment and dependence on the mother for coping support (Bush et al., 1986) may explain their higher levels of cooperation than the 5-6.9 years age group. The larger occurrences of overt distress behaviours in the 5-6.9 years group may reflect the group's greater desire for control and independence in the situation as they are developmentally more independent than children under the age of five years. The results also support the suggestion that older children consider stressful situations as anger provoking (Kagan, 1983), as overt distress could be considered as signs of anger (kicking, screaming). The anger reaction plus the lower impulse control in children 5-6.9 years of age compared to older children (Piaget & Inhelder, 1966/1969) may also account for these results. As Cry occurred in all age groups this may reflect the multifunctional nature of crying and each age group may utilise Cry differently. Few research studies have compared 3-4.9 years and 5-6.9 years age groups and distress behaviours, so comparative studies are scant. Studies that are available either do not investigate age effects (Blount et al., 1989) or have different age groups (Caty et al., 1984; Gonzalez et al., 1993; Katz et al., 1980; Ritchie et al., 1988).

Overall, Information seeking by children was low occurring (3.2%), which may be partly explained by the high proportion (51.5%) of children under the age of five years, and the low occurrence of Information-seeking in children aged 3-4.9 years compared to other age groups. Some studies have found that information seeking behaviour was used less by young children (LaMontagne et al., 1996), probably due to their limited cognitive and verbal development. Other studies have found that information seeking increased with

age (Peterson & Toler, 1986; Smith et al., 1989). Internal Locus of Control has been found to increase with age (LaMontagne, 1984, 1987; LaMontagne et al., 1996) and may be associated with information seeking. This is a measure of the belief that self rather than external forces control events, and includes vigilant coping behaviours such as information seeking. Some studies had contrary findings where children aged 2-5.5 years used high information seeking behaviours (Caty et al., 1989; Ritchie et al., 1988) but methodological differences such as low stress events and retrospective parental reporting of children's coping may explain these differences. The lack of Information-seeking behaviours in young children in this study may indicate their lack of cognitive ability to formulate questions, or to consider information seeking a form of coping or may indicate a reliance on the parent to contribute to their coping efforts. The provision of information to children under the age of 5 years may be inappropriate.

Some behaviours did not vary significantly with age, including Non-procedural talk, Requests emotional support, Behaviour ignoring adult and Behavioural interest. As Non-procedural talk by child is exhibited by all ages this gives support to promoting Non-procedural talk as a potential distraction method in all age groups. Few studies have utilised the CAMPIS measure for child coping or investigated the effect of child age so comparison is difficult. However, in studies with other measurement tools, Non-procedural talk and other distraction strategies increased with age (Ryan-Wenger, 1996), and requesting emotional support or help and interest in the procedure (such as watching) decreased with age (Caty et al., 1984; Ellerton et al., 1994). Reasons for the non-significant findings in the present study could be methodological differences in age groups and measurement tools. Information-seeking varied with child age yet Behavioural interest did not. Differences in developmental levels may explain these

findings as young children are less able to communicate their concerns due to their limited cognitive and linguistic abilities compared to older children (Peterson, 1989), whereas Behavioural interest may be a personality characteristic independent of age.

6.5.1 Child Age, Child Behaviour and Phase of Procedure

When the effect of phase of procedure on children's behaviour by age group was investigated only two CAMPIS-CT behaviours were significantly different between age groups, Emotion (EMOT) and Behaviour relaxed (BREL). Although the occurrence of Emotion was highest in the 3-4.9 years age group, analysis of phase of procedure showed that children aged 5-6.9 years had the highest use of Emotion during the Insertion phase. Compared to the other age groups, children aged 5-6.9 years had over double the occurrence of the 7-8.9 years age group and over four times the occurrence of the 3-4.9 years age group. However, children under the age of five years had a greater proportion of occurrence of Emotion in each phase of procedure compared to other groups. Kagan (1983), as previously mentioned, suggests older children perceive stressful situations as anger provoking. Anger can be reflected by the high use of Emotion in children aged 5-6.9 years, and compounded by their possible misinterpretation of events (Peterson, 1989), lack of impulse control and decreased ability to verbally express themselves compared to older children which may result in higher use of Emotion. These reasons could also explain the lowest use of relaxed behaviours by the 5-6.9 years group. More extensive studies could determine if other behaviours vary significantly across phases.

Of all age groups, the 7-8.9 years age group had the highest overall occurrence of Behaviour relaxed, however the effects of child age and phase of procedure on Behaviour relaxed gave a different pattern of behaviour. Behaviour relaxed had its highest

occurrence in the 9-11.9 years age group during the Insertion phase, although the 7-8.9 years group had more of a spread of the behaviour across phases. These results support the developmental view of coping and are supported by other studies suggesting that children express fewer distress behaviours with increasing age (Jay et al., 1983; Katz et al., 1980; Kazak et al., 1996; LeBaron & Zeltzer, 1984; Malone, 1996; Melamed et al., 1983; Rudolph et al., 1995). Effects of phase of procedure are able to identify differences in patterns of behaviours across phases that are not detected by overall effects, showing the importance of including this analysis in child coping research.

6.6 Child Pain

Child pain was measured by a Faces Pain Scale (Bieri et al., 1990) and the proportion of occurrences of Pain CAMPIS-CT codes. There was a moderate correlation between scores on the Faces Pain Scale and the proportion of total Pain codes for each child. The high proportion of children in this study under the age of 5 years may account for this low correlation, as the Faces Pain Scale has variable validity and reliability in children under 5 years of age (Bieri et al., 1985). The spread of scores in the Faces Pain Scale also reflected the possible effect of age as the distribution was bimodal on the two extreme scores. Poker chips (Wong & Baker, 1988) were trialed in the pilot study as a means of obtaining an additional pain score in children under the age of 5 years after the procedure, but the first three young children rejected the poker chips and refused to participate with the researcher. These three children did use the Faces Pain Scale although some had to be assisted by their parents to complete the scale. The situation may have been too stressful for the children to engage in what may have been interpreted as play behaviour. Christiano and Russ (1998) found that children (mean age 7.9 years) prior to a medical procedure were unable to complete a play task or completed it with flat affect. This

suggests that if children are unable to engage in play post-procedure and pre-procedure then distraction techniques based on play, used in some studies (Blount et al., 1992), may not be successful if presented during the procedure. This may explain the inconclusive results from Blount et al.'s (1992) study where blowing bubbles and party blowers were used for children undergoing bone marrow aspirations. Other forms of distraction might be more appropriate with young children. Further research is needed to investigate the effect of play-type interventions on young children's coping behaviours with phase of procedure.

The Faces Pain Scale was administered five minutes after the procedure was completed. This delay may have affected the accuracy of the children's recall of pain during the Insertion phase as distress experienced during the procedure may have affected their interpretation of the scale (Chen, Zeltzer, Craske, & Katz, 2000). Young children under the age of seven years also have difficulty identifying the intensity of the pain experience (Lehmann, Bendebba, & DeAngelis, 1990) and therefore may not accurately interpret the scale. Further research is needed on the effects of distress and age-related changes in pain recall in young children. The Pain CAMPIS-CT code should be more indicative of children's pain levels, but the code does not indicate intensity of pain experiences. The highest occurrence of Pain was in the 5-6.9 years group, probably due to children seeking control but with less impulse control and cognitive coping behaviours than older groups. The length of EMLA application was not significantly related to children's occurences of Pain. This supports other studies where children were distressed regardless of EMLA application (Cohen et al., 1999; Lal et al., 2001; Lander et al., 1996; Robieux et al., 1991). Therefore, aspects other than pain may be involved in children's responses to venepunctures as expression of pain may be linked to anxiety and fear levels. EMLA can

also have a vasoconstrictive effect on superficial veins (Steward, 1993) making it more difficult to locate and access a vein for venepuncture, which may have delayed or caused several cannulation attempts. Children under 5 years of age are also generally more difficult to cannulate due to their high proportion of sub-cutaneous fat compared to older children. The venepunctures in this study were performed by several doctors so differences in procedural technique may have accounted for some of the variability in children's pain responses.

6.7 Child Behaviours and Number of Cannulation Attempts

In Lazarus and Folkman's (1984) stress-coping theory children should continually appraise their coping behaviours and readjust behaviours accordingly, which was given some support by this study. Child behaviours differed significantly from the first and second cannulation attempts on two behaviours, Cry and Makes coping statement. The mean Cry behaviour decreased on the second attempt and the mean of Makes coping statement increased slightly in the second attempt with a greater spread of values. This also supports the layered view of coping (Rudolph et al., 1995) where children initially utilise preferred coping strategies and, if unsuccessful, change to less preferred strategies. The effects of other variables on response to cannulation attempts such as child age and phase of procedure were not investigated.

6.8 General Parent Behaviour

The most common parental behaviour was Reassurance, which occurred over 2½ times more frequently than the next highest occurring behaviour, Non-procedural talk to child. Behavioural command to child and Child's general condition-related talk were the next

highest occurring parental behaviours. Other studies reported high reassurance levels during bone marrow aspiration (Blount et al., 1989), immunisation (Gonzalez et al., 1993) and invasive procedures (Caty et al., 1989). Reassurance may be a coping behaviour by parents to reduce arousal or it may reflect parental anxiety. Studies that investigated parental reassurance and anxiety did not report comparisons of the two behaviours (Bush et al., 1986; Frank et al., 1995). The validity of Reassurance as a reflection of parental anxiety is unclear and further research is needed in this area, however the inclusion of a parental anxiety measure such as agitation (Bush et al., 1986) in the CAMPIS-CT measure may assist in clarifying this issue. The effect of Reassurance on child behaviours will be discussed in a later section.

The study findings show that parents rely heavily on Reassurance and distraction in responding to children and also engage in high occurrences of procedure-related activity. This is in contrast to Blount et al.'s (1989) study where Non-procedural talk to adult occurred more frequently than Reassurance, even when restricting the present study's population to children aged 5 years and over, and combining parent and staff behaviours in parity with Blount et al.'s study (Appendix N, Tables A3 and A4, on page 281). In addition, there was a large difference in occurrences of other behaviours. For example, this study had a much higher use of Child's general condition-related talk and Behavioural command to child and a much lower use of Command to engage in coping strategy compared to Blount et al.'s study. The differences between procedures and populations may partly account for this difference. In Blount et al.'s study children and parents were familiar with the procedure and possibly familiar with staff performing the procedure. This may account for the high use of Non-procedural talk to adult and low use of Behavioural command to child. Familiarity with the procedure by the adults may have

led to an increased knowledge regarding coping strategies used and a decreased focus on comforting the child. In the current study over 40% of children had not previously experienced a painful medical procedure (other than immunisation) and therefore parents were probably unfamiliar with the procedure and staff.

Parents and children used all coping behaviours in the CAMPIS-CT measure but parents employed fewer coping behaviours with occurrences over 3.0%, using nine out of 21 behaviours compared to children employing 13 out of 21 behaviours. Children may perceive the stressor as more threatening than their parents. Some parent behaviours were low occurring, especially Apology, Procedural talk to child, Painful procedure (all less than 1% total occurrence), and Notice of procedure to come, Giving control to child, Criticism, Non-painful procedure and Humour to child (all less than 2%). These results are similar to Blount et al.'s (1989) study suggesting that some behaviours may be common to a variety of medical procedures. The roles of these low occurring behaviours are unclear, hence studies need to be designed to manipulate parental responses to increase the occurrence of behaviours such as Apology, Criticism and Giving control to child in order to investigate their significance. Parent behaviour did not change as a result of cannulation attempt, which may indicate that the parent probably did not consider the situation as a change in stressor.

6.9 Parent Behaviour and Phase of Procedure

Some parental behaviours changed as a function of phase of procedure, such as Reassurance, Praise, Non-procedural talk to child, Command to use coping strategy, Non-procedural talk to adult and Non-painful procedural behaviour. Reassurance and Praise shared similar patterns of occurrences across phases where they increased over the course

of the procedure and decreased during the last Post-procedure phase. Praise and Reassurance have been considered as supportive behaviours in previous studies (Blount et al., 1989, 1990; Frank et al., 1995; Gonzalez et al., 1993) however, the patterns of occurrences across phase of procedure in these studies are unclear. The patterns of occurrences of Reassurance and Praise in the present study may be a reflection of parental anxiety paralleling the level of perceived threat of the procedure, or it may be in response to child and staff behaviours.

Non-procedural talk to adult and Non-painful procedural behaviour shared similar patterns of occurrences for the first three phases, decreasing from phase 1 to phase 3. This may reflect an increased focus by the parent away from the adult, and toward the child, as the procedure progressed. Blount et al. (1990) found similar results where Non-procedural talk by adult to adult occurred more often in the anticipatory anxiety phases (pre-insertion). The phase definitions for Blount et al.'s study were very similar to the present study's definitions, although Blount et al. had more insertion phases as the procedure included local anaesthetic administrations, bone marrow aspiration and lumbar puncture.

Non-procedural talk to child and Command to use coping strategy shared similar patterns of occurrences for the first three phases, increasing from phase 1 to phase 2 and decreasing to approximately phase 1 levels during the Insertion phase (phase 3). This pattern supports the contention that parents increase focus on the child as the procedure progresses. The low occurrences of these behaviours in phase 3 suggests that parents utilise other strategies to help children during the Insertion phase, such as supportive behaviours. In this present study Non-painful procedural behaviour occurred most often in the first phase, which may reflect the parents' actions in preparing the child for the

procedure such as removing articles of children's clothing. The occurrences of Non-painful procedural behaviour during other phases were lower suggesting that parents may have relinquished control to staff for the procedure.

The Insertion phase was of short duration (10 seconds) compared to other phases, affecting the number of responses displayed. Therefore, several behaviours did not occur during this phase or had extremely low occurrences, such as Behavioural commands to child, Giving control to child, Non-procedural talk by adult to adult and Child's general condition-related talk. However, changing the definitions of the phases to increase the length of time of the Insertion phase would not be conceptually valid, as stressors before and after insertion would contain different levels of threat to that of insertion. Reassurance was the only behaviour that increased in the insertion phase that also showed a significant change across phase. Other behaviours to change significantly across phases showed a decrease in occurrence during phase 3, for example, Non-procedural talk to adult, Command to use coping strategy, Non-procedural talk to child and Non-painful procedural behaviour. These results suggest that parents prefer to utilise supportive behaviours during episodes of high threat involving their children rather than distraction or other coping behaviours.

As expected, the parental behaviours in phases 4 and 5 showed different patterns to the insertion phase. Reassurance increased during the Procedure phase (phase 4) which suggests that parents considered this phase a continued threat, whereas the occurrence of Reassurance decreased markedly after the procedure in phase 5. Praise occurrence paralleled the pattern of Reassurance occurrence. Non-procedural talk to adult and child increased during the last phase, suggesting parents had already changed their focus away from the procedure. It also suggests that parents were not focusing on future procedures

or treatments otherwise there would have been a significant increase in Child's general condition-related talk. The parents may have used these distraction behaviours to distance themselves from the stressors of the venepuncture.

In summary, parents of acutely ill children undergoing venepunctures displayed a predominance of support, distraction and encouraging child coping behaviours during the first two phases, support behaviours during the Insertion phase, support and distraction behaviours in the Procedure phase and a predominance of distraction behaviours in the Post-procedure phase. The patterns of responses could be due to the parent's perception of threat to the child during each phase of the procedure or a response to child behaviours. The high level of Reassurance in all phases may act as a strategy to decrease parents' arousal during the procedure, and may also reflect the state of parental anxiety. There is no similar study with which to compare findings.

6.10 Parental Behaviour and Child Age

It was expected that parent behaviour would differ according to child age, with more supportive behaviours employed for young children and more procedure-focused behaviours for older children (Broome et al., 1990; Caty et al., 1984; Peterson, 1989; Rudolph et al., 1995). Results from the study showed no significant differences in occurrences of parental behaviours for child age group except for Behaviour ignoring child, which was an overall low occurring behaviour (2%). There were high occurrences of Behaviour ignoring child in the 5-6.9 years and 9-11.9 years age groups. Different reasons may account for these results. The 5-6.9 years age group had high expressions of distress behaviours such as Pain, Scream and Resistance, and lower levels of Behaviour cooperation and Behaviour relaxed than any other group. The parents may have been

trying to extinguish these behaviours or minimise child distress by ignoring the child. Children aged 9-11.9 years had high occurrences of Makes coping statement, Behaviour cooperation and Behaviour relaxed. The parents of this age group may believe that the children are coping well and have no need of assistance, therefore ignoring the child. This supports the concept that parents provide a great deal of support when children are young, and relinquish that support as the children grow older and are able to contribute more to their own coping needs.

Apart from the low-occurring Behaviour ignoring child, results suggest that parents do not change their behaviours according to children's developmental level, contrary to a generally accepted premise where parents do alter behaviours. This study only used a single hospital and a descriptive design, so the results need to be replicated to determine if the lack of change in parental behaviours generalises to other situations. Parents may still change behaviours according to different situations, for example during bone marrow aspirations, but may not change due to child age. Parents may have set ways of responding to children during venepunctures regardless of the children's age. The nature of parent-child interaction may explain these results, and will be discussed in a later section. If the results of this study are supported then this can have repercussions in the study of parent and child coping, such as coaching parents in age-appropriate strategies to assist their child during painful medical procedures.

6.11 Parent Behaviour and Child Gender

The idea that parents raise children differently according to gender is common in the literature (Block, 1983; Jacklin, DiPietro, & Maccoby, 1984; Witt, 1997), and it follows that parents may respond differently to a girl or boy child, but this was not supported by

this study. Few studies involving parent and child coping behaviours investigated the effect of child gender on parental behaviours. Bush et al. (1986) found that mothers restrained girls more than boys, however this was a low occurring behaviour. The stressful nature of the situation may disorganise the parents' ability to attend to the socialisation aspect of gender behaviours resulting in no differences in behaviours between responses to boys or girls. Another explanation may relate to the children's behaviours, which did not vary significantly with gender. Therefore, parents may be responding to children's behaviour, but as the children's behaviours did not vary with gender, the parents' behaviour reflected this lack of variation.

6.12 Parental Anxiety

As expected, parents' state anxiety scores were significantly higher than trait anxiety as the parents would find the procedure a stressful situation, supporting similar findings by Parkinson et al. (1999). However, the effects of state and trait anxiety scores on parental behaviours were not statistically significant. It is possible that only small differences in parental behaviours are necessary for emotions to be perceived by others, and the analyses may not be sensitive enough to detect these changes. Another explanation is that anxiety measures were obtained prior to the procedure yet the parents' anxiety levels may have changed when exposed to the stressors of the procedure. This implies that parents' usual anxiety responses may not be employed during venepunctures. The nature of the procedure may create its own distinctive level of anxiety in parents independent of the parents' usual anxiety responses. Parental anxiety needs to be assessed during the phases of the procedure and across different situations to test this contention.

6.12.1 Parental Anxiety and Child Characteristics

Parents of children under seven years of age were more anxious than parents of children aged seven years and older. This supports similar findings by Litman et al. (1996) from a study within an Emergency department. Parents may feel more protective toward younger children due to the child's greater vulnerability in stressful situations. State and trait anxiety scores were analysed to identify differences due to other demographic variables such as concurrent medical condition of child, previous painful medical procedures and child gender. Only trait anxiety scores differed significantly between groups. Those children who had no previous painful medical procedures or concurrent medical condition had parents with higher trait anxiety scores. Child or parental age groups were not significant factors in these results as younger children were as likely to have a concurrent medical condition or previous painful medical procedures as older children, and there were no differences between parental age groups on state and trait anxiety scores. An explanation for trait anxiety score differences is that a parent's level of general anxiety may be moderated by experience, such as medical procedures and concurrent medical condition. Habituation of parents to their child's medical procedures has not been the focus of previous studies into child coping and needs further investigation. Differences between state and trait anxiety scores for child gender were not significant. This supported Bush et al.'s (1986) study that also reported no significant effects.

6.12.2 Parental Anxiety and Child Behaviours

From the study's results, only one child behaviour differed significantly according to parental anxiety level. Parents in the low state anxiety group (one standard deviation below the mean) had children who displayed greater occurrences of Information-seeking

than other anxiety groups. No child behaviours differed according to parental trait anxiety. An explanation for the state anxiety results is that children might feel uninhibited in seeking answers to their concerns in the presence of a low anxious parent. Another explanation is that children might interpret low anxiety as a lack of parental concern and involvement in the child's situation and responds by taking control of their coping with Information-seeking to provoke a response from the adults. Age may also be a factor, as those parents in the low anxiety group had children who were generally older than the higher anxiety groups. In this study children over the age of five years had higher use of Information-seeking than younger children.

6.13 Parental Behaviour and Prediction of Child's Reaction to the Venepuncture

Parents were asked to predict their child's level of cooperative behaviour expected during the venepuncture on the behaviours 'cooperates completely', 'unwilling, complains, but will not fight, kick or resist treatment', and 'uncooperative, fights, kicks, and/or resists treatment'. The proportional use of Resistance/Emotion behaviours and Behaviour cooperation by children were obtained and compared to the parents' predicted reactions. Parents were able to predict their child's proportional use of Resistance/Emotion behaviours, yet were unable to significantly predict their child's use of cooperative behaviours. Previous studies found parents were able to predict overall child distress (Jacobsen et al., 1990; Jay et al., 1983) but separate analyses for cooperation were not reported. Lumley, Melamed, and Abeles (1993) did find that parents generally predicted the level of child's cooperative behaviour during anaesthesia induction. Methodological differences may partly account these results, as Lumley et al.'s study had no parents present during the procedure and overall cooperation was measured on a 7-point scale. The present study was based upon the proportion of cooperation behaviours used and

probably has greater discrimination of child cooperative behaviours compared to Lumley et al.'s study. However, the present study's 3-point scale may not be sensitive enough to detect predicted reactions and it needs to discriminate between child cooperation and overt distress reactions. An explanation for parents' abilities to generally predict their child's level of distress and cooperation may be based on previous experiences or accurate perceptions of the child's way of responding. Additionally, it may reflect a self-fulfilling prophecy (Rosenthal & Jacobson, 1966) where parents exhibit behaviours that may communicate to the child pre-conceived expectations of behaviours (Jacobsen et al., 1990).

6.14 Parent and Child Interaction

Sequential analysis was used to identify the transitional probabilities of specific adult behaviours preceding or following specific child behaviours, and vice versa. For analysis parent and staff codes were combined as parent and child behaviours cannot be considered in isolation of the total venepuncture interaction. Significant chains of behaviours were then identified for specific child behaviours. Sequential analyses allowed adult behaviours to be categorised according to the promotion of specific child coping categories; distress, information-exchange, distraction, control and coping-other. The behaviours directed towards the child will be discussed using the child coping categories as a framework for discussion, followed by a discussion on adult-to-adult behaviours. However, prior to these discussions the relationship of Reassurance to child coping behaviours will be explored.

6.14.1 The Effects of Reassurance

Reassurance was the most frequently occurring behaviour by adults, preceding and following many child behaviours. Such a wide use of Reassurance in response to a wide range of child behaviours suggests an indiscriminate response by the adult to the child. This is supported by other findings in this study where parental behaviours did not change significantly with child age or gender. Previous studies found that reassurance was also frequently employed by parents in other procedures, such as bone marrow aspirations (Blount et al., 1989) and immunisations (Gonzalez et al., 1993), supporting the contention of a generalised parental response to painful medical procedures. Crisis theory can help explain such a response, which proposes that anxiety from stressful situations can cause disorganisation of parents' coping strategies resulting in anxious parents exhibiting behaviours high in emotional expression, such as agitation, reassurance and ignoring child (Bush et al., 1986; Kaplan, Smith, Grobstein, & Fischman, 1973). However, Reassurance occurrence in sequential analysis was comprised of both parent and staff behaviours. Correlational analyses were performed and the occurrence of maternal Reassurance was more strongly correlated to all child coping categories than doctor and nurse Reassurance. This suggests that parental Reassurance has a greater influence upon children's coping behaviours than other adults' Reassurance behaviours, which supports previous contentions that children utilise parents as part of their coping resources. It may also support the view that children respond to their parents' emotional state such as anxiety.

Previous studies have found a relationship between parental Reassurance and child distress behaviours (Blount et al., 1989; Gonzalez et al., 1993) and the present study supports those findings. Results from this study showed clear patterns relating

Reassurance to all child distress behaviours. Witkin's psychological differentiation theory (Witkin et al., 1977) has been used to explain this phenomenon (Broome et al., 1989) where parents engage in excessive use of Reassurance providing cues that the procedure is threatening. Another explanation that has been used is stimulus generalisation (Mussen et al., 1979) where the child has previously been exposed to parental Reassurance in association with a similar stressful situation and then generalised this experience to the current situation. However, these theories do not explain the high occurrence of Reassurance across all age groups, the significantly lower distress behaviours in children seven years and over and the lack of significant associations between previous painful experiences and child behaviours. One explanation could be the mismatch between parents' usual ways of responding and their behaviours during venepunctures, which may create uncertainty in young children who respond by crying. Reassurance may also reinforce distress behaviours thereby maintaining the level of child distress. Further research into children's appraisals of situations according to their understanding of events is needed. Older children may be able to cope with the psychological effects of the danger signal or threat by employing strategies such as avoidance or attending to minimise the threat (Miller, 1980). Results from this study support this contention as older children utilised more attending behaviours such as Assertive procedural verbalisations and Behaviour cooperation, and employed a greater variety of coping strategies (Carson & Bittner, 1994). As Reassurance has been found to increase children's distress, parents should be discouraged from using Reassurance and encouraged to use other behaviours to assist their children during venepunctures.

The effects of maternal Reassurance in child coping is complex as it also correlates with other child coping categories, information exchange and coping-other/control. This

reflects the importance of maternal behaviour effects on children's coping responses. There may also be different types of reassurance, for example informing the child the procedure is nearly over when it is not or physically stroking the child, which promote different types of child coping behaviours. Dahlquist et al. (1995) measured reassurance as two categories, verbal and physical reassurance. Results from Dahlquist et al.'s study found that both types of reassurance were significantly correlated to overall child distress in the anticipatory phase but only verbal reassurance had a significant effect in the procedural phase. However, Dahlquist et al.'s study had many methodological differences to the present study, such as the population (children with cancer), procedure (bone marrow aspiration), measures, phase of procedure and observations that were time-based not event-sequenced. Separating Reassurance into verbal and physical categories in future studies may show differences across phases and child behaviours.

6.14.1.1 Other behaviours related to child distress

Criticism preceded child Cry and from previous discussions the role of Cry could reflect children's anxiety, fear or pain. The child's appraisal of parental criticism is unclear, although some studies have found similar results (Blount et al., 1989; Dahlquist et al., 1995). Painful procedural behaviour preceded child Pain behaviours as can be expected, however it was not related to any other distress behaviour. This suggests that the measure of pain by CAMPIS-CT Pain category may be valid.

6.14.2 The Effects of Adult Behaviours in Child Information-exchange Coping

There is a commonly held belief that children have a tendency to seek or avoid information in order to minimise their anxiety related to medical situations (Fanurik et al.,

1993; Hubert et al., 1988; Miller, 1980). It follows that if information is given to a child who has a pre-disposition for seeking information then this will decrease the child's anxiety, and has been supported by some studies (Hunsberger et al., 1984; Kolk et al., 2000; Rasnake & Linscheid, 1989). The CAMPIS-CT measure did not directly measure parental information-giving, but procedural questions were included in Child's general condition-related talk and non-procedural questions were in Non-procedural talk to child. However, Information-seeking was most commonly followed by Reassurance. This suggests that parents may not be responding to their children's behaviour but to the children's perceived emotions such as fear and anxiety, and exacerbating distress behaviours. Note that Child's general condition-related talk was probably adult initiated as Child's general condition-related talk by adult preceded Child's general condition-related talk by child, and also preceded and followed Child's general condition-related talk by adult. Non-procedural talk to child was considered a distraction behaviour and will be discussed in a later section. Use of Reassurance may also interfere with the child's own ability to employ coping measures such as the child trying to attend to the situation. Thompson (1994) reported that children who used a mix of information attending or avoiding information, rather than a predominant use of one information strategy, were more anxious. This study did not investigate the use of parent information provision or types of explanations and further research is needed to clarify the effect of these behaviours on children's coping.

Reassurance and Praise were at their lowest levels in the first phase of procedure whilst Information-seeking was at its highest. The relationship of Reassurance to Information-seeking has been investigated by Gonzalez et al. (1993) and was reported as not significantly correlated, but the study did not investigate the proportions of Reassurance

behaviours, only Reassurance as a test condition. Hence, the parents in Gonzalez et al.'s study, although coached to provide reassuring comments, would have also displayed other behaviours so the exact relationship between Reassurance and Information-seeking is unclear. Bush et al. (1986) found that high maternal information-provision and low rates of reassurance were associated with high rates of child exploration (e.g., information-seeking). In the current study maternal Reassurance was strongly inversely correlated with child information-exchange behaviours. These findings suggest that reassurance does not promote information-seeking behaviours in the child.

6.14.3 The Effects of Adult Behaviours in Child Distraction Coping (Non-Procedural Talk to Child)

Non-procedural talk to child followed and preceded a variety of child behaviours, particularly Non-procedural talk by child. Correlational analysis of person category and child coping categories found that Non-procedural talk to child was correlated with child distraction coping in all person categories. Maternal Non-procedural talk was most strongly correlated with child distraction behaviours, followed by doctor and nurse Non-procedural talk. Sequential analysis also revealed a significant pattern of interaction between Non-procedural talk to child and Non-procedural talk by child. In addition, Non-procedural talk to child was the only distraction promoting coping behaviour identified from the sequential analysis. Non-procedural talk to child has been described as a distraction behaviour in some studies (Bush et al., 1986; Dahlquist et al., 1995), and their findings associated Non-procedural talk to child with lower distress behaviours in children. However, Jacobsen et al. (1990) found that distraction (Non-procedural talk to child) was associated with child distress. The differences can probably be explained by Jacobsen et al.'s measure of distraction behaviours, where inclusion in the distraction

category only required the use of one distraction behaviour during the procedure. It would be assumed that parents may use a variety of behaviours during an interaction and the difference between using a small proportion or large proportion of distraction behaviours could affect child behaviours as no direct relationship between parent and child behaviours were identified. This study's findings suggest that distracting the child's attention away from the procedure results in non-distress behaviours and this strategy should be successful regardless of who is distracting the child. Distraction may also serve to distract the parent from the stressor thereby reducing parental anxiety and anxious behaviours.

As previously discussed in Section 6.9 (on page 187), Non-procedural talk by child most frequently occurred in the final phase of procedure with low occurrences in the Insertion phase. Distraction behaviours by the child were not employed in the high-stress phase (Insertion) suggesting that the child is attending to the painful aspect of the procedure. This may explain why previous interventions to distract children from the pain of needle insertion were unsuccessful (Arts et al., 1994; Caire & Erickson, 1986; Malone, 1996), as the children were employing other coping techniques such as relaxation or emotion.

Behaviour ignoring adult was also a distraction coping behaviour that had a high occurrence overall compared to other child behaviours (6.1%). However, the behaviour did not return significant results when the effect of phase of procedure and child age was considered. Bush et al. (1986) found that adult ignoring behaviour was negatively correlated with child exploration behaviours (interest in the procedure) and positively correlated with prosocial (distraction) behaviours. It is unclear whether the child employs distraction techniques that cue the adult to ignore the child or whether the reverse occurs.

6.14.4 The Effects of Adult Behaviours in Child control and Coping-other coping

Due to the low occurrences of child control behaviours (Assertive procedural verbalisation, Requests relief from non-procedural discomfort) this category was collapsed into the coping-other category for analyses. Behaviours in this category are Deep breath, Behaviour cooperation, Behaviour relaxed, Humour to adult, Makes coping statement and Requests emotional support. Some behaviours had low occurrences so significant relationships were unable to be identified. However, the results do give general trends and patterns that can be discussed.

Deep breathing is sometimes used by parents and staff in other studies as a relaxation strategy for the child (Blount et al., 1989, 1994; Christiano & Russ, 1998; Jay et al., 1987). In this study the adult may have considered deep breathing by the child as a symptom for concern, as the adult's response was to check on the child's status. It is possible that parents in previous studies encouraged children to deep breathe in imitation of staff behaviours. Blount et al.'s (1989, 1994) and Jay et al.'s (1987) studies investigated children with cancer who were familiar with bone marrow aspirations. It is likely that in previous procedures the staff encouraged the use of deep breathing that was mimicked by the parents to children in later procedures. Deep breathing may be appropriate for very painful procedures such as bone marrow aspirations but may not be successful in decreasing child distress during venepunctures where pain sensation is only a minor factor influencing child distress behaviours due to the application of a local anaesthetic cream.

Non-procedural talk to the child preceded child Requests relief from non-procedural discomfort. A possible explanation is that children were ignoring the adults' attempts to

distract them as they may be focusing on their own coping strategies. It may also indicate that parents were not attending to children or were not sensitised to perceive cues from the children, possibly due to anxiety.

Control behaviours by the parent promoted similar behaviours in the child, however other studies have mixed results. Manne et al. (1992) found that Giving control to the child was associated with low cry/scream behaviours during venepunctures in children with cancer, whereas Blount et al.'s (1989) study found Giving control to child promoted child distress. In Blount et al.'s study the timing of Giving control to child may coincide with painful events (such as insertion of local anaesthetic and aspirate needle) which acted as a cue to forthcoming painful events. Therefore, the painful nature of the procedure may explain these differences.

6.14.5 The Effects of other Adult Behaviours in Venepunctures

The results showed there was a significant amount of adult-to-adult interaction during venepunctures, such as Humour to adult, Non-procedural talk to adult and Child's general condition-related talk. It is unclear in the analyses whether staff behaviours provide cues to parents or vice-versa. An extension of the study is needed to explore the interaction patterns of parents and staff during venepunctures. The relationships of these adult behaviours to children's behaviours is also unclear and analyses may need to extend more than five lags forward and reverse to clarify this relationship. Extended adult-to-adult interaction may be interpreted by children as ignoring child as Behaviour ignoring child was followed by adult interaction (Procedural talk to adult).

Some adult behaviours predictably elicited similar behaviours in the child, such as Non-procedural talk, Checking child's status and Child informs about status. This suggests a reciprocal interaction between the adult and child. For example, Giving control to child was followed by Assertive procedural verbalisation, Painful procedure was followed by Pain, Non-procedural talk by adult followed by Non-procedural talk by child and Checking child's status was followed by Child informs about status. Similarly, some child behaviours were followed by expected adult behaviours, such as child Pain followed by Apology, Humour followed by Humour by adult, and Child informs about status followed by Empathy. Encouraging the parent to engage in these behaviours would increase distraction and communication behaviours in the child.

6.15 Staff Behaviours

The study did not focus on staff behaviours but the proportions of overall staff behaviours were described. It can be expected that staff would use more procedure-related behaviours and this was supported where five out of the highest eight occurring behaviours were procedure-related, however Reassurance was the highest occurring staff behaviour. Children may respond differently to staff than parents as maternal Reassurance was more strongly correlated with child distress category than doctor and nurse Reassurance. Differences have been found between parent and staff behaviours in other studies (Dahlquist et al., 1995; Frank et al., 1995) but the relationships of staff behaviours to child and parent behaviours remains unclear. Further investigation needs to be conducted in this area to clarify the effect of staff behaviours on parent-child interaction during venepunctures.

6.16 Methodological Issues

Results from studies in many areas of child coping with medical procedures have been inconclusive and a major reason for the confusion is the variety of methodologies used. This is an important issue in child coping research and the methodological aspects of this study related to future research will be discussed.

6.16.1 The Procedure, Participants and Setting

The study's setting was an Emergency Department in a large paediatric hospital. Although some smaller studies have been conducted in such a setting, no other study has focused on parent-child interaction during a venepuncture in this setting. Acutely ill, otherwise well, children were studied in contrast to the majority of studies in this area involving chronically ill children, usually with cancer. The results give a unique insight into this acutely ill population, however, it does make it difficult to compare this study with others. A different paediatric Emergency Department to the main study setting was used for the pilot study. This department was not used for the main study as it closed operation during the study. Another paediatric hospital's Emergency Department was approached for inclusion in the study, however, no support was given. Although this is a limiting factor on the generalisability of the results, the study was planned as exploratory and therefore aimed to describe and provide insight and guidance for further research. However, it was found that the study population had similar characteristics to the national urban population and was therefore representative of the general population.

Random sampling was not used due to the nature and setting of the study as subjects presenting to an Emergency department cannot be predicted or controlled. However, random time slots were used to provide a random selection of children to be included in

the study. The setting provided some problems in obtaining participants for the study. The department has two main sections with many staff and only one researcher. Due to the busy nature of the setting the researcher had to frequently remind staff to notify the researcher of potential participants, and hence frequently visited each section for potential participants. The researcher needed to be on-site for extended periods of time due to the unpredictable nature of admissions. In similar studies employing a research assistant for data collection is recommended.

Field notes were used to document observed non-verbal behaviours, enabling observations once every 15 seconds. In the original research plan videotaping was to be used to give a continuous recording of non-verbal behaviour. Videotaping was performed for the pilot study, however this was not accepted at the main study hospital and therefore audiotaping and observation were used. This may have affected the results and lessened the amount of non-verbal behaviours recorded for analysis. It is recommended that in future studies in this area videotaping should be the preferred method of data collection.

Previous studies have defined phases of procedure differently, making comparisons between studies difficult. This is partly due to the type of procedure involved and the conceptual bases for the studies, for example bone marrow aspiration, immunisation and venepuncture all differ in procedure. Few previous studies have used a conceptual basis for allocating phase categories (Jacobsen et al., 1990; Jay et al., 1983; Katz et al., 1980; LeBaron & Zeltzer, 1984; Lumley et al., 1993), which probably contributed to the lack of consistency between studies. Dahlquist et al. (1995) used type of anxiety to determine phase, that is, anticipatory and procedural, however the procedural category was extremely broad and encompassed almost the whole procedure and no behaviours immediately post-procedure were observed. A strength of this study was that a clear

relationship between conceptual theory and application was present. The phases were defined according to the differing stressors encountered by the child relating to the amount of touch and type of activities the staff were engaged in. The Insertion phase was very short compared to other phases and may have contributed to non-significant results for some low occurring behaviours. However, it was important to conceptually differentiate this type of pain-producing phase from phases with different stressors. More extensive studies are needed to enable collection of enough data for analyses of all parent and child behaviours during this phase. There needs to be further discussion and agreement on the conceptual nature of child coping and research needs to clarify these concepts. Determining phase of procedure by a theoretical framework may be the first step in gaining consistency across child coping studies.

6.16.2 Measurement Tools

This study used a modified CAMPIS tool which gave a total of 43 codes compared to 33 codes of the original CAMPIS tool (Blount et al., 1989). This gave greater specificity for parent and child behaviours, however the amount of data needed for assigning significance is greater. Some of the high occurring child behaviours in the present study were not part of the original CAMPIS tool, such as Behaviour cooperation, Behavioural interest and Behaviour ignoring adult. This supports the inclusion of the behaviours in the modified CAMPIS-CT but raises the issue of validity in measurement tools. Deleting low occurring behaviours in measuring tools, as some studies have done (Blount et al., 1989; Katz et al., 1980), limits the understanding of children's coping and may delete behaviours that occur in other situations. A validated comprehensive measurement tool is needed for use across different procedures.

The comprehensive CAMPIS-CT tool enabled specific child behaviours to be identified, and examination across phase of procedure showed that several child behaviours varied across the venepuncture. The Observational Scale for Behavioural Distress (Katz et al., 1980) has been widely used in child coping research and gives a total distress score, yet child distress has been shown to be a complex phenomenon. To understand the multidimensional nature of child coping individual behaviours need to be identified and analysed rather than overall behavioural categories. More naturalistic descriptive research needs to be undertaken to clarify the relationships between variables and behaviours in children's coping so that the tools reflect the nature of child coping during painful medical procedures. It is also clear that the nature of the procedure and the timing of the stressors have important effects in child coping behaviours, thus complicating the development of a universal coping tool.

The Faces Pain Scale by Bieri et al. (1990) was used in the study, and the results found a disproportionate number of extreme values reported by the children. This may be due to the large number of children under the age of five years who may have difficulty understanding the scale due to their limited cognitive abilities (Peterson, 1989; Wong & Baker, 1988). When administering the scale many children in this age level needed assistance by the parent, which may have influenced the results. Poker chips were trialed in the pilot study for young children but were unsuccessful. The children did not want to use the chips and they clung to their parents. The play aspect of the poker chips may have been inappropriate in this setting (post-stressful experience) and other non-play pain measures such as the "Oucher" scale may have been more appropriate. The present study highlights the sensitivity needed to conduct research with young children. Objective measures of child pain are also needed in child coping research but are difficult to

achieve. Heart rate and blood pressure are not only indicative of pain, for in a stressful situation the autonomic nervous system is at a general state of arousal (Selye, 1956). Facial grimaces and cries may also reflect emotions and feelings other than pain, such as fear and anxiety. A solution may be the use of multi-dimensional measures of pain for young children.

The State-Trait Anxiety Inventory's norms (Spielberger, 1983) were based upon a United States of America population of college students, general medical-surgical patients and psychiatric patients. No validation studies could be found for the Australian population. Therefore, it is unknown whether the study's population reflects the normative means and standard deviations of the Australian population. However, in the study the mean and standard deviations of the population were used for analyses, as well as repeated measures, so the results can be valid for the study population.

6.16.2.1 Transcription and Coding

The transcription was performed by the researcher and the transcript verified as accurate by an assistant. Interactions during the procedure often involved people talking at the same time, the child continuously crying, background noises and interruptions and transcription was challenging. Extreme care in listening to the tape was essential, as sometimes the verbal utterances were difficult to distinguish. From this experience it was clear that transcription could only be satisfactorily performed by a person familiar with the situation who was able to identify terms and expressions used in a less than ideal environment. It is suggested that coders be familiar with the environment and procedure for accurate transcription of utterances. Some cases could not be used for analysis as

some parents started using their primary language other than English to interact with the child when the child became distressed.

6.16.3 Analysis of Data

One of the aims of this study was to describe natural phenomena by direct patterns of parent-child interaction. The selection of sequential analysis identified probable patterns of interactions, which other quantitative or qualitative techniques would not provide. Sequential analysis does not provide a cause and effect relationship but does give strong indications of probable cause and effect which can be explored in further studies. Parent and staff behaviours were not differentiated in the sequential analysis and a more extensive study would be required to explore this concept. However, for describing general parent and child behaviours ANOVAs were able to examine the effects of various variables on these behaviours, including changes across phase of procedure.

6.17 Summary

Concepts within Lazarus and Folkman's (1984) stress-coping theory were supported by this study. Child and parent behaviour changed across the duration of the venepuncture, children seemed to appraise the situation and change behaviours accordingly and the contextual nature of coping was supported. Analyses were able to identify patterns of child and parent behaviours across phases, which were different to overall occurrences and gave support for the inclusion of effect of phase in future research.

Some child behaviours changed across phase of procedure, which may be related to the level of threat to the child's integrity by each phase. The child's most common response in every phase was Cry, which may reflect a general way of responding rather than an

indicator of child distress. Cry behaviour may be employed for several reasons, self-comfort, seeking parental support, attempts at control or pain. This contention is further supported by the high use of Makes coping statement in the Post-procedure phase compared to other phases, suggesting that after uncontrollable situations children may employ strategies to gain a sense of self-esteem, self-comfort and control. Distress behaviours were most common in children under the age of seven years which supports a developmental view of coping. Some child behaviours also changed between the first and second cannulation attempts, suggesting that children appraise situations and alter their behaviours accordingly. This supports a layered view of coping where children may initially employ preferred coping strategies, and when these are appraised as unsuccessful, change to the next level of preferred coping strategies.

Some parental behaviours changed across phase of procedure but did not change according to the age of child or level of parental anxiety. The stressors in the venepuncture may disorganise the parent's usual way of responding and lead to a set way of responding to children during venepunctures. This may also explain the lack of attendance to age and gender. Lack of significant parental behaviour change according to level of anxiety may be explained by the level of parental anxiety changing from administration of the instrument (one hour before the procedure) to involvement in the venepuncture. Parents may exhibit levels of anxiety specific to the venepuncture regardless of their previous state or trait anxiety measure. Another explanation could be that behaviours may have changed in response to changing anxiety levels but the instrument was not sensitive enough to detect these effects.

Reassurance by adult was related to all child distress behaviours and was the highest occurring behaviour used by parents. Children may have perceived the parents' high use

of Reassurance as an unfamiliar pattern of parental behaviour and responded to uncertainty with Cry behaviours. Parental use of Reassurance may also act as a cue, or danger signal, to a child for a threatening situation and also reinforce distress behaviours. Further support for the lack of parental attending to the child was the parental response of Reassurance following child Information-seeking, suggesting that parents' were not attending to their children's needs. Non-procedural talk by adult and Non-procedural talk by child were not related to child distress and it is possible that distraction is an appropriate form of coping strategy for children of all ages in this study. Distraction may also allow parents to focus away from the procedure and thereby reduce their anxiety. Adults engaged in some extended patterns of adult-to-adult interaction but the influence on child behaviours is unknown. Further research may need to extend lags forward and reverse to identify child behaviours after adult-to-adult interactions. The investigation of staff behaviours in interactions may also further clarify the parental influence on child coping behaviours.

Methodological issues related to child coping include validation and development of a comprehensive coping instrument. It was shown that the analysis of individual behaviours was important in describing the nature of child coping, therefore measurement tools such as the CAMPIS-CT are preferred but they must be validated across different situations and with different populations. Coping is a complex phenomenon influenced by many factors. This study identified aspects of parent-child interaction important in the understanding of child coping during a venepuncture. Comparison with other studies was difficult due to differences in methodologies, which reflects the general status of coping research. The following chapter will discuss methodological issues arising out of the study's results, strengths and limitations of the study and implications for future research.

CHAPTER - 7 CONCLUSION

In this concluding chapter an overview of the thesis will be provided. A brief background to the decision to study parent-child interaction during venepunctures will be given to provide a context for the study's aims. The methodology will then be described and the aims of the study given. The main results will briefly be given and the implications of the results for further research into child coping will be provided. Areas related to further research include methodological issues, coping strategies, conceptual issues and directions for future research. Finally, guidelines for practice will be given.

Children admitted to hospital and Emergency Departments frequently undergo venepuncture for diagnosis and treatment. However, some children have been noted to become extremely distressed during the procedure. Child distress has prolonged procedures or caused procedures to be repeated, as well as creating a potentially negative impression of health care procedures. There are many influences on child coping behaviours but one of the least understood, and possibly one of the most important influences, is that of the parent. This thesis explored the influences on child behaviours during venepunctures, focusing on parental behaviours. A literature review was undertaken which explored the concepts of stress and coping in children during painful medical procedures.

Strategies to ameliorate child distress, such as relaxation, information-giving and distraction have been the focus of some studies yet no strategy decreased distress in all

children, and often adult-based strategies have been applied to children without supporting research. Various child characteristics may affect child coping behaviours, such as child developmental level, gender, and previous experiences, however not all studies have investigated these phenomena. The effects of parental presence and parental anxiety have been investigated in the literature but with no clear results. There has been little investigation into the influences of specific parental behaviours. Aspects of the environment, such as phase of procedure, may also influence children's coping behaviours yet research in this area is sparse.

There are many methodological issues in conducting research into child coping. Many types of measurement tools have been used for the constructs of coping, distress, pain, fear and anxiety, and different conceptual bases have been used to explain child coping. Despite the amount of research in child coping no clear pattern can be identified to explain child coping or guide researchers and clinicians due to the lack of consistent findings in child coping research. Further research is needed to clarify the effects of parental behaviours on child coping behaviours.

The purpose of this thesis was to examine parental influences on child coping behaviours during venepunctures. Lazarus and Folkman's (1984) stress-coping theory was used to guide the study design. Lazarus and Folkman view coping as a cognitive process where all behavioural responses to a stressor are considered as coping strategies. Coping is also viewed as changing over time and according to the situational context. There were three aims of this study: to examine child and parent behaviours across phase of procedure, and their relationships to child and parent characteristics, and lastly, to explore parent-child interaction and identify parental behaviours that promote child coping behaviours.

Using a naturalistic study setting and a descriptive-exploratory design parent-child relationships were able to be explored and some major variables considered. An Emergency Department was chosen as it is often the first contact for acutely ill children and their first venepuncture, yet is rarely selected as a study location. This provided a specific context in which to study child coping. Selection of children was narrowed to assist with increasing the specificity of the context yet allowing the investigation of important variables such as child age. Therefore, children 3 years and over up to 12 years of age were included in this study. Acutely ill otherwise well children were selected in order to fill gaps in the knowledge regarding coping as the majority of studies involved chronically ill children or children with cancer.

Sixty-six parent-child dyads were selected using convenience sampling. All children were to undergo venepuncture as part of their medical diagnosis or treatment for an acute illness. After consent for inclusion in the study was obtained a questionnaire was administered to each parent. The questionnaire obtained demographic data concerning the parent, child and parent's partner, parental state and trait anxiety (Spielberger et al., 1970) and time of EMLA application (a local anaesthetic cream). Child and adults were observed during the venepuncture with non-verbal behaviour recorded every 15 seconds on a dedicated form and verbal behaviour audiotaped. Five minutes after the venepuncture the child was asked to rate his/her pain intensity experienced during the venepuncture on a Faces Pain Scale (Bieri et al., 1990).

The audio recording was transcribed and the transcript coded with a modified version of the Child Adult Medical Procedure Scale (CAMPIS: Blount et al., 1989), the CAMPIS-CT. This scale was modified after it was tested in a pilot study of 12 parent-child dyads at a hospital different to the main study hospital. Coding was validated by training a

research assistant in coding, and correlational analyses were performed on the coded transcripts of researcher and assistant. Phase of procedure, type of speaker and cannulation attempt number were also coded. Analyses were performed on the demographic data and coded child and parent behaviours, and effects of major variables such as child age, child gender and phase of the procedure were able to be explored using one-way ANOVA's. The interactions between child and parent behaviours were analysed using sequential analysis and some specific behaviours were explored in greater depth using correlational coefficients.

Some results from the study support previous research findings, for example Cry was the most commonly occurring child behaviour in all phases and all ages. This may indicate that Cry is used by children to fulfil a variety of functions, such as tension release, control, pain and seeking comfort from parent. Child age had an effect on child coping, with children under the age of 7 years exhibiting more distress behaviours and children 7 years and older exhibiting higher occurrences of cooperative and relaxed behaviours, thereby supporting a developmental view of child coping. Child gender and exposure to previous painful medical procedures had no significant effects on child behaviours, therefore children were not seen to habituate to painful medical procedures. Behaviours changed across phase of procedure with distress behaviours occurring most frequently in the insertion phase. Unexpectedly, Makes coping statement occurred most highly in the Post-procedure phase which suggests that the venepuncture may inhibit certain forms of child coping or that the child uses coping behaviours to serve different functions other than coping with the procedure.

The most commonly occurring parental behaviour was Reassurance, which supports other research findings. However, the effect of Reassurance on child behaviour was unclear as

it promoted both distress and non-distress behaviours. Further analyses revealed that the type of person delivering Reassurance might have an effect on child behaviour as child distress was more strongly correlated with maternal use of Reassurance than doctor or nurse use. Non-procedural talk to child promoted several types of non-distress coping behaviours. Correlational analysis revealed that Non-procedural talk to child was moderately correlated with child distraction behaviours. Parental behaviours did vary between groups of children who had prior painful medical procedures compared to children with no experience, suggesting that parents may habituate to their child's prior painful medical experiences. An unexpected finding from the study was that parental behaviour did not change with child age or parental state or trait anxiety level. This may imply that parents have set ways of responding during venepunctures regardless of their children's behaviour. Parents may need coaching to assist their children to cope with venepunctures.

Adult and child interaction was analysed using sequential analysis. As the staff members were part of the interaction process all adult behaviours were included in these analyses. Sequential analysis is not often used by researchers and the process was described in detail. The analytical technique used transitional probabilities to identify the most probable patterns of behaviours. Some adult behaviours promoted similar behaviours in the child, such as Non-procedural talk, Giving control to child and Assertive procedural verbalisation, Checking child's status and Child informs about status. Child behaviours were categorised into broad coping categories and parental behaviours were categorised as to whether they promoted each coping category. Parental behaviours that promoted child distress were Reassurance and Painful procedural behaviour. Non-procedural talk promoted child distraction behaviours, Giving control to child promoted control

behaviours, and Command to use coping strategy and Command to engage in procedural activity promoted child coping-other behaviours.

7.1 Strengths of the Study

The study investigated elements of child coping that have received very little attention in previous studies. Specific child and parent behaviours were examined and the specific nature of parent-child interaction was explored. The investigation of parent and child interaction related to coping behaviours were unique for the study setting, an Emergency Department, and population of acutely ill children. Naturalistic observation enabled an accurate portrayal of children's coping behaviours during natural events. The selection of sequential analysis enabled the probability of specific behaviours preceding and following specific child behaviours to be identified and added strength to the understanding of the relationships between child and parent behaviours. The modified parent-child interaction tool enabled a comprehensive measure of verbal and non-verbal parent and child behaviours during venepunctures. Another strength was the investigation of coping over time by exploring the effect of phase of procedure on parent and child behaviours. Lazarus and Folkman's (1984) stress-coping theory was used to guide the study, which provided a consistent framework for methodological decisions. From the interpretation of the study's findings many areas were identified for future research to add to the body of knowledge in child coping and provide guidelines for practice.

7.2 Limitations of the Study

Due to problems with the original study hospitals the main study was conducted in only one hospital, although the pilot study was conducted in a different hospital. However, the

sample reflected the Australian urban population. The number of participants was sufficient to enable examination of child and parent behaviours, however larger studies are needed to examine the effects of staff and paternal behaviours and parent-child interactions across phase of procedure. Greater strength would have been given to the study if videotaping of the venepunctures were undertaken, however this was unacceptable to the hospital Ethics committee. The nature of the statistical analyses did not identify cause and effect relationships, however they provided probable relationship patterns of parent-child interaction and gave insight into the reciprocal nature of the interaction. An aspect not investigated, which may influence child behaviours, was the proximity of the parent to the child, as a small number of parents chose not to be near their child during the procedure.

7.3 Recommendations for Future Research

The study's findings provided many directions and implications for future research in child coping. The implications of the findings to conceptual interpretations and theory, methodological issues, coping strategies and direction for future research will be given, followed by recommendations for nursing practice.

7.3.1 Conceptual Interpretations

The results supported Lazarus and Folkman's (1984) stress-coping theory. Child behaviour changed across time with distress increasing during the Insertion phase (phase 3) and information exchange behaviours occurring most often in the initial two phases. There was a low use of problem-focused control behaviours, which was expected as venepunctures allow children very little control in the situation. The highest occurring

coping behaviours in this study (e.g., Behavioural interest, Behaviour ignoring adult, Non-procedural talk to adult) were different to those exhibited by children in previous studies of chronically ill children during bone marrow aspirations (e.g., Scream, Emotion). This supports the contextual nature of coping and that environment and child characteristics effect children's coping responses. There was also support that children appraise their behaviours and adjust behaviours accordingly, as some child behaviours varied significantly across the first and second cannulation attempts. It is proposed that the behaviours varied according to the level of threat each phase of the procedure produced. Further research is needed to explore the child's appraisal process during a venepuncture.

Cry behaviour occurred across all phases and in all age groups, suggesting it may be used for a variety of coping functions such as self-comfort and control. Resistance behaviours did not vary across phase, suggesting that it may be a general non-specific behaviour or that it may reflect a different function than distress, for example control. This has implications for the measurement of distress by researchers. The nature of Cry and Resistance as coping behaviours needs to be investigated as the behaviours may serve several functions for a child and these functions may differ with age and phase of procedure.

Parental behaviours did not vary according to child age, child gender, or level of parental anxiety. This suggests that parents may have a set way of responding to children during venepunctures. The stress of the venepuncture in an Emergency department may disorganise the parents' usual modes of coping with their children. This suggests a lack of perception of their children's needs and is further evidenced by the response to children's Information-seeking with Reassurance rather than information. In addition, Reassurance

was the highest occurring parental behaviour and was associated with many child behaviours, suggesting an indiscriminate response to children.

7.3.2 Methodological Issues

The CAMPIS-CT was able to identify a comprehensive range of child and parent behaviours. All codes in the tool should be used in future research as behaviours that are low occurring in one population, such as acutely ill children, may be high occurring in other populations. However, the non-verbal descriptors for Fear (Body tenseness, Eyes tightly closed and Body shaking) may be indicative of other feelings such as anxiety or denial. Therefore, in future studies Fear needs to be differentiated from anxiety. The tool may also lack sensitivity to detect parental anxiety behaviours as the effect of parental anxiety was not significant for child age, child gender or parental behaviours across phase of procedure. It is suggested that 'agitation' be added to the tool to measure anxiety across the procedure. Cry also needs to be separately categorised from distress behaviours in other coping measures as Cry occurred highly in all ages and phases of the procedure. An explanation for these findings is that crying is used for different purposes by the child, for example gaining control or seeking comfort. Due to the difficulty of verifying the rationales for children's use of any behaviour it is suggested that child behaviours not be categorised into coping categories as researchers cannot assume that the behaviour is being used according to its categorisation, for example to control or seek comfort.

As the occurrence of child and parent behaviours differ from a similar study involving bone marrow aspirations this study supports the investigation of single-procedure studies. Some researchers have investigated several procedures within the same study, for

example bone marrow aspirations and lumbar punctures, and the data from both procedures pooled for analysis, which could confound the results.

Phase of procedure had an effect on child and parent behaviours and needs to be considered in future research. The pattern of occurrence of behaviours across phase of procedure varied from the overall occurrence of the behaviours. There also needs to be greater consistency between studies in the definitions of each phase of procedure. Procedures vary but concepts used in this study provide a guide for other investigations by basing categorisations of phase on the degree of threat each phase poses to the child.

Some measures used in the study need to be applied with caution. The Faces Pain Scale (Bieri et al., 1990) returned a bimodal distribution on the extreme scores. This may be accounted for by the high number of children under the age of five years (over 50%) in the sample. Young children may not be able to use the scale with accuracy. Poker chips were trialed in the pilot study to assess child pain post-procedure in children under 5 years of age but were unsuccessful as the children refused to cooperate. Further investigation is needed of the appropriateness of self-report measures of pain in children under five years of age. Parent's predicted children's resistance and emotional behaviours but not their level of cooperation, which may indicate a lack of sensitivity in the three-point scale.

7.3.3 Coping Strategies

The age and developmental level of the child should be taken into account when selecting coping strategies for investigation or implementation. Distraction strategies in the form of Non-procedural talk were found to promote non-distress behaviours in all age groups of

children (from 3 to 11.9 years). Information-giving as a coping strategy would appear to be only suitable for children over 5 years of age as younger children showed a lack of information seeking behaviour. The timing of information provision is important and it is suggested that information should be given in the Pre-preparation, Procedure and Post-procedure phases when children's interest in seeking information is highest. Reassurance was found to promote all child distress behaviours yet was widely used by parents, and the occurrence of Reassurance increased as the procedure progressed. Hence parents need to be assisted in utilising alternative behaviours to decrease the occurrence of Reassurance behaviour such as Giving control to child. In addition, there was evidence from the study that parents' behaviours did not change according to child age or gender. This suggests that parents may have a set way of responding to children during venepunctures. This supports the contention that parents may have to be coached in appropriate non-distress promoting behaviours. It also implies that parental coping styles need to be considered within the context of the situation rather than applying styles from other situations, for example home or other procedures.

7.3.4 Directions for Future Research

Future studies need to consider the previously presented conceptual and methodological issues when investigating parental influences on child coping. Comparative studies need to be conducted with acutely ill and chronically ill populations undergoing the same and different procedures to investigate the extent to which child coping behaviours are situation specific. Using a comprehensive interaction tool the question of whether children have a non-specific set of behaviours that do not vary across situations can be answered.

Replication of this study is needed to verify the lack of change in parental behaviours with child age and to explore whether parents' have a set way of responding to their children during venepunctures. Further investigation is recommended to clarify the effects of Reassurance on child coping behaviours, for example verbal reassurance may have different effects to physical reassurance. The effect of Giving control to the child also needs to be explored as this study found that it promoted control behaviours in children yet in Blount et al.'s (1989) study it promoted distress behaviours. Parental anxiety was found to have minimal effect on child behaviours. This needs further investigation as many studies have focused on the effects of parental anxiety on child behaviours with conflicting results. Inclusion of parental anxiety behaviours, such as agitation, in the CAMPIS-CT tool will assist in identifying relationships between parent anxiety and child coping behaviours. Investigation of Reassurance as an indicator of parental anxiety also needs investigating to clarify the nature of parental Reassurance and anxiety. Study findings also suggest that parents may habituate to their children's painful medical experiences which can be explored in further studies. Staff behaviours were not addressed in this study, however, the findings indicated that children may respond to staff differently than parents. Therefore, research needs to be conducted where doctor, nurse, mother and father behaviours are examined separately during an interaction.

Implementation of coping strategies need to focus on distraction and non-distress promoting strategies whilst minimising Reassurance behaviours, and studies need to be designed to test the effectiveness these strategies. The effects of staff members' utilisation of coping strategies also needs investigation. If staff members use strategies as effectively as parents then it would be more feasible for staff to use the strategies to avoid the time

investment of coaching parents. Staff would also be role modelling desired behaviours to parents.

The use of naturalistic observation methods with a comprehensive measurement tool enabled specific child and parent verbal and non-verbal behaviours to be identified. Further studies using videotaping of behaviours during venepunctures in different hospitals and settings needs to be undertaken to enable accurate observation and confirm this study's findings. When designing studies into child coping the characteristics of the sample and context need to be included as variables in child coping, for example child age, child medical condition, type and phase of procedure. These characteristics have been shown to influence child coping behaviours. Sequential analysis is also recommended for analysing parent-child interaction as it clearly describes the reciprocal nature of the interaction during venepunctures.

7.4 Recommendations for Nursing Practice

The results of the study have implication for practice to minimise child distress during venepunctures in Emergency departments. Following the findings of the study some suggested recommendations for nursing practice are given below.

1. Coach parents to minimise reassuring behaviours as this increases child distress.
2. Replace reassuring behaviours by encouraging parents and staff to use the following behaviours:
    - Non-procedural talk to the child to promote distraction behaviours,
    - General condition-related talk and Procedural talk to promote information-exchange,

- Commands to use coping strategies and engage in procedural activities to promote cooperation, and
- Giving control to the child to promote control behaviours in the child.
- The attitude of the parent during venepunctures should be low in emotion and support and high in procedural and non-procedure related talk.

3. Avoid giving information to children under the age of 5 years as they are not receptive to information, instead use Non-procedural talk as distraction.
4. Information for children over the age of 5 years should be given before the Insertion phase or after insertion, as this is when their interest is highest and children will probably be receptive to receiving information.

In conclusion, the field of child coping and response to stressors is complex and not clearly understood despite the numerous studies in this field. This study has added to the body of knowledge of child coping by identifying the probable relationships between specific child and parent behaviours during a venepuncture. The study has provided a rich source of findings from which to develop many directions for further studies into child coping. No one study will ever define the comprehensive and complex nature of child coping but this current study does provide insight into one specific area of coping, parental influences on children's coping during a venepuncture in an Emergency Department.

REFERENCES

Ainsworth, M.D. (1964). Patterns of behaviors shown by an infant in interaction with his mother. *Merril-Palmer Quarterly, 10*, 51-58.

Allison, P.D., & Liker, J.K. (1982). Analyzing sequential categorical data on dyadic interaction: A comment on Gottman. *Psychological Bulletin, 91*, 393-403.

Altshuler, J.L., & Ruble, D.N. (1989). Developmental changes in children's awareness of strategies for coping with uncontrollable stress. *Child Development, 60*, 1337-1349.

Anthony, E.J. (1987). Risk, vulnerability and resilience: An overview. In E.J. Anthony & B.J. Cohler (Eds.), *The invulnerable child* (pp. 3-48). New York: Guildford.

Antonovsky, A. (1985). *Health, stress, and coping.* San Francisco: Jossey-Bass.

Arts, S.E., Abu-Saad, H.H., Champion, G.D., Crawford, M.R., Fisher, R.J., Juniper, J.H., & Ziegler, J.B. (1994). Age-related response to lidocaine-prilocaine emulsion (EMLA) and effect of music distraction on the pain of intravenous cannulation. *Pediatrics, 93*, 797-801.

Australian Bureau of Statistics. (1995). *National health survey: Asthma and other respiratory conditions*. Canberra, ACT: Australian Bureau of Statistics.

Bachanas, P.J., & Blount, R.L. (1996). The behavioral Approach-Avoidance and Distress Scale: An investigation of reliability and validity during painful medical procedures. *Journal of Pediatric Psychology, 21*, 671-681.

Bachanas, P.J., & Roberts, M.C. (1995). Factors affecting children's attitudes toward health care and responses to stressful medical procedures. *Journal of Pediatric Psychology, 20*, 261-275.

Bakeman, R., & Brownlee, J.R. (1980). The strategic use of parallel play: A sequential analysis. *Child Development, 51*, 873-878.

Bakeman, R., & Gottman, J.M. (1986). *Observing interaction: An introduction to sequential analysis*. New York: Cambridge University Press.

Band, E.B. (1990). Children's coping with diabetes: Understanding the role of cognitive development. *Journal of Pediatric Psychology, 15*, 27-41.

Band, E.B., & Weisz, J.R. (1988). How to feel better when it feels bad: Children's perspectives on coping with everyday stress. *Developmental Psychology, 24*, 247-253.

Banez, G.A., & Compas, B.E. (1990). Children's and parents' daily stressful events and psychological symptoms. *Journal of Abnormal Child Psychology, 18*, 591-605.

Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.

Bauchner, H., Vinci, R., Bak, S., Pearson, C., & Corwin, M.J. (1996). Parents and procedures: A randomized controlled trial. *Pediatrics, 98*, 861-867.

Benner, P., & Wrubel, J. (1989). *The primacy of caring: Stress and coping in health and illness*. Menlo Park, CA: Addison-Wesley.

Bibace, R., & Walsh, M.E. (1980). Development of children's concepts of illness. *Pediatrics, 66*, 912-917.

Biddinger, L.A. (1993). Bruner's theory of instruction and preprocedural anxiety in the pediatric population. *Issues in Comprehensive Pediatric Nursing, 16*, 147-154.

Bieri, D., Reeve, R.A., Champion, G.D., Addicoat, L., & Ziegler, J.B. (1990). The Faces Pain Scale for the self-assessment of the severity of pain experienced by children: Development, initial validation, and preliminary investigation for ratio scale properties. *Pain, 41*, 139-150.

Bieri, D., White, L., O'Gorman Hughes, D., Vowels, M., Newsum, M., Warren, J., & Miller. (1985). Communication of self perceived pain in children. *Medical Pediatric Oncology, 13*, 143.

Bjerring, P., & Arendt-Nielsen, L. (1990). Depth and duration of skin analgesia to needle insertion after topical application of EMLA cream. *British Journal of Anaesthesia, 64*, 173-177.

Block, J.H. (1983). Differential premises arising from differential socialization of the sexes: Some conjectures. *Child Development, 54*, 1335-1354.

Blount, R.L., Bachanas, P.J., Powers, S.W., Cotter, M.C., Franklin, A., Chaplin, W., Mayfield, J., Henderson, M., & Blount, S.D. (1992). Training children to cope and parents to coach them during routine immunizations: Effects on child, parent, and staff behaviors. *Behavior Therapy, 23*, 689-705.

Blount, R.L., Bunke, V., Cohen, L.L., & Forbes, C.J. (2001). The Child-Adult Medical Procedure Interaction Scale-Short Form (CAMPIS-SF). Validation of a rating scale for children's and adults' behaviors during painful medical procedures. *Journal of Pain Symptom Management, 22*, 591-599.

Blount, R.L., Corbin, S.M., Sturges, J.W., Wolfe, V.V., Prater, J.M., & James, L.D. (1989). The relationship between adult's behaviour and child coping and distress during BMA/LP procedures: A sequential analysis. *Behavior Therapy, 20*, 585-601.

Blount, R.L., Davis, N. Powers, S.W., & Roberts, M.C. (1991). The influence of environmental factors and coping style on children's coping and distress. *Clinical Psychology Review, 11*, 93-116.

Blount, R.L., Powers, S.W., Cotter, M.W., Swan, S., & Free, K. (1994). Making the system work: Training pediatric oncology patients to cope and their parents to coach them during BMA/LP procedures. *Behavior Modification, 18*, 6-31.

Blount, R.L., Sturges, S.W., & Powers, S.W. (1990). Analysis of child and adult behavioral variations by phase of medical; procedure. *Behavior Therapy, 21*, 33-48.

Boekaerts, M., & Roder, I. (1999). Stress, coping, and adjustment in children with a chronic disease: A review of the literature. *Disability and Rehabilitation, 21*, 311-337.

Bretherton, I., & Ainsworth, M.D.S. (1974). Responses of one-year-olds to a stranger in a strange situation. In M. Lewis & L.A. Rosenblum (Eds.), *The origins of fear* (pp. 131-164). New York: Wiley.

Brewster, A.B. (1982). Chronically hospitalized children's concepts of their illness. *Pediatrics, 69*, 355-362.

Broome, M. E., Bates, T.A., Lillis, P.P., & McGahee, T.W. (1990). Children's medical fears, coping behaviors, and pain perceptions during a lumbar puncture. *Oncological Nurses Forum, 17*, 361-367.

Broome, M.E., & Endsley, R. (1989). Parent and child behaviour during immunisation. *Pain, 37*, 85-92.

Broome, M.E., & Hellier, A.P. (1987). School age children's fears of medical experiences. *Issues in Comprehensive Pediatric Nursing, 10*, 77-85.

Bull, B., & Drotar, D. (1991). Coping with cancer in remission: Stressors and strategies reported by children and adolescents. *Journal of Pediatric Psychology, 16*, 767-782.

Burns, N., & Grove, S.K. (1987). *The practice of nursing research: Conduct, critique and utilization*. Philadelphia: Saunders.

Bush, J.P. (1987). Pain in children. A review of the literature from a developmental perspective. *Psychology and Health, 1*, 215-236.

Bush, J.P., Melamed, B.G., Sheras, P.L., & Greenbaum, P.E. (1986). Mother-child patterns of coping with anticipatory medical stress. *Health Psychology, 5*, 137-157.

Byrne, D. (1974). *An introduction to personality* (2nd. ed.). Englewood Cliffs, NJ: Prentice Hall.

Caire, J.B., & Erickson, S. (1986). Reducing distress in pediatric patients undergoing cardiac catheterization. *Children's Health Care, 14*, 146-152.

Carpenter, P.J. (1990). New method for measuring young children's self-report of fear and pain. *Journal of Pain and Symptom Management, 5*, 233-240.

Carpenter, P.J. (1992). Perceived control as a predictor of distress in children undergoing invasive medical procedures. *Journal of Pediatric Psychology, 17*, 757-773.

Carson, D.K., & Bittner, M.T. (1994). Temperament and school-aged children's coping abilities and responses to stress. *The Journal of Genetic Psychology, 155*, 289-302.

Carson, D.K., Council, J.R., & Gravley, J.E. (1991). Temperament and family characteristics as predictors of children's reactions to hospitalization. *Journal of Developmental and Behavioral Pediatrics, 12*, 141-147.

Carson, D.K., Gravley, J.E., & Council, J.R. (1992). Children's prehospitalization conceptions of illness, cognitive development, and personal adjustment. *Children's Health Care, 21*, 103-110.

Caty, S., Ellerton, M.L., & Ritchie, J.A. (1984). Coping in hospitalized children: An analysis of published case studies. *Nursing Research, 33*, 277-282.

Caty, S., Ellerton, M.L., & Ritchie, J.A. (1997). Use of a projective technique to assess young children's appraisal and coping responses to a venipuncture. *Journal of Social Pediatric Nursing, 2*, 83-92.

Caty, S., Ritchie, J.A., & Ellerton, M.L. (1989). Helping hospitalized preschoolers manage stressful situations: The mother's role. *Children's Health Care, 18*, 202-209.

Chandler, L.A. (1985). *Assessing Stress in Children*. New York: Praeger.

Chandler, L.A. (1986). *The Stress Response Scale for Children: Revision*. Pittsburgh, PA: University of Pittsburgh, The Psychoeducational Clinic.

Chen, E., Zeltzer, L.K., Craske, M.G., & Katz, E.R. (2000). Children's memories for painful cancer treatment procedures: implications for distress. *Journal of Dentistry for Children, 67*, 263-267.

Chess, S. (1967) The role of temperament in the child's development. *Acta Paedopsychiatrica, 34*, 91-103.

Chess, S., & Thomas, A. (1985). Temperamental differences: A critical concept in child health care. *Pediatric Nursing, 11*,167-171.

Christiano, B., & Russ, S.W. (1998). Matching preparatory intervention to coping style: The effects on children's distress in the dental setting. *Journal of Pediatric Psychology, 23*, 17-27.

Ciarenello, R.D. (1983). Neurochemical aspects of stress. In N. Garmezy & M. Rutter (Eds.), *Stress, coping, and development in children* (pp. 85-105). New York: McGraw-Hill.

Cohen, L.L., Blount, R.L., Cohen, R.J., Schaen, E.R., & Zaff, J.F. (1999). Comparative study of distraction versus topical anesthesia for pediatric pain management during immunizations. *Health Psychology, 18*, 591-598.

Cohen, F., & Lazarus, R.S. (1973). Active coping processes, coping dispositions, and recovery from surgery. *Psychosomatic Medicine, 35*, 375-389.

Cohen, S. & Willis, A.T. (1985). The stress buffering hypothesis of social support. *Psychological Bulletin, 98*, 310-357.

Collins Dictionary and Thesaurus. (1994). Glasgow, Scotland: Harper Collins.

Compas, B.E., Connor-Smith, J.K., Saltzman, H., Thomsen, A.H., & Wadsworth, M.E. (1992). Coping with stress during childhood and adolescence: Problems, progress, and potential in theory and research. *Psychological Bulletin, 127*, 87-127.

Conway, V.J., & Terry, D.J. (1992). Appraised controllability as a moderator of the effectiveness of different coping strategies: A test of the goodness of fit hypothesis. *Australian Journal of Psychology, 44*, 1-7.

Coon, D. (2000). *Introduction to psychology: Gateways to mind and behavior* (9th ed.). Belmont, CA: Wadsworth/Thompson Learning.

Curry, S.L., & Russ, S.W. (1985). Identifying coping strategies in children. *Journal of Clinical Psychology, 14*, 61-69.

Dahlquist, L.M. (1992). Coping with aversive medical treatments. In A.M. La Greca, L.J. Siegel, J.L. Wallender, & C.E. Walker (Eds.), *Stress and coping in child health* (pp. 345-376). New York: Guildford Press.

Dahlquist, L.M., Gil, K.M., Armstrong, F.D., DeLawyer, D.D., Greene, P., & Wuori, D. (1986). Preparing children for medical examinations: The importance of previous medical experience. *Health Psychology, 5*, 249-259.

Dahlquist, L.M., Power, T.G., & Carlson, L. (1995). Physician and parent behavior during invasive pediatric cancer procedures: Relationships to child behavioural distress. *Journal of Pediatric Psychology, 20*, 477-490.

de Waard-van der Spek, F.B., van den Berg, G.M., & Oranje, A.P. (1992). EMLA cream: An improved local anesthetic. Review of current literature. *Pediatric Dermatology, 9*, 126-131.

Egbert, L.D., Batit, G.E., Welch, C.E., & Bartlett, M.K. (1964). Reduction of postoperative pain by encouragement and instruction of patients: A study of doctor-patient rapport. *New England Journal of Medicine, 270*, 825-827.

Ehrenström-Reiz, G.L.E., Reiz, S.L.A., & Stockman, O. (1983). Topical anaesthesia with EMLA, a new lidocaine-prilocaine cream and the cusum technique for detection of minimal application time. *Acta Anaesthesiologica Scandinavia, 27*, 510-512.

Eisenberg, N., Fabes, R.A., Schaller, M., & Miller, P.A. (1989). Sympathy and personal distress: Development, gender differences, and interrelations of indexes. *New Directions in Child Development, 44*, 107-126.

Ellerton, M., Ritchie, J.A., & Caty, S. (1989). Nurses' perceptions of coping behaviours in hospitalized preschool children. *Journal of Pediatric Nursing, 4*, 197-205.

Ellerton, M., Ritchie, J.A., & Caty, S. (1994). Factors influencing young children's coping behaviors during stressful health care encounters. *Maternal-Child Nursing Journal, 22*, 74-81.

Elliott, G.R., & Eisdorfer, C. (1982). *Stress and human health*. New York: Springer.

Ethnic Affairs Commission of NSW. (1998). *The people of New South Wales: Statistics from the 1996 census*. Sydney, NSW: Ethnic Affairs Commission of NSW.

Fanurik, D., Zeltzer, L.K., Roberts, M.C., & Blount, R.L. (1993). The relationship between children's coping styles and psychological interventions for cold pressor pain. *Pain, 53*, 213-222.

Farrell, D., & Wraight, R. (1993). *State of health in N.S.W.* Sydney, NSW: Department of Health, NSW.

Fassler, D. (1985). The fear of needles in children. *American Journal of Orthopsychiatry, 55*, 371-377.

Faust, J., & Melamed, B.G. (1984). Influence of arousal, previous experience, and age on surgery preparation of same-day surgery and in-hospital patients. *Journal of Consulting and Clinical Psychology, 52*, 359-365.

Faust, J., Olson, R., & Rodriguez, H. (1991). Same-day surgery preparation: Reduction of pediatric patient arousal and distress through participant modeling. *Journal of Consulting and Clinical Psychology, 59*, 475-478.

Felleman, E.S., Barden, R.C., Carlson, C.R., Rosenberg, L., & Masters, J.C. (1983). Children's and adults' recognition of spontaneous and posed emotional expressions in young children. *Developmental Psychology, 19*, 405-413.

Fernandez, E., & Sheffield, J. (1996). Relative contributions of life events versus daily hassles to the frequency and intensity of headaches. *Headache, 36*, 595-602.

Field, T., Alpert, B., Vega-Lahr, N., Goldstein, S., & Perry, S. (1988). Hospitalization stress in children: Sensitizer and repressor coping styles. *Health Psychology, 7*, 433-445.

Findley, M.J., & Cooper, H.M. (1983). Locus of control and academic achievement: A literature review. *Journal of Personality and Social Psychology, 44*, 419-427.

Fletcher, K.E., Fischer, M., Barkley, R.A., & Smallish, L. (1996). A sequential analysis of the mother-adolescent interactions of ADHD, ADHD/ODD, and normal teenagers during neutral and conflict discussions. *Journal of Abnormal Child Psychology, 24*, 271-297.

Folkman, S., & Lazarus, R.S. (1988). The relationship between coping and emotion: Implications for theory and research. *Social Science Medicine, 26*, 309-317.

Folkman, S., Schaefer, C., & Lazarus, R. S. (1979). Cognitive processes as mediators of stress and coping. In V. Hamilton & D.M. Warburton (Eds.), *Human stress and cognition* (pp. 265-300). New York: Wiley & Sons.

Forehand, R., Wierson, M., Thomas, A.M., Armistead, L., Kempton, T., & Neighbors, B. (1991). The role of family stressors and parent relationships on adolescent functioning. *Journal of the American Academy of Child and Adolescent Psychiatry, 30*, 316-322.

Fowler-Kerry, S., & Lander, J.R. (1987). Management of injection pain in children. *Pain, 30*, 169-175.

Fradet, C., McGrath, P.J., Kay, J., Adams, S., & Luke, B. (1990). A prospective survey of reactions to blood tests by children and adolescents. *Pain, 40*, 53-60.

Frank, N.C., Blount, R.L., Smith, A.J., Manimala, M.R., & Martin, J.K. (1995). Parent and staff behavior, previous child medical experience, and maternal anxiety as they

relate to child procedural distress and coping. *Journal of Pediatric Psychology, 20,* 277-89.

Frankl, S.N., Shiere, F.R., & Fogels, H.R. (1962). Should the parent remain with the child in the dental operatory? *Journal of Dentistry for Children, 29,* 152-160.

Frydenberg, E., & Lewis, R. (1991). Adolescent coping: The different ways in which boys and girls cope. *Journal of Adolescence, 14,* 119-133.

Garmezy, N. (1983). Stressors of childhood. In N. Garmezy & M. Rutter (Eds.), *Stress, coping and development in children* (pp. 43-84). New York: McGraw-Hill.

Garmezy, N. (1987). Stress, competence, and development: Continuities in the study of schizophrenic adults, children vulnerable to psychopathology, and the search for stress-resistant children. *American Journal of Orthopsychiatry, 57,* 159-174.

Gedaly-Duff, V. (1987). Preparing young children for painful procedures. *Journal of Pediatric Nursing, 3,* 169-179.

Gelfand, D.M., & Hartmann, D.P. (1984). *Child behavior analysis and therapy* (2nd ed.). New York: Pergamon.

Goldstein, M. J. (1973). Individual differences in response to stress. *American Journal of Community Psychology, 1,* 113-137.

Gonzalez, J.C., Routh, D.K., & Armstrong, F.D. (1993). Effects of maternal distraction versus reassurance on children's reactions to injections. *Journal of Pediatric Psychology, 18,* 593-604.

Gonzalez, J.C., Routh, D.K., Saab, P.G., Armstrong, F.D., Shifman, L., Guerra, E., & Fawcett, N. (1989). Effects of parent presence on children's reactions to injections: Behavioral, physiological, and subjective aspects. *Journal of Pediatric Psychology, 14,* 449-462.

Gottman, J.M. (1979). *Marital interaction. Experimental investigations.* New York: Academic Press.

Gross, A.M., Stein, R.M., Levin, R.B., Date, J., & Wojnilower, D.A. (1983). The effect of mother-child separation on the behavior of children experiencing a diagnostic medical procedure. *Journal of Consulting and Clinical Psychology, 71,* 783-785.

Harrison, A. (1991). Preparing children for venous blood sampling. *Pain, 45,* 299-306.

Hart, D., & Bossert, E. (1994) Self-reported fears of hospitalized school-age children. *Journal of Pediatric Nursing, 9,* 83-90.

Hatfield, E., Cacioppo, J.T., & Rapson, R.L. (1994). *Emotional contagion.* Cambridge, England: Cambridge University Press.

Hegvik, R.L., McDevitt, S.C., & Carey, W.B. (1982). The Middle Childhood Temperament Questionnaire. *Developmental and Behavioral Pediatrics, 3,* 197-200.

Hodapp, R.M. (1982). Effects of hospitalization on young children: Implications of two theories. *Children's Health Care. 10,* 83-86.

Hodgins, M.J., & Lander, J. (1997). Children's coping with venipuncture. *Journal of Pain and Symptom Management, 13*, 274-285.

Holmes, C.S., Yu, Z., & Frentz, J. (1999). Chronic and discrete stress as predictors of children's adjustment. *Journal of Consulting Clinical Psychology, 67*, 411-419.

Hubert, N. C., Jay, S. M., Saltoun, M., & Hayes, M. (1988). Approach-avoidance and distress in children undergoing preparation for a painful medical procedure. *Journal of Clinical Child Psychology, 17*, 194-202.

Humphrey, G.B., Boon, C.M., van Linden van den Heuvell, G.F., & van de Wiel, H.B. (1992). The occurrence of high levels of acute behavioral distress in children and adolescents undergoing routine venipunctures. *Pediatrics, 90*, 87-91.

Hunsberger, M., Love, B., & Byrne, C. (1984). A review of current approaches used to help children and parents cope with health care procedures. *Maternal and Child Nursing Journal, 13*, 145-165.

Hurley, A., & Whelan, E.G. (1988). Cognitive development and children's perception of pain. *Pediatric Nursing, 14*, 21-24.

Hutton, J.B., & Roberts, T.G. (1990). *Stress Impact Scale*. Austin, TX: Pro-Ed.

Hyson, M.C., Snyder, S.S., & Andujar, E.M. (1982). Helping children cope with checkups: How good is the "good patient"? *Childrens Health Care, 10*, 139-144.

Jacob, T., & Leonard, K. (1992). Sequential analysis of marital interactions involving alcoholic, depressed, and nondistressed men. *Journal of Abnormal Psychology, 101*, 647-656.

Jacobsen, P.B., Manne, S.L., Gorfinkle, K., Schorr, O., Rapkin, B., & Redd, W.H. (1990). Analysis of child and parent-behaviour during painful medical procedures. *Health Psychology, 9*, 559-576.

Jacklin, C.N., DiPietro, J.A., & Maccoby, E.E. (1984). Sex-typing behavior and sex-typing pressure in child/parent interaction. *Archives of Sexual Behaviour*, 13, 413-425.

Janis, I. (1958). *Psychological stress: Psychological and behavioural studies of surgical patients*. New York: Wiley.

Jay, S.M., & Elliott, C.H. (1984). Behavioral observation scales for measuring children's distress: The effects of increased methodological rigor. *Journal of Consulting and Clinical Psychology, 52*, 1106-1107.

Jay, S.M., Elliott, C.H., Fitzgibbons, I., Woody, P., & Siegel, S. (1995). A comparative study of cognitive behavior therapy versus general anesthesia for painful medical procedures in children. *Pain, 62*, 3-9.

Jay, S.M., Elliott, C.H., Katz, E.R., & Siegel, S.E. (1987). Cognitive-behavioral and pharmacologic interventions for children's distress during painful medical procedures. *Journal of Consulting and Clinical Psychology, 55*, 860-865.

Jay, S.M., Elliott, C.H., Woody, P., & Siegel, S.E. (1991). An investigation of cognitive-behavior therapy combined with oral Valium for children undergoing painful medical procedures. *Health Psychology, 10*, 317-322.

Jay, S.M., Ozolins, M. Elliot, C.H., & Caldwell, S. (1983). Assessment of children's distress during painful medical procedures. *Health Psychology, 2*, 133-147.

Jensen, P.S., Richters, J., Ussery, T., Bloedau, L., & Davis, H. (1991). Child psychopathology and environmental influences: Discrete life events versus ongoing adversity. *Journal of the American Academy of Child and Adolescent Psychiatry, 30*, 303-309.

Johnson, R., & Baldwin, D. (1968). Relationship of maternal anxiety to the behavior of young children undergoing dental extractions. *Journal of Dental Research, 74*, 801-805.

Johnson, J., & Dabbs, J. (1967). Enumeration of active sweat glands: A simple physiological indicator of psychological changes. *Nursing Research, 16*, 273-276.

Jung, J., & Khalsa, H.K. (1989). The relationship of daily hassles, social support, and coping to depression in black and white students. *Journal of General Psychology, 116*, 407-417.

Kagan, J. (1983). Stress and coping in early development. In N. Garmezy & M. Rutter (Eds.). *Stress, coping, and development in children.* New York: McGraw-Hill.

Kaplan, D.M., Smith, A., Grobstein, R. & Fischman, S.E. (1973). Family mediation of stress. *Social Work, 18*, 60-69.

Kanner, A.D., & Feldman, S.S. (1991). Control over uplifts and hassles and its relationship to adaptational outcomes. *Journal of Behavioral Medicine, 14*, 187-201.

Katz, E. R., Weiner, H., & Gallagher, T. E. (1970). Stress, distress, and ego defenses: Psychoendocrine responses to impending breast tumor biopsy. *Archives of General Psychiatry, 23*, 131-147.

Katz, E.R., Kellerman, J., & Siegel, S.E. (1980). Distress behaviour in children with cancer undergoing medical procedures: Developmental considerations. *Journal of Consulting and Clinical Psychology, 48*, 356-356.

Kazak, A.E., Penati, B., Boyer, B.A., Himelstein, B., Brophy, P., Waibel, M.K., Blackall, G.F., Daller, R., & Johnson, K. (1996). A randomized controlled prospective outcome study of a psychological and pharmacological intervention protocol for procedural distress in pediatric leukemia. *Journal of Pediatric Psychology, 21*, 615-631.

Kleiber, C., & Harper, D.C. (1999). Effects of distraction on children's pain and distress during medical procedures: A meta-analysis. *Nursing Research, 48*, 44-49.

Kliewer, W., Fearnow, M.D., & Miller, P.A. (1996). Coping socialization in middle childhood: Tests of maternal and paternal influences. *Child Development, 67*, 2339-2357.

Kliewer, W. & Kung, E. (1998). Family moderators of the relation between hassles and behavior problems in inner-city youth. *Journal of Clinical Child Psychology, 27,* 278-292.

Kolk, A.M., van Hoof, R., & Fiedeldij Dop, M.J. (2000). Preparing children for venepuncture. The effect of an integrated intervention on distress before and during venepuncture. *Child Care Health Development,* 26, 251-260.

Lal, M.K., McClelland, J., Phillips, J., Taub, N.A., & Beattie, R.M. (2001). Comparison of EMLA cream versus placebo in children receiving distraction therapy for venepuncture. *Acta Paediatrica, 90*(2), 154-159.

LaMontagne, L.L. (1984). Children's locus of control beliefs as predictors of preoperative coping behavior. *Nursing Research, 33,* 76-85.

LaMontagne, L.L. (1987). Children's preoperative coping: Replication and extension. *Nursing Research, 36,* 163-167.

LaMontagne, L.L., Hepworth, J.T., Johnson, B.D., & Cohen, F. (1996). Children's preoperative coping and its effects on postoperative anxiety and return to normal activity. *Nursing Research, 45,* 141-147.

Lander, J., Hodgins, M., Nazarali, S., McTavish, J., Ouellette, J., & Friesen, E. (1996). Determinants of success and failure of EMLA. *Pain, 64,* 89-97.

Lazarus, R.S. (1980). The stress and coping paradigm. In L.A. Bond & J.C. Rosen (Eds.), *Competence and coping during adulthood* (pp. 28-69). Hanover, NH: University Press of New England.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping.* New York: Springer.

Lazarus, R.S., & Launier, R. (1978). Stress-related transactions between person and environment. In L.A. Pervin & M. Lewis (Eds.), *Perspectives in interactional psychology* (pp. 287-327). New York: Plenum Press.

LeBaron, S., & Zeltzer, L. (1984). Assessment of acute pain and anxiety in children and adolescents by self-reports, observer reports, and a behavior checklist. *Journal of Consulting and Clinical Psychology, 52,* 729-738.

Lee, L.W., & White-Traut, R.C. (1996). The role of temperament in pediatric pain response. *Issues in Comprehensive Pediatric Nursing, 19,* 49-63.

Lehmann, H.P., Bendebba, M., & DeAngelis, C. (1990). The consistency of young children's assessment of remembered painful events. *Journal of Developmental and Behavioral Pediatrics, 11,* 128-134.

Litman, R.S., Berger, A.A., & Chhibber, A. (1996). An evaluation of preoperative anxiety in a population of parents of infants and children undergoing ambulatory surgery. *Paediatric Anaesthesia, 6,* 443-447.

Litt, M.D. (1996). A model of pain and anxiety associated with acute stressors: Distress in dental procedures. *Behavior Research Therapy, 34,* 459-476.

Luthar, S.S. (1991). Vulnerability and resilience: A study of high-risk adolescents. *Child Development, 62*, 600-616.

Lumley, M.A., Abeles, L.A., Melamed, B.G., Pistone, L., & Johnson, J. (1990). Coping outcomes of children undergoing stressful medical procedures: The role of child-environment variables. *Behavioral Assessment, 12*, 223-238.

Lumley, M.A., Melamed, B.G., & Abeles, L.A. (1993). Predicting children's presurgical anxiety and subsequent behavior changes. *Journal of Pediatric Psychology, 18*, 481-497.

Mabe, P.A., Treiber, A., & Riley, W.T. (1991). Examining emotional distress during pediatric hospitalization for school-aged children. *Children's Health Care, 20*, 162-169.

Maccoby, E.E. (1983). Social-emotional development and response to stressors. In N. Garmezy & M. Rutter (Eds.), *Stress, coping, and development in children*. New York: McGraw-Hill.

Magnussen, D., & Endler, N.S. (1977*). Personality at the crossroads: Current issues in interactional psychology*. Hillsdale, NJ: Laurence Erlbaum.

Malone, A.B. (1996). The effects of live music on the distress of pediatric patients receiving intravenous starts, venipunctures, injections, and heel sticks. *Journal of Music Therapy, 33*, 19-33.

Manne, S.L., Redd, W.H., Jacobsen, P.B., Gorfinkle, K., Schorr, O., & Rapkin, B. (1990). Behavioral intervention to reduce child and parent distress during venipuncture. *Journal of Consulting and Clinical Psychology, 58*, 565-572.

Masten, A.S., Hubbard, J.J., Gest, S.D., Tellegen, A., Garmezy, N., & Ramirez, M. (1999). Competence in the context of adversity: Pathways to resilience and maladaptation from childhood to late adolescence. *Developmental Psychopathology, 11*, 143-169.

Mazur, E., Wolchik, S.A., Virdin, L., Sandler, I.N., & West, S.G. (1999). Cognitive moderators of children's adjustment to stressful divorce events: The role of negative cognitive errors and positive illusions. *Child Development, 70*, 231-245.

McDevitt, S.C., & Carey, W.B. (1978). The measurement of temperament in 3-7 year old children. *Journal of Child Psychology and Psychiatry, 19*, 245-253.

McGrath, P.J., de Veber, L.L., & Hearn, M.T. (1985). Multidimensional pain assessment in children. *Advances in Pain Research and Therapy, 9*, 387-389.

McGrath, P.J., Johnson, G., Goodman, J.T., Schillinger, J., & Chapman, J. (1985). CHEOPS: A behavioral scale for rating postoperative pain in children. *Advances in Pain Research and Therapy, 9*, 395-402.

McLennan, W. (1998). *1996 Census of population and housing: Selected family and labour force characteristics. Australia*. Canberra, ACT: Australian Bureau of Statistics.

Mechanic, D. (1968). *Medical Sociology: A selective view*. New York: Free Press.

Melamed, B.G. (1982). Reduction of medical fears: An information processing analysis. In J. Boulougouris (Ed.), *Learning theory approaches to psychiatry* (pp. 205-218). New York: Wiley.

Melamed, B.G., Dearborn, M., & Hermecz, D.A. (1983). Necessary considerations for surgery preparation: Age and previous experience. *Psychosomatic Medicine, 45*, 517-524.

Melamed, B.G., & Siegel, L.J. (1975). Reduction of anxiety in children facing hospitalization and surgery by the use of filmed modeling. *Journal of Consulting and Clinical Psychology, 43*, 511-521.

Miller, S.M. (1980). When is a little information a dangerous thing? Coping with stressful events by monitoring versus blunting. In S. Levine & H. Ursin (Eds.), *Coping and health* (pp. 145-169). New York: Plenum Press.

Miller, S.M. (1989). Cognitive informational styles in the process of coping with threat and frustration. *Advances in Behavioral Research and Therapy, 11*, 223-234.

Miller, A.C., Johann-Murphy, M., & Zhelezniak, V. (2001). Impact of the therapist-child dyad on children's pain and coping during medical procedures. *Developmental Medical Child Neurology, 43*, 118-123.

Mischel, W. (1968). *Personality and Assessment.* New York: Wiley.

Monroe, S.M. (1983). Major and minor life events as predictors of psychological distress: Further issues and findings. *Journal of Behavioral Medicine, 6*, 189-205.

Moos, R., & Tsu, V.D. (1977). *Coping with physical illness.* New York: Plenum.

Moulden, J.A., & Persinger, M.A. (1996). Visuospatial/vocabulary differences in boys and girls and a potential age-dependent drift in vocabulary proficiency. *Perception and Motor Skills, 82*, 472-474.

Murphy, L.B. (1962). *The widening world of childhood: Paths toward mastery.* New York: Basic Books.

Murphy, L.B., & Moriarty, A.E. (1976). *Vulnerability, coping and growth.* New Haven, CT: Yale University Press.

Murphy, L.M., Thompson, R.J. Jr., & Morris, M.A. (1997). Adherence behavior among adolescents with type I insulin-dependent diabetes mellitus: The role of cognitive appraisal processes. *Journal of Pediatric Psychology, 22*, 811-825.

Mussen, P.H., Conger, J.J., & Kagan, J. (1979). Chilld development and personality (5th ed.). New York: Harper & Row.

Nordberg, L., Rydelius, P.A., & Zetterstrom, R. (1991). Psychomotor and mental development from birth to age of four years; Sex differences and their relation to home environment. Children in a new Stockholm suburb. Results from a longitudinal prospective study starting at the beginning of pregnancy. *Acta Paediatrica Scandinavia Supplement, 378*, 1-25.

Norusis, M.J. (1993). *SPSS for Windows: Advanced Statistics, Release 6.0*. Chicago, IL: SPSS Inc.

Olson, A.L. Johansen, S.G. Powers, L.E. Pope, J.B. & Klein, R.B. (1993). Cognitive coping strategies of children with chronic illness. *Developmental Behavioral Pediatrics*, *14*, 217-223.

Parkinson, G.W., Gordon, K.E., Camfield, C.S., & Fitzpatrick, E.A. (1999). Anxiety in parents of young febrile children in a pediatric emergency department: Why is it elevated? *Clinical Pediatrics (Philadelphia)*, *38*, 219-226.

Pattern, A.C., Ventura, J.N., & Savedra, M. (1986). Stress and coping responses of adolescents with Cystic Fibrosis. *Child Health Care*, *14*, 153-156.

Perrin, E.C., & Gerrity, P.S. (1981). There's a demon in your belly: Children's understanding of illness. *Pediatrics*, *67*, 841-849.

Peterson, L. (1989). Coping by children undergoing stressful medical procedures: Some conceptual, methodological, and therapeutic issues. *Journal of Consulting and Clinical Psychology*, *57*, 380-387.

Peterson, L., & Shigetomi, C. (1981). The use of coping techniques to minimize anxiety in hospitalized children. *Behavior Therapy*, *12*, 1-14.

Peterson, L., & Toler, S.M. (1986). An information seeking disposition in child surgery patients. *Health Psychology*, *4*, 343-359.

Pfaff, V.K., Smith, K.E., & Gowan, D. (1989). The effects of music-assisted relaxation on the distress of pediatric cancer patients undergoing bone marrow aspirations. *Children's Health Care*, *18*, 232-236.

Piaget, J., & Inhelder, B. (1969). *The psychology of the child* (H. Weaver, Trans.). London: Routledge and Kegan Paul. (Original work published 1966).

Polillio, A.M., & Kiley, J. (1997). Does a needleless injection system reduce anxiety in children receiving intramuscular injections? *Pediatric Nursing*, *23*, 46-49.

Pontious, S.L. (1982). Practical Piaget: Helping children understand. *American Journal of Nursing*, *82*, 114-117.

Powers, S.W., Blount, R.L., Bachanas, P.J., Cotter, M.W. & Swan, S.C. (1993). Helping preschool leukemia patients and their parents cope during injections. *Journal of Pediatric Psychology*, *18*, 681-695.

Pridham, K.F., Adelson, F., & Hansen, M.F. (1987). Helping children deal with procedures in a clinic setting: A developmental approach. *Journal of Pediatric Nursing*, *2*, 13-22.

Quinonez, R., Santos, R.G., Boyar, R., & Cross, H. (1997). Temperament and trait anxiety as predictors of child behavior prior to general anesthesia for dental surgery. *Pediatric Dentistry*, *19*, 427-431.

Rasnake, L.K., & Linscheid, T.R. (1989). Anxiety reduction in children receiving medical care: Developmental considerations. *Journal of Developmental and Behavioral Pediatrics*, *10*, 169-175.

Ritchie, J.A., Caty, S., & Ellerton, M. (1988). Coping behaviours of hospitalized preschool children. *Maternal-Child Nursing Journal*, *17*, 153-171.

Ritchie, J.A., Caty, S., Ellerton, M., & Arklie, M.M. (1990). Descriptions of preschoolers' coping with fingerpricks from a transactional model. *Behavioral Assessment*, *12*, 213-222.

Robieux, I., Kumar, R., Radhakrishnan, S., & Koren, G. (1991). Assessing pain and analgesia with a lidocaine-prilocaine emulsion in infants and toddlers during venipuncture. *Journal of Pediatrics*, *118*, 971-973.

Rodriguez, C.M., & Boggs, S.R. (1998). Assessment of behavioral distress and depression in a pediatric population. *Children's Health Care*, *27*, 157-170.

Rose, M.H. (1984). The concepts of coping and vulnerability as applied to children with chronic conditions. *Issues in Comprehensive Pediatric Nursing*, *7*, 177-186.

Rosenthal, R., & Jacobson, L. (1966). Teacher expectancies: Determinates of pupil IQ gains. *Psychological Reports*, *19*, 115-118.

Ross, D. M., & Ross, S. A. (1984). Childhood pain: The school-aged child's viewpoint. *Pain*, *20*, 179-191.

Rowlison, R.T., & Felner, R.D. (1988). Major life events, hassles, and adaptation in adolescence: Confounding in the conceptualization and measurement of life stress and adjustment revisited. *Journal of Personality and Social Psychology*, *55*, 432-444.

Rudolph, K.D., Dennig, M.D., & Weisz, J.R. (1995). Determinants and consequences of children's coping in the medical setting: Conceptualisation, review, and critique. *Psychological Bulletin*, *118*, 328-357.

Rutter, M. (1983). Stress, coping, and development: Some issues and some questions. In N. Garmezy & M. Rutter (Eds.), *Stress, coping, and development in children*. New York: McGraw-Hill.

Ryan, N.M. (1988). The stress-coping process in school-age children: Gaps in the knowledge needed for health promotion. *Advances in Nursing Science, 11*, 1-12.

Ryan-Wenger, N.M. (1994). Coping behavior in children: Methods of measurement for research and clinical practice. *Journal of Pediatric Nursing*, *9*, 183-194.

Ryan-Wenger, N.M. (1996). Children, coping, and the stress of illness: A synthesis of the research. *Journal of the Society of Pediatric Nurses*, *1*, 126-138.

Sackett, G.P. (1979). The lag sequential analysis of contingency and cyclicity in behavioral action research. In J.D. Osofsky (Ed.), *Handbook of infant development* (pp. 623-649). New York: Wiley.

Savedra, M., & Tesler, M. (1981). Coping strategies of hospitalized school-age children. *Western Journal of Nursing Research, 3*, 371-384.

Savedra, M., Tesler, M., Ward, J., Wegner, C., & Gibbons, P. (1981). Description of the pain experience: A study of school-age children. *Issues in Comprehensive Pediatric Nursing, 5*, 373-380.

Schechter, N.L., Bernstein, B.A., Beck, A., Hart, L., & Scherzer, L. (1991). Individual differences in children's response to pain: Role of temperament and parental characteristics. *Pediatrics, 87*, 171-177.

Seligman, M.E.P. (1968). Chronic fear produced by unpredictable electric shock. *Journal of Comparative and Physiological Psychology, 66*, 402-411.

Selye, H. (1956). *The stress of life.* New York: McGraw-Hill.

Shacham, S. & Daut, R. (1981). Anxiety or pain: What does the scale measure? *Journal of Consulting and Clinical Psychology, 49*, 468-469.

Sharrer, V.W., & Ryan-Wenger, N.M. (1995). A longitudinal study of age and gender differences of stressors and coping strategies in school-aged children. *Journal of Pediatric Health Care, 9*, 123-130.

Shaw, D.S., & Emery, R.E. (1987). Parental conflict and other correlates of the adjustment of school-age children whose parents have separated. *Journal of Abnormal Child Psychology, 15*, 269-281.

Shaw, E.G., & Routh, D.K. (1982). Effects of mothers' presence on children's reaction to aversive procedures. *Journal of Pediatric Psychology, 7,* 33-42.

Siegel, S. (1956). *Nonparametric statistics for the behavioral sciences.* New York: McGraw-Hill.

Siegler, R.S. (1986). *Children's thinking.* Englewood Cliffs, NJ: Prentice-Hall.

Skinner, E.A. (1995). *Perceived control, motivation, and coping.* Thousand Oaks, CA: Sage.

Smith, K.E., Ackerson, J.D., & Blotcky, A.D. (1989). Reducing distress during invasive medical procedures: Relating behavioral interventions to preferred coping style in pediatric cancer patients. *Journal of Pediatric Psychology, 14*, 405-419.

Smith, J.T., Barabasz, A., & Barabasz, M. (1996). Comparison of hypnosis and distraction in severely ill children undergoing painful medical procedures. *Journal of Counseling Psychology, 43*, 187-195.

Smith, R.E., Smoll, F.L., & Ptacek, J.T. (1990). Conjunctive moderator variables in vulnerability and resiliency research: Life stress, social support and coping skills, and adolescent sport injuries. *Journal of Personality and Social Psychology, 58*, 360-370.

Spielberger, C.D. (1983). *State-Trait Anxiety Inventory (Form Y).* Palo Alto, CA: Mind Garden.

Spielberger, C.D, Gorsuch, R.L., & Lushene, R. (1970). *Manual for the State-Trait Anxiety Inventory.* Palo Alto, CA: Consulting Psychologists Press.

SPSS Inc. (1997). *SPSS Base 7.5 for windows: User's guide.* Chicago, IL: SPSS Inc.

Spirito, A., Stark, L.J., & Williams, C. (1988). Development of a brief coping checklist for use with pediatric populations. *Journal of Pediatric Psychology, 13*, 555-574.

Spirito, A., Stark, L.J., Gil, K.M., & Tyc, V.L. (1995). Coping with everyday and disease-related stressors by chronically ill children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 34*, 283-290.

Spitzer, A. (1992). Illness and treatment appraisal processes of healthy and hemophilic boys. *Research in Nursing and Health, 15*, 3-9.

Stevens, M. (1989). Coping strategies of hospitalized adolescents. *Children's Health Care, 18*, 163-169.

Steward, D.J. (1993). Eutectic mixture of local anaesthetics (EMLA): What is it? What does it do? *Journal of Pediatrics, 122*, S1-S3.

Suls, J., & Fletcher, B. (1985). The relative efficacy of avoidant and non-avoidant coping strategies: A meta-analysis. *Health Psychology, 4*, 249-288.

Sykes, J.B. (Ed.). (1976). *Concise Oxford dictionary* (6th ed.). Oxford, UK; Clarendon Press.

Thomas, A., & Chess, S. (1977). *Temperament and development.* New York: Brunner/ Mazel.

Thompson, M.L. (1994). Information-seeking coping and anxiety in school-age children anticipating surgery. *Childrens Health Care, 23*, 87-97.

Thompson, P. (1998). Adolescents from families of divorce: Vulnerability to physiological and psychological disturbances. *Journal of Psychosocial Nursing: Mental Health Service, 36*, 34-39.

Tudge, J., & Rogoff, B. (1989). Peer influences on cognitive development: Piagetian and Vygotskian perspectives. In M.H. Bornstein & J.S. Bruner (Eds.), *Interaction in human development.* Hillsdale, NJ: Erlbaum.

Ulbrich, P.M., Warheit, G.J., & Zimmerman, R.S. (1989). Race, socioeconomic status, and psychological distress: An examination of differential vulnerability. *Journal of Health and Social Behavior, 30*, 131-146.

Vaillant, G.E. (1977). *Adaptation to life.* Boston, MA: Little, Brown and Co.

Vernon, D.T.A., Foley, J.M., & Shilman, J.L. (1967). Effect of mother-child separation and birth order on young children's responses to two potentially stressful experiences. *Journal of Personality and Social Psychology, 5*, 162-174.

Vessey, J.A., Carlson, K.L., & McGill, J. (1994). Use of distraction with children during an acute pain experience. *Nursing Research, 43*, 369-372.

Vygotsky, L.S. (1978). *Mind in Society: The development of higher psychological processes. (*M. Cole, J. Steiner, S.Scribner, & E. Souberman, Eds.). Cambridge, MA: Harvard University Press. (Original work published 1896-1934).

Walden, T.D., & Field, T.M. (1982). Discrimination of facial expressions by pre-school children. *Child Development, 53*, 1312-1319.

Walker, C.L. (1988). Stress and coping in siblings of childhood cancer patients. *Nursing Research, 37*, 208-212.

Weekes, D.P., Kagan, S.H., James, K., & Seboni, N. (1993). The phenomenon of hand holding as a coping strategy in adolescents experiencing treatment-related pain. *Journal of Pediatric Oncology Nursing, 10*, 19-25.

Weisenberg, M., Schwarzwald, J., Waysman, M., Solomon, Z., & Klingman, A. (1993). Coping of school-age children in the sealed room during Scud missile bombardment and postwar stress reactions. *Journal of Consulting and Clinical Psychology, 61*, 462-467.

Weisz, J.R., McCabe, M., & Dennig, M.D. (1994). Primary and secondary control among children undergoing medical procedures: Adjustment as a function of coping style. *Journal of Consulting and Clinical Psychology, 62*, 324-332.

Whaley, D., & Wong, D.L. (1987). *Nursing care of infants and children* (3rd ed.) (pp. 1068-1070). St Louis, MO: Mosby.

White, R.W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, 66, 297-333.

White, R.W. (1974). Strategies of adaptation: An attempt at a systematic description. In G.V. Coelho, D.A. Hamburg, & J.E. Adams. (Eds.), *Coping and adaptation* (pp. 47-68). New York: Basic Books.

Witkin, H., Goodenough, D., & Oltman, P. (1977). Psychological differentiation: Current status. *Journal of Personality and Social Psychology, 37*, 1127-1145.

Witt, S.D. (1997). Parental influence on children's socialization to gender roles. *Adolescence, 32*, 253-259.

Wong, D.L., & Baker, C.M. (1988). Pain in children: Comparison of assessment scales. *Pediatric Nursing, 14*, 9-17.

Worchel, F.F., Copeland, D.R., & Barker, D.G. (1987). Control-related coping strategies in pediatric oncology patients. *Journal of Pediatric Psychology, 12*, 25-38.

Wyman, P.A., Cowen, E.L., Work, W.C., Raoof, A., Gribble, P.A., Parker, G.R., & Wannon, M. (1992). Interviews with children who experienced major life stress: Family and child attributes that predict resilient outcomes. *Journal of the American Academy of Child and Adolescent Psychiatry, 31*, 904-910.

Yoder, P.J., & Davies, B. (1990). Do parental questions and topic continuations elicit replies from developmentally delayed children? A sequential analysis. *Journal of Speech and Hearing Research, 33*, 563-573.

Young, M.R., & Fu, V.R. (1988). Influence of play and temperament on the young child's response to pain. *Children's Health Care, 16*, 209-215.

APPENDIX A: CHILD COPING QUESTIONNAIRE

Office Use Only	
Date:	/ /
Time:	: :
ID:	- -

CHILD COPING QUESTIONNAIRE

This questionnaire forms part of a study into parents' influence on children's coping. Each question will provide important facts needed for the study.

The questionnaire has three parts, Part A, Part B, and Part C. Part A asks questions about yourself. Part B asks questions about your child. Part C asks questions relating to your partner (if applicable). Please complete Parts A, B, and C (if applicable).

Names or addresses are not required on this questionnaire. Please DO NOT write your name on the questionnaire. Your responses to the questionnaire will therefore remain anonymous.

Thankyou for your help in this study.

Christine Taylor
Investigator

PART A

ABOUT YOURSELF

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

At this moment-

		NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1.	I feel calm	1	2	3	4
2.	I feel secure	1	2	3	4
3.	I am tense	1	2	3	4
4.	I feel strained	1	2	3	4
5.	I feel at ease	1	2	3	4
6.	I feel upset	1	2	3	4
7.	I am presently worrying over possible misfortunes	1	2	3	4
8.	I feel satisfied	1	2	3	4
9.	I feel frightened	1	2	3	4
10.	I feel comfortable	1	2	3	4
11.	I feel self-confident	1	2	3	4
12.	I feel nervous	1	2	3	4
13.	I am jittery	1	2	3	4
14.	I feel indecisive	1	2	3	4
15.	I am relaxed	1	2	3	4
16.	I feel content	1	2	3	4
17.	I am worried	1	2	3	4
18.	I feel confused	1	2	3	4

19.	I feel steady	1	2	3	4	
20.	I feel pleasant	1	2	3	4	( )

A number of statements which people have used to describe themselves are given below. Read each statement and then place a CIRCLE around the appropriate number to the right of each statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

Generally-

		ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
21.	I feel pleasant	1	2	3	4
22.	I feel nervous and restless	1	2	3	4
23.	I feel satisfied with myself	1	2	3	4
24.	I wish I could be as happy as others seem to be	1	2	3	4
25.	I feel like a failure	1	2	3	4
26.	I feel rested	1	2	3	4
27.	I am "calm, cool and collected"	1	2	3	4
28.	I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
29.	I worry too much over something that doesn't really matter	1	2	3	4
30.	I am happy	1	2	3	4
31.	I have disturbing thoughts	1	2	3	4
32.	I lack self-confidence	1	2	3	4
33.	I feel secure	1	2	3	4
34.	I make decisions easily	1	2	3	4
35.	I feel inadequate	1	2	3	4

36.	I am content	1	2	3	4	
37.	Some unimportant thought runs through my mind and bothers me	1	2	3	4	
38.	I take disappointments so keenly I can't put them out of my mind	1	2	3	4	
39.	I am a steady person	1	2	3	4	
40.	I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4	( )

41. What is your relationship to the child?

a. mother [ ]

b. father [ ]

c. guardian (male) [ ]

d. guardian (female) [ ] ( )

42. How old are you? [ ] years ( )

43. What is your current occupation?

not applicable [ ]

_____ ( )

44. What is the main language spoken in your home?

a. English [ ]

b. other (please specify)

_____ ( )

45. What is your highest level of education?
(Tick one box only)

a. Primary school
(years 1 - 6) [ ]

b. 3 years or less of High school
(years 6 - 9) [ ]

c. School Certificate
(year 10) [ ]

d. Higher School Certificate
(year 12) [ ]

e. TAFE [ ]

f. CAE/University [ ]

g. Other (please specify)

_____ [ ] ( )

46. In what range was your family's gross annual income last year?

Under $10,000 [ ]

$10,000 -$19,999 [ ]

$20,000 - $29,999 [ ]

$30,000 - $44,999 [ ]

$45,000 - $59,999 [ ]

$60,000 - $74,999 [ ]

$75,000 or above [ ] ( )

47. How do you expect your child to react to the medical treatment he/she is about to receive?

a. Cooperates completely [ ]

b. Unwilling, complains, but will not
fight, kick or resist treatment [ ]

c. Uncooperative, fights, kicks,
and/or resists treatment [ ] ( )

PART B

ABOUT YOUR CHILD UNDERGOING MEDICAL TREATMENT

PLEASE TICK THE APPROPRIATE BOX OR COMPLETE THE RESPONSE IN THE SPACE PROVIDED.

48. How old is your child?

_____ yrs _____ months ( )

49. What sex is your child?

male [ ]

female [ ] ( )

50. Does your child regularly attend pre-school?

yes [ ]

no [ ] ( )

If you answered yes, how many days per week does your child attend pre-school?

_____ days ( )

51. Does your child regularly attend child care other than pre-school?

yes [ ]

no [ ] ( )

If you answered yes, how many days per week does your child attend child care?

_____ days ( )

52. Does your child usually attend school? (this includes Kindergarten)

yes [ ]

no [ ] ( )

53. Has your child ever been treated in a Casualty (Accident and Emergency) Department before?

yes [ ]

no [ ]

If you answered yes, how many times? _____ ( )

54. Has your child ever been treated in a hospital ward before?

yes [ ]

no [ ]

If you answered yes, how many times? _____ ( )

55. Has your child ever had an "operation" under general anaesthetic?

yes [ ]

no [ ]

If you answered yes, how many times? _____ ( )

56. Has your child had any other painful medical treatments or procedures during the past 3 years?
You may tick more than one box.

a. blood test [ ] ( )

b. intravenous "drip" [ ] ( )

c. "needle" (other than immunisation) [ ] ( )

d. stitches [ ] ( )

e. other (please specify) [ ] ( )

_____

57. Does your child suffer from any of the following long-term illnesses?
You may tick more than one box.

a.	asthma	[ ]	( )
b.	cancer	[ ]	( )
c.	diabetes	[ ]	( )
d.	epilepsy	[ ]	( )
e.	other/s (please specify)	[ ]	( )

_____

_____

PART C

ABOUT YOUR PARTNER

If you do not have a partner please do not answer the following questions. ( )

58. What is your partner's current occupation?

not applicable [ ]

_____ ( )

59. What is your partner's highest level of education?
Tick one box only.

a.	Not applicable	[ ]
b.	Primary school (years 1 - 6)	[ ]
c.	3 years or less of High school (years 6-9)	[ ]
d.	School Certificate (year 10)	[ ]
e.	Higher School Certificate (year 12)	[ ]
f.	TAFE	[ ]
g.	CAE/University	[ ]
h.	Other (please specify)	
	_____	[ ] ( )

END OF QUESTIONNAIRE

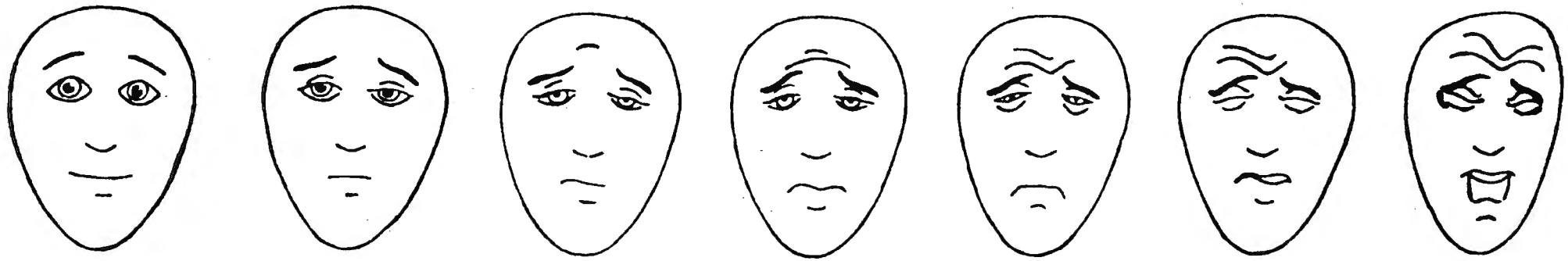
THANK YOU VERY MUCH FOR COMPLETING THE QUESTIONNAIRE.

PLEASE GIVE THE QUESTIONNAIRE TO THE RESEARCHER AS SOON AS YOU CAN.

60.

THE FACES PAIN SCALE[1]

THIS SECTION IS TO BE COMPLETED BY THE CHILD AFTER THE PROCEDURE.



0 1 2 3 4 5 6

( )

[1] Bieri, D., Reeve, R.A., Champion, G.D., Addicoat, L., and Ziegler, J.B. (1990). The Faces Pain Scale for the self-assessment of the severity of pain experienced by children: development, initial validation, and preliminary investigation for ratio scale properties. Pain, 41, 139-150.

OFFICE USE ONLY

61. Was EMLA cream used for the procedure?

yes [ ]

If yes, what time was it applied? ___:___

No [ ] ( )

APPENDIX B: ORIGINAL CAMPIS CODES

ADULT TO ADULT

1.	HMA	Humour directed to adults
2.	NPTA	Nonprocedure-related talk to adults
3.	PTA	Procedure-related talk to adults
4.	SMC	Commands for managing child's behaviour

ADULT TO CHILD

5.	HMC	Humour directed to child
6.	NPTC	Nonprocedure-related talk to child
7.	CCS	Command to use coping strategy
8.	CPA	Command to engage in procedural activity
9.	PRAS	Praise
10.	CRIT	Criticism
11.	NPC	Notice of procedure to come
12.	REASU	Reassuring comment
13.	GCC	Giving control to the child
14.	APOL	Apology
15.	BCC	Behavioural commands to the child
16.	CST	Checking child's status
17.	EMP	Empathy

ADULT TO EITHER ADULT OR CHILD

18.	CGCT	Child's general condition related talk
19.	CGST	Child's general status comments

CHILD

20.	CRY	Crying
21.	SCRM	Screaming
22.	VRES	Verbal resistance
23.	EMSUP	Emotional support
24.	VFEAR	Verbal fear
25	VPAIN	Verbal pain
26.	VEMOT	Verbal emotion
27	INSEK	Information seeking
28.	CIA	Child informs about status
29.	RRD	Request relief from nonprocedural discomfort
30.	MCOP	Making coping statement
31.	NPTC	Nonprocedural-related talk by the child
32.	APV	Assertive procedural verbalisations
33.	CGCT	Child's general condition related talk
34.	BRTH	Audible deep breathing
35.	HUM	Humour by the child

APPENDIX C: CAMPIS-CT CODES

ADULT TO ADULT

1.	HMA	Humour to adult
2.	NPTA	Non-procedural talk to adult
3.	PTA	Procedural talk to adult
4.	CGCTA	Child's general condition-related talk by adult

ADULT TO CHILD

5.	HMC	Humour to child
6.	NPTC	Non-procedural talk to child
7.	CCS	Command to use coping strategy
8.	CPA	Command to engage in procedural activity
9.	PRAS	Praise
10.	CRIT	Criticism
11.	NPC	Notice of procedure to come
12.	REASU	Reassurance
13.	GCC	Giving control to child
14.	APOL	Apology
15.	BCC	Behavioural command to child
16.	CST	Checking child's status
17.	EMP	Empathy
34	BPROC	Non-painful procedural behaviour
35	BPAPR	Painful procedural behaviour
36	BIGNA	Behaviour ignoring child
37	PTAC	Procedural talk by adult to child

(continued overleaf)

CHILD

18.	CRY	Cry
19.	SCRM	Scream
20.	RES	Resistance -verbal and behavioural
21.	EMSUP	Requests emotional support
22.	FEAR	Fear -verbal and behavioural
23	PAIN	Pain -verbal and behavioural
24.	EMOT	Emotion.-verbal and behavioural
25	INSEK	Information seeking
26.	CIA	Child informs about status
27.	RRD	Requests relief from non-procedural discomfort
28.	MCOP	Makes coping statement
29.	NPTC2	Non-procedural talk by child
30.	APV	Assertive procedural verbalisation
31.	BRTH	Deep breath
32.	HUM	Humour by child
38	CGCTC	Child's general condition related talk by child
39	BIGNC	Behaviour ignoring adult
40	BCOOP	Behaviour cooperation
41	BINT	Behavioural interest
42	BREL	Behaviour relaxed
43	PTC	Procedural talk by child to adult

Note that another code (#33, OT-other) was used for all participants to indicate verbal utterings that were unable to be identified as belonging to any other code.

APPENDIX D: FIELD NOTES PROFORMA

RECORDING SHEET

DATE_____ TIME_____ ID NUMBER [ ] page__of__

CHILD M/F PARENT M/F DOCTOR M/F NURSE M/F

TIME	PHASE	PERS.	BEHAVIOUR	CODE

APPENDIX E: DESCRIPTORS FOR CAMPIS-CT CODES

When coding child and adult behaviours the context in which the behaviour occurs must be taken into account as well as the perceived intent of the adult or child and the tone of voice. For example, squirming can indicate pain or emotion depending upon the context, and sarcastic comments can be coded as humour or criticism depending on the tone of voice.

ADULT CODES

[1, 5] Humour by adult to adult (HMA) or to child (HMC)

Any statement that is clearly intended to be humorous and is primarily light-hearted in tone. Humour is often accompanied by laughter from the person making the statement and may evoke laughter in the patient or in other staff members. Sarcasm may be coded as humour if it is accompanied by laughter on the part of the speaker or on the part of the listener. Sarcasm is not coded as humour if it is accompanied by an angry or harsh tone of voice, eg. Statements that suggest purely facetious, outlandish, or outrageous ideas. Statements that emphasise the humorous aspects of a situation or problem. Statements which present light-hearted criticism of someone else in such a manner that would be lightly received,

eg. "Oh you silly goose!".
"Sure, working on Sunday is my top priority."
Laughter.

[2] Non-procedural talk by adult to adult (NPTA)

Talk that does not pertain to the treatment procedure or the child's illness, eg. Questions about a parent's other child, spouse, home, garden, the nurse on 3-south, etc.,

eg. "Did you drive in this morning?"
"How is the new baby doing?"

[3] Procedural talk by adult to adult (PTA)

Any talk that directly pertains to the current treatment procedures. Comments about past treatment procedures are included in this category only if they relate to what is going on now. Commands included in this category may relate to actual physical manipulation of the child (eg. "Help me wrap him up"), as this relates to the ongoing procedures and is not issued as a result of child distress behaviour. Included in this category are commands or suggestions related to managing the child's distress behaviours during the procedures ("Hold his legs"). The resulting holding of the child should be coded as Behaviour-non-painful procedure,

eg. "I can't find the vein."
"It's not dripping."
"Which colour tube do you want?"
"Roll him over."

[4] Child's general (physical) condition-related talk. (CGCT)

Questions or comments about the child's medical history, present medical status or future health care. These comments must relate to the child's illness or treatment,

eg. Questions about the child's history. "Boy is she out of it."
Parent's request for information,
"How long does it take to get results back?"
"Will she have to come back tomorrow?"
"Last time he didn't do too well during the procedure."

Child comments eg. "It took a long time" (referring to something about the procedure).
"The other doctor washed too hard last time."

[6] Non-procedural talk to child (NPTC)

Talk that does not pertain to the treatment procedure or about the child's illness, eg. Conversations about the child's pet, siblings, parents. school, motorcycles, toys, etc. Questions unrelated to the child's illness or treatment, about the child's plans, wants, desires, etc.

[7] Command to use coping strategy (CCS)

Any orders, suggestions or statements that direct the child to engage in a coping behaviour. These strategies are generally issued immediately prior to a painful event, and may suggest one (but not exclusively one) of the following: relaxation, distraction (other than NPTC), use of coping statements, or deep breathing. An example such as "Can you breath now?" is coded CCS in spite of it giving the impression of control to the child (GCC),

eg. "Would you like to count backwards from 10 very slowly?"
"Imagine you are Superman and this is a test of your strength."
"Squeeze your mother's hand when you feel the mozzie bite."
"Just relax."

[8] Command to engage in procedural activity (CPA)

Any orders, suggestions or statements that direct the child to engage in some procedure-related activity. Common commands might include asking a child to move a part of his/her body, or asking the child to tell staff when something hurts,

eg. "Could you move your thumb so that I can put on the tape."
"Squeeze your hand for me."
"Tell me when this hurts. OK?"

[9] Praise (PRAS)

Any statement referring to the child or the child's prior, ongoing or future behaviour that is positive in evaluation, shows approval or is rewarding. The positive behaviour is specified eg. "You kept nice and still for us." "You are so brave". The positive behaviour is not specified eg. "Great," "good boy" "well done!". Descriptions of child's behaviour

denoting better-than-average performance eg. "Tommy is doing so well!" or "You are really being braver than ever!"

[10] Criticism (CRIT)

Any verbalisation that finds fault or implies fault with the (a) activities, (b) products, or (c) attributes of the child. Criticisms include negatively evaluative adjectives or adverbs referring to the child, statements of disapproval, statements pointing out something wrong about the child or the child's behaviour, and statements pointing out that the child is not doing something positive. Also included as criticism are obvious sarcastic statements, if these are unaccompanied by laughter on the part of either the speaker or listeners. Usually criticism is accompanied by a harsh voice tone,

eg. "Do as you're told or you'll get a slap."

"Boy, you really controlled yourself that time." (after child lets out a big scream).

"You're being a pain."

Non-verbal behaviour includes showing disapproval of the child's behaviour or vocalisations, eg. facial grimace, scowling, tense lips, slapping.

[11] Notice of procedure to come (NPC)

Any statement denoting that a procedure is about to occur, including the swabbing, the "bee sting," wiping off the EMLA etc. If the same information is repeated by the parents or staff, either without the child's request for reassurance or emotional support, or with the child asking for mere repetition of the information code, the subsequent notification is NPC,

eg. "Okay, I'm just going to wash you hand."

"Now, it's gonna be just a little sting."

"This is going to feel cold."

[12] Reassurance (REASU)

Procedure-related comments that are directed toward the child with the intent of reassuring the child about his/her condition or the course of the procedure. These may be volunteered by staff and/or parents and may be in response to questions by the child or may reflect the child's comments. If procedure-related information is repeated in response to the child's request for reassurance or emotional support code these procedural notifications as REASU,

eg. "You're O.K."

"It's almost over."

"We're hurrying."

"Darling it's just soap, O.K."

"I'm not doing anything."

"Just touching honey."

With non-verbal behaviour the intent is to reassure the child, eg. hugs, kisses, stroking, cuddling, and touching in a comforting manner.

[13] Giving control to child (GCC)

Any statement to child denoting that child has control over some event to occur with relation to the procedure. Generally this includes staff suggestions where the child is given a choice about the procedure, eg. "Can you wriggle your toes now?" is coded CCS even though it has the impression of giving control to child,

eg. "Which hand would you like it in?"
"Do you want a pillow for your head?"
"Do you like it better when we tell you or don't tell you?"
"Are you ready?"

[14] Apology (APOL)

Any statement relating a sense of sorrow or a sense of responsibility for the pain or any aspect of the procedure the child is experiencing. These statements may occur prior to, during, or after a painful event, and may occur in conjunction with other verbal codes,

eg. "Timmy, we don't like doing this either."
"I'm sorry this is taking so long."
"I wish I didn't have to hurt you."

[15] Behavioural command to child (BCC)

Commands by adults toward the child that direct the child to change some aspect of his or her behaviour. This category is designed to include the limits that parents' typically set on their child's behaviour and behavioural request/commands of the child. This category is distinguished from CRIT in that the focus of BCC is toward managing the child's behaviour whereas the focus of CRIT is to find fault with the child and/or has an evaluative nature to the verbalisations. BCC is distinguished from CPA in that CPA is directed toward some specific procedural activities,

eg. "No, don't hurt your mum."
"Shhh..." (not comforting)
"Wipe the tears."
"Don't move, keep very still."
"Ralph, you have to behave"

[16] Checking child's status (CST)

Any question directed towards child that asks for his or her opinion about his or her status. Enquiries may refer to how the child is feeling, whether the child is afraid, whether the pain is too bad, etc, also included are reflections of the child's answers to adults' questions regarding his or her status. Examples such as "Can you breath now?" are coded as CCS because the intent is to suggest using a coping strategy and not checking status,

eg. "Did you feel that?"
"Are you comfortable?"
"That didn't hurt, did it?" (not reassuring)
"Are you all right?"

[17] Empathy (EMP)

Statements which show an appreciation for the frame of reference of the person being spoken to,

eg. "I know this is hard."
"I know it hurts."
"You must be getting tired."
"You must be getting sick of this."

[34] Non-painful procedural behaviour (BPROC)

This is where the adult engages in behaviour related directly to the procedure that is not usually associated with eliciting pain in the child, eg. swabbing, drawing-up solutions in a syringe, arranging a dressing pack or towel, tapping the child's hand, applying a tourniquet.

[35] Painful procedural behaviour (BPAPR)

Similar to BPROC except behaviour is usually associated with eliciting pain, eg. touching an already painful area and needle insertion.

[36] Behaviour ignoring child by adult (BIGNA)

The intent is for the adult to ignore the child's behaviour or vocalisations, eg. looks away, refuses to answer, changes subject abruptly.

CHILD CODES

[18] Cry (CRY)

Crying sounds, usually unintelligible but can be double-coded with verbal categories, eg. sobbing, "Booohooohooo", and other crying sounds.

[19] Scream (SCRM)

Vocal expression of pain at high pitch/intensity, usually non-intelligible but can be coded with other verbal categories. Not included in this category is loud yelling at a low pitch (denoting anger). Screaming behaviours include sharp, shrill, harsh high tones and shrieks.

[20] Resistance (RES)

Non-verbal resistance is coded when the child resists any adult vocal or behavioural communication related to the procedure, eg. pushing others away, folding arms. Verbal resistance: any expression of delay, termination, or resistance. It must be intelligible.

eg. "Stop"
"No more"
"Don't"
"Let me rest"
"Take the needle out"
"Take me home"

[21] Requests emotional support (EMSUP)

Verbal solicitation of hugs, hand holding, physical or verbal comfort by the child. Do not code EMSUP for "Mummy" if part of statement requires another code, eg. "Mummy, get me out of here" is coded as Resistance,

eg. "Hold me"
"Daddy"
"Mummy please"
"Help me"
"I want my bottle"

Non-verbal behaviours are where the child seeks emotional support or reassurance from the adult by behaviours such as clinging, trying or succeeding in engaging eye contact, holding out arms for a hug.

[22] Fear (FEAR)

Statement of being apprehensive or in fear. The verbal statement must be intelligible,

eg. "I'm afraid"
"I'm scared"

Non-verbal indicators include behaviours indicating fear, dread, or apprehension, eg. body tenseness, eyes tightly closed, body shaking.

[23] Pain (PAIN)

Statement of pain, damage or being hurt. It may be in any tense and can be anticipatory as well as actual. It has to be a statement not a question,

eg. "That hurts"
"It stings"
"Owwwch"
"You're killing me"

Non-verbal behaviours indicating pain or discomfort include flinching, facial grimaces, squirming.

[24] Emotion (EMOT)

Statements other than FEAR or RES that express the child's emotional state. Anger, self-pity, or resentment would be emotions conveyed here. This category is reserved for negative emotions only,

eg. "Why does this have to happen to me."
"I hate you."

Non-verbal behaviours indicating negative emotions (excluding pain or fear) such as anger, frustration, tiredness. Behaviours indicative of such emotions includes kicking, lifting one or both legs, frequent head turns, hitting, squirming (not resistance or pain).

[25] Information-seeking (INSEK)

The child asks questions about the medical procedures,
eg. "When will you give me the needle?"
"When will you be finished?"
"Will you tell me when you are going to do something?"
"Is the needle in?"

[26] Child informs about status (CIA).

The child either volunteers or answers questions about his or her current status, or is related to the procedure,
eg. "My hand hurts." (not a pain response)
"I'm sleepy." or "Yes, a little," in response to the question "Are you sleepy?"
"Yes," or "No," to the question "can you feel it?"

[27] Request relief from non-procedural discomfort (RRD).

The child request relief from something that is clearly not procedural-related,
eg. "My tummy hurts."
"The light's too bright."
"You're squeezing my hand too hard."
"I can't move my foot."

[28] Makes a coping statement (MCOP).

The child makes some statement that indicates courage or attempts to soothe himself or herself verbally,
eg. "I'll be O.K."
"I'm Superman/woman."
"I can take it."
"It won't last long."
"Superman would not cry."
"I did good."
This code also includes non-verbal behaviours indicating that the child is trying to engage in coping behaviours to minimise the distress/discomfort/emotion associated with the procedure, eg. rubbing painful area, thumb sucking (not EMSUP as it is directed at self not parent), distraction through play, counting to self, hand tapping etc.

[29] Non-procedural talk by child (NPTC2).

The child engages in talk that is in no way related to his or her current physical condition or the procedure,
eg. "That cat was a girl."
"I was watching Ninja Turtles the other day."
"School is going OK."

[30] Assertive procedural verbalisation (APV).

Commands, statements, or requests by the child which seek to direct the course of the procedure, or some aspect of the adult's behaviour as it relates to the procedure, without attempting to terminate the procedure or some aspect of the procedure. The essence of what is being targeted here is the child exercising some aspect of control over the course of the procedure without trying to terminate the procedure,

eg. "Count to three, then put it in, okay?"
"Push it in fast."
"Please tell me when you are ready."
"Go slow."

[31] Deep breath (BRTH).

Deep breathing or taking a deep breath, used to cope with the procedures. Breathing that is part of the child's distress does not count as BRTH.

[32] Humour by child (HUM).

This is the same type of category as in the Codes for Staff/Parent behaviours [1,5] but with the child doing the talking.

[38] Child's general condition-related talk (CGCTC).

This is the same type of category as in the CGCTA code for Staff/Parent behaviours [4] but with the child doing the talking.

[39] Behaviour ignoring adult by child (BIGNC).

Same as for [36] except that it is child who is ignoring adult.

[40] Behaviour cooperation (BCOOP).

This is where the child cooperates with the procedure, eg. doing as asked, such as lifting hand up to apply strapping, following behavioural commands.

[41] Behavioural interest (BINT).

This is where the child exhibits behaviours indicting an interest in the procedure or adult, eg. looking or trying to look at the procedure, looking at the person speaking.

[42] Behaviour relaxed (BREL).

This is where the child exhibits behaviours indicating that the child is relaxed, eg. lying still with relaxed muscles, i.e. not tense, smiling.

SHARED CODE

[33] Other (OT).

Code *other* whenever verbal behaviour does not fit any other categories. This includes verbalisations that are not clear enough for accurate recording such as mumbling, or sounds where the meaning cannot be ascertained such as "umph". Use this as a last result when audible complete sentences are issued. Excluded from this category are "Yes", "No", "Huh". "What", etc. These should be coded according to the context of the conversation if possible.

Adapted from Blount, R.L., Corbin, S.M., Sturges, J.W., Wolfe, V.V., Prater, J.M., & James, L.D. (1989). The relationship between adult's behaviour and child coping and distress during BMA/LP procedures: a sequential analysis. *Behavior Therapy*, *20*, 585-601.

APPENDIX F: INFORMATION SHEET FOR PARENTS AND CHILD

PROJECT: Child coping behaviours

CONTACT PERSON: Christine Taylor, 685 9519 or 685 9020

Please feel free to contact the research team if you have any questions.

PURPOSE OF THE STUDY:

The purpose of the study is to look at ways children react to medical treatments, such as having a "drip" put in, or having blood taken, and how the child responds to parent support. The researchers hope to find new ways to help children and parents deal with these procedures.

PROCEDURES:

If you agree to help us in this study you will be asked to do the following:

1. Fill out a brief questionnaire (a form) which should take you about 15 minutes to finish. Questions asked will include things like: the age of your child, your occupation and previous education, and your child's experience with hospitals.

2. After finishing the questionnaire you will then be asked to go to the treatment room with your child. It is in this room that your child's procedure will take place. This treatment or test has been ordered by the doctor to help your child and not as a part of the research study.

3. During the treatment or test in the procedure room, both you and your child will be audiotaped (the sound recorded). The audiotape will help us look at the procedure in more detail. The recorder will be held by the researcher.

4. 5 minutes after the treatment has finished, your child will be asked how painful he or she thought the treatment was, and to indicate the level of pain on a chart provided.

(Please turn over the page)

RISKS AND DISCOMFORTS:

There are no risks to you or your child in helping with this research as we just want to ask you some questions and videotape you and your child. All researchers will be registered nurses (sisters), however, they will not be involved in the treatment of your child.

USE OF THE CONSENT FORM, QUESTIONNAIRE AND AUDIOTAPE:

The consent form is used to record your agreement to take part in the study. The consent form will be kept by the research team and a copy will be placed in your hospital medical records. The questionnaire and audiotape will be kept for five years, for reference, and then destroyed. The tape will be erased. The questionnaire and audiotape will be stored in a locked drawer and only the research team will look at them. Your name and address will not be linked with the questionnaire or audiotape at any stage.

APPENDIX G: INFORMATION SHEET FOR STAFF

PROJECT: Child coping behaviours

CONTACT PERSON: Christine Taylor, 685 9519 or 685 9020

Please feel free to contact the research team if you have any questions.

PURPOSE OF THE STUDY:

The purpose of the study is to examine children's coping during a painful medical procedure. The study's aim is to identify effective strategies health care workers can implement to help children and parents cope with these procedures.

PROCEDURES:

If you agree to help us in this study you will be asked to do the following:

1. Allow the researcher to audiotape and observe you, as well as the parent and child, during a child's painful medical procedure.

2. Your interaction will be coded and included in the study's analysis in identifying effective ways to assist a child's coping during a painful medicalprocedure.

Parents and children will be asked to do the following for the study:

1. Fill out a brief questionnaire (a form) which should take you about 15 minutes to finish. Questions asked will include things like: the age of your child, your occupation and previous education, and your child's experience with hospitals.

(Please turn over the page)

2. After finishing the questionnaire you will then be asked to go to the treatment room with your child. It is in this room that your child's procedure will take place. This treatment or test has been ordered by the doctor to help your child and not as a part of the research study.

3. During the treatment or test in the procedure room, both you and your child will be audiotaped (the sound recorded). The audiotape will help us look at the procedure in more detail. The recorder will be held by the researcher.

4. 5 minutes after the treatment has finished, your child will be asked how painful he or she thought the treatment was, and to indicate the level of pain on a chart provided.

RISKS AND DISCOMFORTS:

There are no risks to you or your child in helping with this research as we just want to ask you some questions and videotape you and your child. All researchers will be registered nurses (sisters), however, they will not be involved in the treatment of your child.

USE OF THE CONSENT FORM, QUESTIONNAIRE AND AUDIOTAPE:

The consent form is used to record your agreement to take part in the study. The consent form will be kept by the research team and a copy will be placed in your hospital medical records. The questionnaire and audiotape will be kept for five years, for reference, and then destroyed. The tape will be erased. The questionnaire and audiotape will be stored in a locked drawer and only the research team will look at them. Your name and address will not be linked with the questionnaire or audiotape at any stage.

APPENDIX H: CONSENT FORM

NAME OF STUDY.....

NAME OF INVESTIGATORS.....

I have read and understood the Parent Information Sheet, and give my consent for my child to participate in this research study, which has been explained to me by

.....

I understand that I am free to withdraw from the study at any time and this decision will not otherwise affect my child's treatment at the Hospital.

NAME OF CHILD.....(Please print)

NAME OF PARENT OR GUARDIAN.....(Please print)

SIGNATURE OF PARENT OR GUARDIAN.....(Please print)

NAME OF WITNESS.....(Please print)

SIGNATURE OF WITNESS.....(Please print)

NAME OF INTERPRETER .....(Please print)

SIGNATURE OF INTERPRETER .....(Please print)

APPENDIX I: NON-CAMPIS-CT CODES USED IN THE STUDY

SPEAKER (PERSON) CODES

1. Mother
2. Father
3. Girl
4. Boy
5. Doctor
6. Nurse
7. Other

ATTEMPT CODES

The first cannulation attempt was given the code 1, the second attempt code 2, and so forth.

APPENDIX J: EXAMPLE OF TRANSCRIPT

CASE 1

BOY, 17.15 HRS, 1.12.95

C lying flat on his back, no restraints, P is not near C

*1,2,2,1	P	HE THOUGHT HE WAS PRETTY TERRIFIC	NPTA
		(LAUGHING)	
5,2,2,1	D	IT WORKS. IT WORKS MORE EFFECTIVELY	NPTA
		(LOOKS AT P)	
1,1,2,1	P	(LAUGH) IT GETS MORE TOO. YOU LEAVE IT	HMA
		IN THE CUP AND AFTER IT STAYS IN THE	
		CUP	
5,7,1,2	D	[TO C] IF IT HURTS...YOU CAN...PUNCH	CCS
		ME IN THE GUTS TWICE	
4,23,4,2	C	[C RAISES ONE LEG AS]	PAIN -
5,35,1,2	D	[PULLS OFF PLASTER]	BPAPR
4,23,4,2	C	[FACIAL EXPRESSION OF PAIN]	PAIN
1,12,1,2	P	[TO C] HE'S JUST PULLING THE PLASTIC	REASU
		OFF, THATS ALL	
5,12,2,2	D	[TO C] THERE, THATS THE ONLY BIT THAT	REASU
		HURTS, SEE	
4,28,1,2	C	[SITS UP, LOOKS AT ARM, GIVES IT A	MCOP
		RUB WITH A SYRINGE (GIVEN AS A TOY),	
4,21,1,2		LOOKS AT P]	EMSUP
1,9,2,2	P	YOU'RE DOING WELL, DO YOU WANT ME TO	PRAS
1,13,1,2		STAND NEXT TO YOU?	GCC
4,21,1,2	C	[NODS HEAD]	EMSUP
1,12,1,2	P	[MOVES TO C AND PUTS HAND ON C HEAD]	REASU
1,35,1,2			BPAPR
4,19,4,2	C	[YELP OF PAIN]	SCRM
*1,14,2,2	P	OOH SORRY YOUR EAR, OH MY GOD *I TOUCHED	APOL
1,1,2,2		THE WRONG ONE, [TO ME] I HOPE YOU HAVE'NT	HMA
		GOT THAT ON TAPE (LAUGH).	
1,14,3,2		SORRY DARLIN [STROKES OTHER PART OF HEAD]	APOL
4,18,4,2	C	[STARTS SOBBING].....	CRY
1,12,1,2	P	ITS NOT REALLY A NEEDLE, ITS JUST A	REASU
		LITTLE TUBE	

APPENDIX K: EXAMPLE OF CONTINGENCY TABLE OF SELECTED CAMPIS-CT BEHAVIOURS (LAG0 x LAG1)

	HMA	NPTA	PTA	CGCTA	HMC	NPTC	CCS	CPA	PRAS	CRIT	NPC	REASU	GCC
HMA	60	20	15	5	9	17	3	2	5	1	12	15	7
NPTA	35	363	34	27	4	46	4	10	11	1	9	35	5
PTA	13	29	715	32	5	35	13	27	39	3	61	94	8
CGCTA	16	38	33	340	5	12		10	14		13	25	2
HMC	22	6	4	5	35	13	1	5	7		7	3	
NPTC	15	44	30	14	19	261	8	12	30		17	51	11
CCS		3	2		3	6	44	7	5		12	27	4
CPA	1	8	18	3	1	6	12	82	26	1	32	41	5
PRAS	9	15	36	18	4	40	27	34	113	1	39	99	8
CRIT		1	3			1	2		3	5	7	9	
NPC	3	10	36	5	8	19	14	28	21	2	63	127	15
REASU	13	39	135	38	14	87	49	83	124	6	151	462	31
GCC	2	2	4	4	2	8	1	5	1	1	7	13	8
APOL	2	4	4			2	1	3	4		7	13	
BCC	2	7	12	8	1	20	11	13	10	6	24	107	5
CST	4	3	12	7	3	14	1	5	9	2	16	35	8
EMP	5	3	13	3	5	10	3	4	6	1	12	56	5
CRY	1	31	162	43		103	43	40	78	12	87	433	16
SCRM	1	2	17		1	12	6	4	7	5	7	81	2
VRES	1	2	10	5	1	20	5	11	9	8	11	97	10
EMSUP		5	13	4		14	3	4	12	3	8	88	
FEAR			1	1		2	1		1	2		15	1
PAIN	1		19	2	2	9	6	3	6	2	5	63	
EMOT		1	13	5	1	9	5	10	4	8	6	58	3
INSEK	1	4	7	3		12	1	3	1	1	13	128	4
CIA	5	1	11	12	1	10	4	10	19	6	16	95	1
RRD	1	1			1	7		1	1			17	2
MCOP	2	5	15	8	1	16	13	10	26	3	11	56	9
NPTC2	5	9	9	8	13	257	3	3	12	2	9	33	4
APV	1		2	3	3	6		7	5	1	3	19	13
BRTH			2	2		2			1		1	1	1
HUM		1			7	6					1	2	
OT				4								7	
BPROC	2	5	21	6	1	15	5	5	9	2	18	41	4
BPAPR											1	2	
BIGNA	1	6	20	4		4	1	2	6		6	13	3
PTAC		1	1	1	2	1		2	2			4	
CGCTC			1	24	1	1					1	9	
BIGNC	4	24	55	31	5	60	14	22	16	1	30	50	8
BCOOP	4	25	61	22	6	52	23	36	128		57	124	4
BINT	2	22	58	28	3	62	15	30	41	1	57	83	10
BREL	7	4	17	16	9	17	1	5	7		13	21	2
PTC		1		1	1			1					
Total	241	745	1621	742	177	1294	343	539	819	87	850	2752	219
col%	1.2	3.8	8.2	3.8	0.9	6.6	1.7	2.7	4.2	0.4	4.3	14	1.1

APPENDIX L: TRANSITIONAL PROBABILITIES OF ALL CAMPIS-CT CODES FOR LAG0 x LAG1

Lag0 ↓	Lag1												
	HMA	NPTA	PTA	CGCTA	HMC	NPTC	CCS	CPA	PRAS	CRIT	NPC	REASU	GCC
HMA	.249	.083	.062	.021	.037	.071	.012	.008	.021	.004	.050	.062	.029
NPTA	.047	.487	.046	.036	.005	.062	.005	.013	.015	.001	.012	.047	.007
PTA	.008	.018	.441	.020	.003	.022	.008	.017	.024	.002	.038	.058	.005
CGCTA	.022	.051	.044	.458	.007	.016	.000	.013	.019	.000	.018	.034	.003
HMC	.124	.034	.023	.028	.198	.073	.006	.028	.040	.000	.040	.017	.000
NPTC	.012	.034	.023	.011	.015	.202	.006	.009	.023	.000	.013	.039	.009
CCS	.000	.009	.006	.000	.009	.017	.128	.020	.015	.000	.035	.079	.012
CPA	.002	.015	.033	.006	.002	.011	.022	.152	.048	.002	.059	.076	.009
PRAS	.011	.018	.044	.022	.005	.049	.033	.042	.138	.001	.048	.121	.010
CRIT	.000	.011	.034	.000	.000	.011	.023	.000	.034	.057	.080	.103	.000
NPC	.004	.012	.042	.006	.009	.022	.016	.033	.025	.002	.074	.149	.018
REASU	.005	.014	.049	.014	.005	.032	.018	.030	.045	.002	.055	.168	.011
GCC	.009	.009	.018	.018	.009	.037	.005	.023	.005	.005	.032	.059	.037
APOL	.025	.050	.050	.000	.000	.025	.013	.038	.050	.000	.088	.163	.000
BCC	.003	.011	.019	.013	.002	.031	.017	.020	.016	.009	.038	.167	.008
CST	.008	.006	.023	.013	.006	.026	.002	.009	.017	.004	.030	.066	.015
EMP	.020	.012	.052	.012	.020	.040	.012	.016	.024	.004	.048	.224	.020
CRY	.001	.018	.092	.024	.000	.058	.024	.023	.044	.007	.049	.246	.009
SCRM	.003	.006	.047	.000	.003	.033	.017	.011	.019	.014	.019	.224	.006
RES	.002	.005	.024	.012	.002	.047	.012	.026	.021	.019	.026	.229	.024
EMSUP	.000	.018	.046	.014	.000	.050	.011	.014	.043	.011	.028	.312	.000
FEAR	.000	.000	.029	.029	.000	.057	.029	.000	.029	.057	.000	.429	.029
PAIN	.004	.000	.067	.007	.007	.032	.021	.011	.021	.007	.018	.222	.000
EMOT	.000	.004	.056	.021	.004	.038	.021	.043	.017	.034	.026	.248	.013
INSEK	.004	.018	.031	.013	.000	.053	.004	.013	.004	.004	.057	.561	.018
CIA	.014	.003	.030	.033	.003	.027	.011	.027	.052	.016	.043	.258	.003
RRD	.019	.019	.000	.000	.019	.135	.000	.019	.019	.000	.000	.327	.038
MCOP	.008	.019	.057	.030	.004	.061	.049	.038	.099	.011	.042	.213	.034
NPTC2	.012	.021	.021	.019	.030	.599	.007	.007	.028	.005	.021	.077	.009
APV	.011	.000	.022	.034	.034	.067	.000	.079	.056	.011	.034	.213	.146
BRTH	.000	.000	.095	.095	.000	.095	.000	.000	.048	.000	.048	.048	.048
HUM	.000	.038	.000	.000	.269	.231	.000	.000	.000	.000	.038	.077	.000
OT	.000	.000	.000	.154	.000	.000	.000	.000	.000	.000	.000	.269	.000
BPROC	.005	.012	.052	.015	.002	.037	.012	.012	.022	.005	.044	.101	.010
BPAPR	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.011	.022	.000
BIGNA	.008	.047	.156	.031	.000	.031	.008	.016	.047	.000	.047	.102	.023
PTAC	.000	.024	.024	.024	.048	.024	.000	.048	.048	.000	.000	.095	.000
CGCTC	.000	.000	.020	.471	.020	.020	.000	.000	.000	.000	.020	.176	.000
BIGNC	.007	.044	.101	.057	.009	.110	.026	.040	.029	.002	.055	.092	.015
BCOOP	.005	.031	.076	.027	.007	.065	.029	.045	.160	.000	.071	.155	.005
BINT	.003	.035	.092	.044	.005	.098	.024	.048	.065	.002	.090	.132	.016
BREL	.036	.021	.088	.083	.047	.088	.005	.026	.036	.000	.067	.109	.010
PTC	.000	.111	.000	.111	.111	.000	.000	.111	.000	.000	.000	.000	.000

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Lag0 ↓	**Lag1**											
	APOL	BCC	CST	EMP	CRY	SCRM	RES	EMSUP	FEAR	PAIN	EMOT	INSEK
HMA	.004	.008	0.041	.004	.021	.004	.000	.000	.000	.000	.000	.008
NPTA	.000	.008	0.009	.005	.054	.001	.005	.003	.000	.001	.001	.008
PTA	.003	.006	0.015	.005	.107	.014	.010	.009	.001	.015	.001	.010
CGCTA	.003	.008	0.011	.009	.065	.000	.001	.005	.000	.007	.003	.011
HMC	.000	.017	0.017	.000	.017	.000	.006	.000	.000	.006	.006	.006
NPTC	.002	.014	0.009	.004	.094	.009	.009	.009	.002	.010	.002	.009
CCS	.000	.006	0.006	.000	.102	.017	.020	.012	.000	.009	.000	.006
CPA	.002	.017	0.013	.004	.093	.009	.037	.011	.000	.006	.004	.013
PRAS	.004	.031	0.028	.005	.125	.011	.009	.006	.006	.017	.002	.010
CRIT	.000	.046	0.011	.000	.207	.115	.069	.023	.000	.000	.023	.057
NPC	.004	.021	0.046	.005	.109	.008	.020	.008	.005	.013	.000	.026
REASU	.003	.048	0.026	.009	.167	.029	.026	.019	.004	.015	.007	.017
GCC	.000	.032	0.005	.005	.114	.005	.100	.014	.000	.005	.000	.023
APOL	.038	.038	0.038	.025	.150	.000	.013	.000	.000	.038	.000	.025
BCC	.002	.086	0.014	.005	.155	.059	.056	.023	.002	.009	.006	.008
CST	.002	.015	0.066	.015	.121	.004	.017	.019	.000	.009	.006	.019
EMP	.016	.032	0.008	.060	.108	.008	.024	.016	.008	.004	.004	.008
CRY	.004	.054	0.035	.011	.010	.023	.049	.045	.001	.022	.027	.008
SCRM	.006	.102	0.006	.000	.072	.019	.133	.033	.000	.028	.136	.000
RES	.002	.087	0.012	.028	.134	.090	.005	.021	.005	.007	.099	.000
EMSUP	.000	.067	0.028	.032	.096	.046	.018	.004	.007	.011	.053	.007
FEAR	.000	.000	0.086	.000	.029	.000	.000	.000	.000	.000	.000	.029
PAIN	.042	.032	0.025	.014	.130	.032	.021	.025	.000	.021	.053	.007
EMOT	.000	.107	0.017	.013	.060	.073	.081	.017	.000	.017	.000	.009
INSEK	.018	.018	0.026	.004	.004	.004	.000	.013	.000	.009	.000	.000
CIA	.011	.022	0.155	.136	.024	.000	.005	.005	.000	.011	.011	.003
RRD	.000	.058	0.135	.077	.000	.019	.000	.000	.000	.000	.019	.000
MCOP	.004	.038	0.027	.034	.049	.004	.008	.004	.004	.004	.030	.004
NPTC2	.002	.019	0.021	.014	.016	.000	.000	.000	.000	.007	.005	.002
APV	.011	.022	0.045	.079	.011	.000	.011	.000	.000	.000	.000	.000
BRTH	.000	.000	0.190	.000	.048	.000	.000	.000	.000	.095	.000	.000
HUM	.000	.038	0.000	.077	.000	.000	.000	.000	.000	.038	.000	.000
OT	.038	.000	0.038	.038	.115	.000	.000	.000	.000	.038	.000	.038
BPROC	.012	.017	0.025	.015	.131	.025	.022	.010	.000	.084	.002	.012
BPAPR	.000	.000	0.011	.000	.132	.143	.000	.011	.000	.286	.000	.000
BIGNA	.008	.016	0.023	.016	.070	.008	.008	.008	.008	.008	.000	.031
PTAC	.000	.000	0.024	.000	.000	.000	.000	.024	.024	.000	.024	.048
CGCTC	.000	.000	0.000	.039	.020	.000	.020	.039	.000	.000	.000	.000
BIGNC	.005	.027	0.027	.009	.075	.020	.004	.013	.000	.002	.002	.007
BCOOP	.002	.029	0.029	.010	.039	.001	.000	.005	.001	.010	.000	.014
BINT	.000	.024	0.040	.016	.038	.002	.005	.005	.000	.006	.010	.021
BREL	.005	.016	0.047	.000	.000	.000	.000	.005	.000	.000	.000	.021
PTC	.000	.000	0.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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Lag0 ↓	**Lag1**												
	CIA	RRD	MCOP	NPTC2	APV	BRTH	HUM	OT	BPROC	BPAPR	BIGNA	PTA	CGCTC
HMA	.012	.000	.004	.017	.004	.000	.008	.000	.008	.008	.000	.000	.000
NPTA	.004	.004	.004	.017	.001	.000	.000	.003	.011	.000	.001	.001	.001
PTA	.008	.002	.005	.001	.002	.000	.000	.001	.036	.002	.003	.000	.000
CGCTA	.011	.000	.005	.004	.003	.000	.003	.003	.012	.000	.000	.000	.042
HMC	.006	.000	.006	.062	.017	.000	.034	.000	.011	.011	.000	.006	.000
NPTC	.009	.006	.009	.226	.001	.001	.005	.002	.014	.005	.002	.000	.002
CCS	.009	.000	.090	.006	.003	.000	.006	.000	.003	.006	.006	.000	.000
CPA	.007	.000	.009	.002	.004	.000	.000	.000	.015	.007	.000	.000	.000
PRAS	.012	.001	.018	.010	.000	.004	.000	.001	.026	.005	.007	.000	.001
CRIT	.000	.000	.023	.023	.000	.000	.000	.000	.011	.000	.000	.000	.000
NPC	.011	.002	.014	.001	.005	.001	.002	.000	.096	.028	.000	.000	.000
REASU	.019	.003	.019	.007	.004	.000	.000	.001	.017	.004	.005	.001	.004
GCC	.041	.005	.014	.032	.169	.000	.000	.000	.014	.000	.000	.000	.000
APOL	.013	.000	.025	.000	.013	.000	.000	.000	.038	.000	.013	.000	.000
BCC	.009	.002	.008	.008	.002	.000	.002	.000	.016	.008	.002	.000	.000
CST	.274	.009	.004	.028	.002	.000	.000	.002	.000	.002	.000	.000	.002
EMP	.072	.008	.008	.004	.020	.000	.000	.004	.016	.008	.004	.000	.004
CRY	.017	.004	.015	.008	.001	.001	.000	.003	.010	.002	.006	.000	.000
SCRM	.008	.000	.017	.000	.003	.003	.000	.003	.008	.000	.008	.000	.000
RES	.000	.000	.005	.000	.002	.000	.000	.000	.028	.000	.007	.000	.000
EMSUP	.007	.000	.007	.004	.000	.000	.000	.004	.018	.000	.018	.000	.000
FEAR	.000	.000	.000	.000	.000	.000	.000	.000	.000	.029	.086	.029	.000
PAIN	.042	.000	.028	.000	.000	.011	.000	.004	.018	.007	.011	.000	.000
EMOT	.000	.000	.026	.004	.004	.000	.000	.000	.021	.000	.009	.000	.000
INSEK	.000	.000	.009	.000	.000	.000	.004	.000	.009	.000	.035	.039	.000
CIA	.005	.003	.005	.000	.005	.000	.003	.000	.016	.003	.016	.000	.000
RRD	.000	.000	.019	.000	.000	.000	.000	.000	.000	.000	.058	.000	.000
MCOP	.011	.008	.008	.008	.000	.000	.000	.000	.008	.004	.023	.008	.000
NPTC2	.000	.002	.002	.000	.000	.002	.000	.000	.012	.000	.009	.002	.000
APV	.000	.011	.000	.000	.000	.000	.000	.000	.000	.011	.000	.045	.000
BRTH	.000	.000	.048	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
HUM	.038	.000	.000	.000	.000	.000	.000	.000	.115	.000	.000	.000	.000
OT	.000	.000	.000	.038	.000	.000	.000	.038	.038	.000	.000	.000	.000
BPROC	.012	.000	.012	.002	.005	.000	.000	.002	.005	.000	.002	.002	.002
BPAPR	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
BIGNA	.008	.016	.016	.023	.008	.016	.000	.008	.016	.000	.070	.000	.008
PTAC	.000	.000	.048	.071	.048	.000	.000	.024	.000	.000	.000	.167	.000
CGCTC	.000	.000	.000	.000	.000	.000	.000	.000	.059	.000	.020	.039	.000
BIGNC	.004	.005	.011	.002	.000	.000	.000	.000	.018	.004	.009	.000	.000
BCOOP	.009	.001	.021	.012	.001	.006	.001	.000	.019	.006	.007	.002	.000
BINT	.005	.002	.013	.006	.000	.002	.002	.000	.038	.008	.021	.005	.000
BREL	.005	.000	.016	.005	.010	.005	.000	.005	.021	.010	.016	.005	.000
PTC	.000	.000	.000	.000	.000	.000	.000	.000	.111	.000	.000	.444	.000

(Table continues to the right, see next page)

Lag0 ↓	**Lag1**					
	BIGNC	BCOOP	BINT	BREL	PTC	Max
HMA	.050	.012	.054	.021	.000	.249
NPTA	.025	.013	.029	.004	.000	.487
PTA	.020	.019	.033	.010	.000	.441
CGCTA	.043	.032	.020	.015	.000	.458
HMC	.028	.040	.023	.073	.000	.198
NPTC	.068	.034	.034	.014	.000	.226
CCS	.125	.230	.006	.003	.000	.230
CPA	.035	.245	.028	.002	.000	.245
PRAS	.032	.053	.028	.007	.001	.138
CRIT	.023	.011	.000	.000	.000	.207
NPC	.027	.046	.081	.006	.001	.149
REASU	.031	.036	.025	.005	.001	.168
GCC	.037	.078	.037	.009	.000	.169
APOL	.000	.013	.025	.000	.000	.163
BCC	.038	.119	.009	.002	.000	.167
CST	.108	.017	.030	.006	.000	.274
EMP	.036	.008	.008	.000	.000	.224
CRY	.010	.015	.024	.000	.000	.246
SCRM	.003	.006	.006	.000	.000	.224
RES	.005	.007	.007	.000	.000	.229
EMSUP	.004	.011	.007	.007	.000	.312
FEAR	.029	.000	.000	.000	.000	.429
PAIN	.004	.025	.032	.004	.000	.222
EMOT	.004	.000	.013	.000	.000	.248
INSEK	.000	.004	.018	.004	.000	.561
CIA	.000	.005	.030	.005	.000	.258
RRD	.000	.000	.019	.000	.000	.327
MCOP	.015	.011	.015	.008	.000	.213
NPTC2	.002	.007	.019	.000	.000	.599
APV	.000	.011	.022	.011	.000	.213
BRTH	.000	.048	.048	.048	.000	.190
HUM	.000	.000	.000	.038	.000	.269
OT	.038	.000	.077	.038	.000	.269
BPROC	.027	.059	.163	.017	.000	.163
BPAPR	.033	.088	.022	.242	.000	.286
BIGNA	.008	.023	.055	.008	.000	.156
PTAC	.000	.024	.048	.000	.095	.167
CGCTC	.000	.020	.020	.000	.000	.471
BIGNC	.002	.055	.073	.038	.000	.110
BCOOP	.005	.011	.057	.022	.000	.160
BINT	.008	.048	.003	.022	.000	.132
BREL	.026	.130	.036	.000	.000	.130
PTC	.000	.000	.000	.000	.000	.444

(Table ends)

APPENDIX M: OBTAINING Z-SCORES

The differences between conditional and unconditional *Z*-scores were computed using a formula by Allison and Liker (1982). There has been some discussion in the literature over which *Z*-score to use when describing sequential data. In the original article on lag sequential analysis by Sackett (1979) he states that the *Z*-score is:

$$Z = \frac{\text{P (observed) - P (expected)}}{\text{SD (expected)}}$$

where P is the probability and SD the standard deviation. This can also be expressed as,

$$\text{SD} = \left[\frac{\text{P(exp)*(1-P(exp)}}{\text{N(total criterion)}} \right]^{1/2}$$

However, Allison and Liker (1982) made extensive comments upon Sackett's (1979) *Z*-score computations and stated that the denominator in Sackett's equation was incorrect as it assumes the expected probability is the true probability. The probabilities used in studies are empirical, that is, "an observed proportion subject to sampling error" (p. 394). Allison and Liker (1982, p. 394) provided a corrected formula using notation from a research study on marital interaction. This formula was then generalised by Bakeman and Gottman (1986, p. 155) to give the following:

$$Z_l = \frac{\text{P(t/g) - P(t)}}{\sqrt{(\text{P(t)[1-P(t)][(1-P(g)])}\,\text{NP(g)}}}$$

where t is the target (lag1) behaviour, g is the given (lag0) behaviour, and N is the number of pairs tallied. Bakeman and Gottman (1986) also stated that the probability of t, written as P(t), is equal to the frequency of (t) divided by the total number of event pairs, coded *only if* the code can repeat itself. Otherwise, for non-repeating codes:

$$\text{P(t)} = \frac{\text{f(t)}}{\text{N - f(g).}}$$

The value from Sackett's formula is more conservative than that obtained by Allison and Liker's formula. For the purposes of this study the Allison and Liker formula will be used as described by Bakeman and Gottman (1986, p. 155).

APPENDIX N: COMPARISON OF PRESENT STUDY TO BLOUNT et al.'s (1989) STUDY

Table A-1: Proportion (Prop) of overall Child CAMPIS-CT Codes for the Present Study and Blount et al.'s (1989) Study

	Present Study			Blount et al. (1989)	
Code	**Prop.**	**Rank**	**Code***	**Prop.**	**Rank**
CRY	0.169	1	CRY	.296	1
BCOOP	0.135	2			
BINT	0.096	3			
CIA	0.073	4	CIA	.075	6
INSEK	0.068	5	INSEK	.070	7
BIGNC	0.064	6			
NPTC2	0.062	7	NPTC	.084	4
PAIN	0.060	8	VPAIN	.115	2
MCOP	0.057	9	MCOP	.006	13
RES	0.041	10	VRES	.076	5
BREL	0.038	11			
EMSUP	0.025	12	EMSUP	.088	3
EMOT	0.025	13	VEMOT	.017	11
SCRM	0.022	14	SCRM	.069	8
APV	0.021	15	APV	.025	10
CGCTC	0.014	16	CGCT*		
VFEAR	0.009	17	VFEAR	.005	14
HUM	0.009	18	HUM	.015	12
RRD	0.007	19	RRD	.005	15
BRTH	0.003	20	BRTH	.053	9
PTC	0.003	21			

* Codes in Blount et al.'s study are all verbal and some have slightly different nomenclature than in present study but are the verbal equivalents to the present study.

Note: proportions for Blount et al.'s study calculated on the raw counts provided in Blount et al. (1989)

Table A-2: Proportion (Prop) of overall Adult CAMPIS-CT Codes for the Present Study and Blount et al.'s (1989) Study

	Present Study			Blount et al. (1989)	
Code	**Prop.**	**Rank**	**Code***	**Prop.**	**Rank**
REASU	.209	1	REASU	.179	2
PTA	.118	2	PTA	.112	3
NPTC	.076	3	NPTC	.074	5
NPC	.071	4	NPC	.081	4
NPTA	.065	5	NPTA	.199	1
CGCTA	.064	6	CGCTA	.018	11
CPA	.056	7	CPA	.054	9
PRAS	.054	8	PRAS	.069	6
CST	.050	9	CST	.058	8
CCS	.041	10	CCS	.064	7
BCC	.036	11	BCC	.012	13
BPROC	.032	12			
HMA	.025	13	HMA	.035	10
HMC	.021	14	HMC	.014	12
EMP	.020	15	EMP	.010	15
GCC	.019	16	GCC	.010	14
BIGNA	.013	17			
APOL	.008	18	APOL	.007	16
BPAPR	.008	19			
PTAC	.007	20			
CRIT	.007	21	CRIT	.003	17

* Codes in Blount et al.'s study are all verbal, but otherwise equivalent to the present study.

Note: proportions for Blount et al.'s study calculated on the raw counts provided in Blount et al. (1989)

Table A-3: Comparison of Present Study and Blount et al.s (1989) for Forward Lags

Present Study*						Blount et al.'s Study (1989)					
Lag 0	**Lag 1**	**Lag 2**	**Lag 3**	**Lag 4**	**Lag 5**	**Lag 0**	**Lag 1**	**Lag 2**	**Lag 3**	**Lag 4**	**Lag 5**
CRY	REASU	CRY	REASU	CRY	REASU	**CRY**	REASU				
SCRM	EMOT	REASU	REASU	REASU	REASU	**SCRM**	REASU	REASU			
RES	REASU	REASU	REASU	REASU	CRY	**VRES**	REASU				
EMSUP	REASU	REASU	REASU	REASU	REASU	**EMSUP**	REASU	REASU	REASU	REASU	REASU
FEAR	REASU	REASU	REASU	REASU	REASU	**VFEAR**	REASU				
PAIN	REASU	REASU				**VPAIN**	REASU	REASU			
EMOT	REASU					**VEMOT**	REASU	REASU	REASU	REASU	
INSEK	REASU	REASU	REASU	REASU	REASU	**INSEK**	REASU	REASU	REASU	REASU	REASU
CIA	REASU	REASU	REASU	REASU	REASU	**CIA**	CST	CIA			
RRD	REASU	REASU	REASU	REASU	REASU	**RRD**	1,8,15,16,18				
MCOP	REASU	REASU	REASU	REASU		**MCOP**	NPC				
NPTC2	NPTC	NPTC2	NPTC	NPTC2	NPTC	**NPTC2**	NPTC	NPTC2			
APV	APOL	REASU				**APV**	REASU	REASU	REASU	REASU	REASU
BRTH	NPTC					**BRTH**	CCS				
HUM	HMC					**HUM**	HMC				
CGCTC	CGCTA	CGCTC	CGCTA	CGCTA	CGCTA						
BIGNC	PTA										
BCOOP	PRAS										
BINT	REASU	REASU	REASU	REASU	REASU						
BREL	BCOOP										
PTC	PTAC	PTAC									
HMA	HMA	HMA	HMA	HMA	HMA	**HMA**	HMA				
NPTA	NPTA	NPTA	NPTA	NPTA	NPTA	**NPTA**	NPTA				
PTA	PTA	PTA	PTA	PTA	PTA	**PTA**	PTA				
CGCTA	CGCTA	CGCTA	CGCTA	CGCTA	CGCTA	**CGCTA**	CGCTA				
HMC	HMC	HMC				**HMC**	HMC				
NPTC	NPTC2	NPTC	NPTC2	NPTC	NPTC2	**NPTC**	NPTC2	NPTC			
CCS	BCOOP					**CCS**	CCS				
CPA	BCOOP					**CPA**	CPA				
PRAS	PRAS					**PRAS**	PRAS				
CRIT	CRY	REASU	REASU	REASU	REASU	**CRIT**	CRY				
NPC	REASU	REASU	CRY	REASU	REASU	**NPC**	NPC				
REASU	REASU	REASU	REASU	REASU	REASU	**REASU**	REASU				
REASU	CRY	REASU	REASU	REASU	REASU						
GCC	APV					**GCC**	CRY	REASU	REASU	REASU	REASU
APOL	REASU	REASU	REASU	REASU	REASU	**APOL**	CRY				
BCC	REASU	REASU	REASU	REASU	REASU	**BCC**	REASU				
CST	CIA	REASU	REASU	REASU	REASU	**CST**	CIA	CST			
EMP	REASU	REASU	REASU	REASU	REASU	**EMP**	REASU				
BPROC	BINT	REASU	REASU	REASU	REASU						
BPAPR	PAIN										
BIGNA	REASU										
PTAC	PTAC	PTAC	PTAC								

* Insufficient data points to assign significance so only probable chains shown

Note: behaviours for Blount et al.'s study in this table from Blount et al. (1989)

Table A-4: Comparison of Present Study and Blount et al.s (1989) for Reverse Lags

Present Study						Blount et al.'s Study (1989)					
Lag 0	**RLag 1**	**RLag 2**	**RLag 3**	**RLag 4**	**RLag 5**	**Lag 0**	**RLag 1**	**RLag 2**	**RLag 3**	**RLag 4**	**RLag 5**
CRY	REASU					**CRY**	REASU	CRY			
SCRM	REASU	REASU	REASU	REASU	REASU	**SCRM**	PAIN	REASU			
RES	CRY	REASU	REASU	REASU	REASU	**VRES**	REASU				
EMSUP	CRY	REASU	REASU	REASU	REASU	**EMSUP**	REASU	REASU			
FEAR	REASU	REASU				**VFEAR**	REASU	REASU			
PAIN	REASU	REASU				**VPAIN**	REASU	REASU	REASU	REASU	REASU
EMOT	RES					**VEMOT**	REASU				
INSEK	REASU	REASU	REASU	REASU	REASU	**INSEK**	REASU	REASU	REASU	REASU	REASU
CIA	CST					**CIA**	CST				
RRD	CST					**RRD**	1,8,15,16, 18				
MCOP	REASU	REASU	REASU			**MCOP**	REASU	REASU			
NPTC2	NPTC	NPTC2	NPTC	NPTC2	NPTC	**NPTC2**	NPTC	NPTC2			
APV	GCC					**APV**	NPC	NPC			
BRTH	PAIN	REASU				**BRTH**	CCS	CCS	CCS	CCS	CCS
HUM	HMC	HMC	HMC			**HUM**	NPTC	HUM			
CGCTC	CGCTA	CGCTC	CGCTA								
BIGNC	REASU										
BCOOP	CPA										
BINT	REASU	REASU									
BREL	REASU										
PTC	PTAC										
HMA	HMA					**HMA**	HMA				
NPTA	NPTA	NPTA	NPTA	NPTA	NPTA	**NPTA**	NPTA				
PTA	PTA	PTA	PTA	PTA	PTA	**PTA**	PTA				
CGCTA	CGCTA	CGCTA	CGCTA	CGCTA	CGCTA	**CGCTA**	CGCTA				
HMC	HMC					**HMC**	HMC				
NPTC	NPTC2	NPTC				**NPTC**	NPTC2	NPTC			
CCS	CCS	CCS	CCS	CCS	CCS	**CCS**	CCS				
CPA	CPA	CPA				**CPA**	CPA				
PRAS	BCOOP					**PRAS**	PRAS				
CRIT	CRY	REASU				**CRIT**	SCRM				
NPC	REASU					**NPC**	NPC				
REASU	REASU	REASU	REASU	REASU	REASU	**REASU**	REASU				
GCC	REASU	REASU	REASU	REASU	REASU	**GCC**	CRY/ GCC				
APOL	PAIN					**APOL**	REASU	REASU	REASU	REASU	REASU
BCC	REASU					**BCC**	CRY	REASU			
CST	REASU	REASU	REASU	REASU	REASU	**CST**	CIA	CST			
EMP	REASU					**EMP**	CRY	REASU	REASU	REASU	REASU
BPROC	NPC	REASU	REASU	REASU	REASU						
BPAPR	NPC	NPC									
BIGNA	BINT	REASU									
PTAC	INSEK	PTAC	PTAC								

* Insufficient data points to assign significance so only probable chains shown

Note: behaviours for Blount et al.'s study in this table from Blount et al. (1989)