"I REALLY WANTED A GIRL 'CAUSE GIRL DOCTORS ARE SOFTER THAN BOYS": CHILDREN'S MEMORIES AND THEIR SUBSEQUENT HEALTH CARE ATTITUDES

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"I really wanted a girl 'cause girl doctors are softer than boys":

Children's Memories and Their Subsequent Health Care Attitudes

by

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Abstract

The present study examined the mediating role of memory within the relationship between experience and children's health care attitudes. Forty-six children between the ages of 6 and 13 years old were recruited from an emergency room and interviewed about their injuries and hospital visits initially and 6 months later. Children were also given a health care attitudes questionnaire at both periods. Children who remembered more about their injuries reported that the health care system was less effective. Children who remembered more about hospital related events reported disliking the health care system more. Changes in children's memory over the two time periods did not relate to changes in children's health care attitudes. Higher levels of distress were found to be related to enhancements in children's memory and more negative health care attitudes initially. Findings suggest that memory for medical experiences may play a minor role in health care attitudes.

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Children's Memories and Their Subsequent Health Care Attitudes

The attitudes that children develop toward the health care system may be a crucial determinant of their future health care behaviors. Within the past fifteen years, research in the area of health care attitudes has investigated factors that influence children's attitudes. Past research in this area has repeatedly shown that experience with the health care system is a key factor (Melamed, Robbins, & Fernandez, 1982; Pate, Blount, Cohen, & Smith, 1996; Peterson, Ross, & Tucker, 2002). However, mediating variables such as age, gender, cognitive ability, temperament, pain and type of experience have been found to influence the relationship between prior experience and health care attitudes (Bush & Holmbeck, 1987; Redpath & Rogers, 1984; Carson , Council, & Gravely, 1991; Hackworth & McMahon, 1991; Peterson et al., 2002). The purpose of the current study is to expand on this growing body of research by investigating another plausible mediating factor, memory, within the relationship between experience and children's health care attitudes.

It is a widely held belief that highly emotional experiences are well-remembered, particularly negative events related to significant degrees of pain, personal injury, or trauma such as having a needle, breaking a bone, or getting lacerations and sutures (Peterson et al., 2002). As such, memory may also play an important mediating role in the relationship between experience and health care attitudes. However, the relationship between children's health care attitudes and event memory has received relatively little attention in the health care and psychology literature. It is plausible that memory may

indeed affect children's health care attitudes (or vice versa) in important ways. After all, our attitudes about a previous direct or indirect experience are influenced by what we can recall about that experience. Consider the case of Johnny, who, while participating in the current investigation, displayed negative attitudes toward operations because when requesting a brother, was constantly reminded of daddy's operation (a vasectomy). Research has shown that children display fear, avoid and display intense dislike for the nurse who repeatedly administers their inoculations (Bush and Holmbeck, 1987).

The current study attempts to investigate the mediating role of memory on children's health care attitudes. The study may also provide additional benefits. First, it will provide additional support for the relationship between health care attitudes and experience. Although it has been suggested that experience plays an important role in health care attitudes, to date, the relationship is unclear. Results have suggested that aversive health care experiences can be both beneficial and detrimental to an individual (Melamed et al., 1982; Peterson et al., 2002). Second, although experience with the health care system has been found to be an important factor influencing children's health care attitudes, how much information children retain about their health care experience may be the determinant of how positive or negative their health care attitudes are in the future. Remembering more about a previous health care experience may allow children to approach future health care experiences with more familiarity. This may in turn lead to decreased fear, anxiousness, or perceived pain during the visit. Third, the investigation may suggest fruitful ideas in treating children with negative health care attitudes and through this, promote more positive health care behavior in the future. For example, if

children who remember more about their health care experience report more positive health care attitudes, then aiding children to remember their health care experiences may be beneficial. However, if children who remember more about their health care experience report more negative health care attitudes, then not reminding children about their health care experiences may be beneficial. Unfortunately it may be unhealthy to encourage repression of negative experiences in children and therefore, parents should discuss with their children what they remember and feel about the event in order to eliminate any aversive effects of the event. Finally, the investigation may have implications for the dental anxiety realm. This investigation may suggest that memory may play a role in the emergence of dental anxiety and suggest similar ways of reducing dental anxiety in dental patients.

The purpose of this introduction is threefold. First, it will address a topic which encompasses a large proportion of research within the health care domain, namely, dental anxiety. Specifically, the section will be devoted to the discussion of factors that are related to the development of dental anxiety in children. This discussion will provide a framework for understanding the factors that have been found to be related to children's attitudes in non-dental domains of health care. The second section of this introduction will review a less explored area of research, children's health care attitudes in non-dental domains. This discussion will provide an overview of the factors that have been reported on children's health care attitudes, but at the same time highlight the apparent contradictions in these findings. The purpose of this section is not to critique previous research on children's healthcare attitudes but instead to provide a brief overview and to

demonstrate further expansion within this field. The final section will then turn to a growing body of research on children's memories for traumatic events, specifically health care experiences. An overview on children's ability to recall traumatic events over prolonged periods of time will be presented. Following this overview, the importance of investigating memories for health care events in relation to health care attitudes will be discussed and specific hypotheses generated.

Dental Anxiety

One area of health care research that has examined potential long-term effects from aversive health care experiences is in the dental anxiety domain. Research in this area has repeatedly shown that patients who experience painful dental visits are more likely to become dentally anxious (e.g., Davey 1989; Liddell, 1990; Townend, Dimigen, & Fung, 2000). Davey (1989) administered self-report questionnaires to university students and found that those who remembered experiencing dental pain before 12 years of age, and experienced more recurrent and severe pain, were more dentally anxious as adults. In turn, those individuals who displayed higher levels of dental anxiety were more likely to have irregular dental visits or worse yet become dentally avoidant, even though such behavior may directly result in more severe dental problems in the future (Vassend, 1993).

Although research has linked dental anxiety and aversive experiences together, there are mediating factors that are associated within this relationship. From the research, it is evident that dental anxiety is apparent in children who have encountered aversive dental experiences. However, a number of factors have played mediating roles in the

relationship between experience and dental anxiety. This discussion will begin by discussing two factors, age and gender, shown to be strong mediating factors in the relationship between experience and dental anxiety. Following this, other factors such as coping strategies, pain, and fear will be discussed.

Age and Gender. In a cross-sectional study, Liddell and Murray (1989) reported significant age and gender differences in dental anxiety. Children attending grades 4 to 7 were administered the Corah Dental Anxiety Scale (DAS) and the results demonstrated that an increase in children's reported levels of dental anxiety were apparent between 9 and 12 years of age. Dealing with gender differences, at age 10, girls reported greater levels of dental anxiety than boys and this significant difference was also apparent at 12 years of age. Thus, Liddell and Murray suggested that gender differences in dental anxiety emerge with the approach of adolescence. During this period of development, children begin to incorporate stronger stereotypical characteristics that are appropriate to their gender (e.g., display of bravado in males and more willingness and openness in females). In a sample of participants 15 years and older, Vassend (1993) reported that females reported significantly more dental anxiety than males and this difference remained consistent through adulthood.

These studies clearly demonstrate the mediating role of age and gender on dental anxiety. Although the findings reported lower levels of dental anxiety in boys, this may indeed be explained as stereotypical characteristics; boys are not actually displaying lower levels of dental anxiety but are reporting lower levels due to social expectations. However, consistent with the previous studies, other research has supported the finding

that preadolescent girls report higher levels of dental anxiety than boys (Winer, 1982; Brown, Wright, & McMurray, 1986; White, 2000).

Coping Strategies. As children progress in age, they become better able to learn and utilize effective coping strategies during aversive dental experiences. This ability to effectively use coping strategies has been shown to mediate the effects of the dental experience.

Nocella and Kaplan (1982) randomly assigned thirty children (5 to 13 years of age) to one of three groups, stress-inoculation, attentional control, and no treatment, prior to their dental experience. Children in the stress-inoculation groups received instructions on relaxation and positive self-talk that would be used during their dental visit. Compared with the attentional control (those who participated in a discussion of non-dental related topics with the experimenter), and no treatment control, these children displayed significantly reduced levels of dental anxiety during their visit. Although children in this study received training on coping strategies, other research has suggested that children can, and will, use effective coping strategies without prior training. Curry and Russ (1985) identified behavioural and cognitive coping strategies that children between the ages of 8 and 10 years of age performed during a dental visit. Behavioral coping strategies employed by children included information seeking, direct efforts to maintain control (actively trying to participate in the situation and set limits), and support seeking. Cognitive coping strategies employed by children included diversionary thinking (diverting one's thoughts away from the situation), emotion-regulating cognitions (the use of self-statements or thoughts to alleviate fear and discomfort), and

positive cognitive restructuring (the attention to positive factors of the situation). Further, the authors noted that older children in the sample were more prone to use cognitive coping strategies than younger children who used behavioural coping strategies.

Research has shown that coping strategies are effective in reducing dental anxiety. The results suggest that children can learn to utilize effective coping strategies that may help to alleviate dental anxiety. Nevertheless, Curry and Russ (1985) demonstrated that children are using coping strategies without prior instruction. The significant effect of coping strategies in reducing levels of dental anxiety has also been noted by other researchers (McMurray, Bell, Fusillo, Morgan, & Wright, 1987; Liddell, Rabinowitz, & Peterson, 1997).

Pain. The perception of pain is also a significant mediating factor in the relationship between dental anxiety and dental experiences. Vassend (1993) demonstrated that in an adult population, dental anxiety is associated with the perception of dental pain. Adults who were classified as highly dentally anxious reported higher ratings of experienced dental pain. Similarly, Arntz, van Eck, and Heijmans (1990) reported that over-anxious dental patients expected more pain even though they did not experience more pain than non-anxious dental patients. Therefore, perception of pain may influence levels of dental anxiety in adults. Other research has shown that actual dental pain may be associated with dental anxiety. Woolgrave and Cumberbatch (1986) found that high levels of dental anxiety were associated with painful dental treatment, aversive dental experiences and the expectation that future dental experiences would be painful. Thus, research has shown a bi-directional relationship between pain and dental

anxiety. Higher amounts of dental pain may increase dental anxiety reported by the patient and vice versa.

Research has suggested that pain is a significant factor associated with dental anxiety. However, all studies presented above clearly demonstrate the relationship of pain and dental anxiety with adult populations. While research has dealt with adult perceptions of pain, it may be logically assumed that children would display similar reactions. Children who experience higher levels of dental pain may be more prone to display dental anxiety in the future because they fear that the next visit will be more painful.

Fear and Negative Cognitions. Although dental anxiety frequently occurs on its own, another mediating factor in the relationship between dental anxiety and experience is fear and negative cognitions concerning dental treatment. Such characteristics, fear and negative cognitions, have been associated with the temperamental characteristic of neuroticism. Murray, Liddell, and Donohue (1989) suggested that dental anxiety is also associated with fear of blood, injury, and hospitals. They found that dentally anxious children rated medical fears, fears of injury and small animals higher than children who were described as non-dentally anxious. They concluded that having these fears predisposed these highly anxious children to finding dental experiences more traumatic. Older children who show greater levels of dental anxiety may be more predisposed than younger children due to increases in other fearful experiences that may directly influence their experience of dental treatment (Murray et al., 1989). For instance, dental fears may be a direct result of an experience with an individual that the child perceives to be similar

to the dentist (Putnam, 1971). This individual may be a person who evoked great fear in the child such as a physician or nurse. Furthermore, dental anxiety may be related to general fearfulness in boys' self-reports and the fear of the unknown for girls (Liddell, 1990).

Locker, Shapiro, and Liddell (1999) investigated variations in negative cognitions of dental treatment in a random sample of 1420 participants 18 years or older. Approximately 82% of the participants reported at least one negative cognition concerning dental treatment. Furthermore, they found that participants who were described as highly dentally anxious reported more negative cognitions than participants described as non-anxious. Negative cognitions included, "Something may be seriously wrong with my teeth," to "Any treatment I need will be very painful." In relation to fear, those participants described as dentally anxious and who reported more negative thoughts also were more afraid of pain, had more severe fears, and higher levels of blood and injury fears. This suggests that negative cognitions are directly associated with their fear levels. Dental patients who are more dentally anxious are at increased risk of perceiving dental treatment as fearful and, as such, produce negative cognitions about forthcoming dental treatment.

In summary, research has shown the importance of mediating factors such as age, gender, coping skills, fearfulness, and the perception of pain that contribute to the relationship between aversive experiences and dental anxiety. It is clear from the discussion of these factors that they play a significant mediating role on dental anxiety.

Further, these results have been replicated many times in research on dental anxiety in both children and adults.

Children's Health Care Attitudes

Up until the mid-1980s, research investigating the effects of aversive experiences in the non-dental domain was relatively rare or non-existent. Murray et al. (1989) suggested that dental anxiety is often associated with other fears, specifically fears of hospitals. Dentally anxious children rated medical fears higher than non-dentally anxious children. Therefore, research seemed to suggest that a relationship between dental and medical fears existed. If dental and medical fears are related, then the effects of aversive medical experiences may directly affect children's reactions during this experience and their later attitudes toward this experience in ways that are similar to children's reactions and attitudes of aversive dental experiences. Thus, negative attitudes fostered by early aversive medical experiences may be detrimental to the child and later adult, in at least two ways (Peterson et al., 2002). First, children who have been highly distressed by earlier aversive medical experiences might react to later medical experience with greater fear and pain. Second, children highly distressed by early aversive experiences might find future medical experiences aversive and try to avoid them, which may inhibit the individual from seeking medical assistance later in life.

The purpose of this section is to discuss the topic of children's health care attitudes. Research in this area is parallel with research in the dental anxiety domain. Factors which have been shown to play mediating roles in the relationship between aversive experiences and dental anxiety have also been shown to play mediating roles in

the relationship between aversive health care experiences and children's health care attitudes. However, as will be discussed below, only a few studies have explicitly studied children's health care attitudes and the results from these studies are inconsistent at times. The discussion below will begin by discussing the development of a questionnaire which assesses children's health care attitudes. Prior to this questionnaire, there was no good psychometric measure of such attitudes. As such, research in this area of health care was limited. We will then look at factors related to children's health care attitudes. The influence of prior experience will be introduced first and then the mediating roles of a number of factors on this relationship will be discussed.

Measuring Health Care Attitudes. Joseph Bush and Grayson Holmbeck (1987) developed the Children's Health Care Attitudes Questionnaire (CHCAQ). The CHCAQ contains three groups of eight multiple-choice questions that focus on three attitudinal dimensions: like-dislike, attributed effectiveness-ineffectiveness, and approach-avoidance. Each group of questions investigates the child's attitudes toward eight targets: doctors, dentists, nurses, hospitals, medicine, injections, blood tests, and surgery. There is also a pain rating scale that measures 17 medical and non-medical stimuli (e.g., getting a shot in your arm, your worst headache) in terms of painfulness.

Along with multiple choice questions, pictures or graphic symbols are provided in order to aid younger children in answering the questionnaire. For questions investigating children's like-dislike toward the eight targets an array of five faces ranging from a smile to a frown are presented. For attributed effectiveness questions, an array consisting of a large plus sign, small plus sign, an equal sign, a small and a large minus sign are

presented. In the approach-avoidance questions, an array of yes and no signs are used that are displayed similar to the plus and minus sign with a question mark as the neutral sign. In the pain scale, five thermometers with varying levels of pain are presented and participants are asked to choose the one that corresponded to their pain levels for that experience.

The questionnaire is suitable for children 5 years and older. For younger children the pictures and graphics can be presented, and for older children, who are cognitively mature, the questionnaire can be revised to omit the pictures and graphic symbols. Bush and Holmbeck (1987) found that with aid, approximately 95% of children over 5 years old were able to complete the questionnaire.

In terms of reliability of the questionnaire, for a sample of 5- to 19-year-olds, Bush and Holmbeck reported Cronbach's alpha coefficients of .63 to .76 for the attitudinal scales and .57 to .75 for the pain scales that indicated significant internal consistency in these scales. In test-retest reliability, they reported coefficients of .70 to .76 for the attitudinal scales and .69 to .84 on pain scales in a 2-week interval. This indicates significant questionnaire reliability. Divergent validity was assessed by examining correlations between the attitudinal and pain scales. All correlations were low to moderate; however, there were significant correlations between the attitudinal approach scale and the pain scale. Further results validating the effectiveness of the questionnaire have also been provided by Hackworth and McMahon (1991).

Experience. Similar to dental anxiety studies, research in children's health care attitudes began with investigating the effects of prior experience on children's health care

attitudes. Research has shown that traumatic experiences with the health care system in childhood are associated with subsequent avoidance of certain aspects of the health care system (Melamed, Robbins, & Fernandez, 1982). Dahlquist, Gil, Armstrong, DeLawyer, Greene, and Wuori (1986) investigated the relationship between medical experience and children's response to preparation for a medical exam in children between the ages of 3 and 12. They found that children with prior negative medical experiences displayed more behavioral distress during the examination than children with positive or neutral medical experiences. The behavioral distress displayed in these children may be a direct result of the development of negative attitudes toward health care after their prior negative experience. Research has shown that traumatic medical experiences in childhood may lead to medical fears that persist into adulthood. Pate, Blount, Cohen, and Smith (1996) administered the Medical Experience Questionnaire (MEQ) to 147 university students between the ages of 17 and 21. The MEQ assesses child and adult medical experience and attitudes. They found that adult fear, pain and coping effectiveness were significantly predicted by childhood experiences of fear, pain and coping effectiveness during a medical examination. They suggested that aversive medical experiences in childhood that would cause these increased perceptions of fear and pain may result in more medical fear and avoidance of health care during later adulthood.

In 2002, researchers reported contradictory findings within the relationship between experience and health care attitudes. Peterson, Ross, and Tucker (2002) investigated the effects of prior aversive health care experiences on children's overall health care attitudes using the CHCAQ. Using a large random sample size (N=1439) and

age range (6 to 19 years of age), they reported that, unlike previous findings, prior aversive health care experiences led to more positive health care attitudes in children. In this study, prior experience seemed to be important in fostering positive health care attitudes in children and not the reverse. They account for this divergent finding by suggesting that the nature of the medical contact is important in how children interpret medically-induced pain. When children are taken to the emergency room for a trauma injury, they have already been injured. As such, they have already experienced the sudden pain and fear that accompanies the injury. When they arrive at the emergency room, they are repeatedly told by parents and medical staff that the injury will be treated and they will feel better soon. Even though the treatment may temporarily hurt, all children were treated on an outpatient basis and probably felt better upon arrival at home. In contrast to children treated in an emergency room for short-term medical emergencies, as in the current study, children with the experience of chronic illness do not experience dramatic improvements in pain reduction after treatment and thus have more negative attitudes toward medical entities (Hackworth & McMahon, 1991).

Although aversive medical experiences may or may not have detrimental effects on children's health care attitudes, there are mediating factors within this relationship, similar to the mediating factors in the relationship between dental anxiety and aversive experiences. However, unlike the dental anxiety literature, the effects of these mediating factors on children's health care attitudes are not as concise and straightforward.

Age. Age has been found to be a mediating factor, but research investigating the mediating effects of age on the relationship between children's health care attitudes and

experience is inconsistent. Hackworth and McMahon (1991) found that in a sample of 55 children between the ages of 6 and 15.5 years, older children reported liking health care personnel, procedures, and settings more and reported greater willingness to approach these targets than younger children. Similar findings have also been reported by Bush and Holmbeck (1987). In contrast, using a younger sample size of 6- to 11-year-olds, Bachanas and Roberts (1995) reported that younger children rated health care personnel, procedures, and settings as more likable and approachable than older children. Findings similar to Bachanas and Roberts' study using a larger and older sample size have also been reported by Peterson et al. (2002).

Fear. Medical fear may be an intervening variable within the relationship between age and health care attitudes. However, the controversy over medical fear in relationship with age is unclear. Aho and Erickson (1985) found that fourth and seventh graders reported more medical fears than first graders, thus providing a possible explanation as to why older children may display more negative health care attitudes than younger children. Older children display more medical fears than younger children; older children may manifest their medical fears into negative healthcare attitudes. Further, they suggested that older children have had more opportunities to learn to be afraid through more exposure to medical procedures, similar to dental anxiety. However, in 1987, Broome and Hellier found that medical fear declined with age for school-age children between the ages of 6 and 11 years, thus providing support for Bachanas and Roberts' (1995) findings on the relationship between age and health care attitudes. This suggests that medical fear, like dental anxiety, may be a significant factor in determining health

care attitudes. Conversely, the direction of the relationship between medical fear and age is unclear to date.

Gender. As children get older, stereotypes of the appropriate gender behaviour that they should display are reinforced. Therefore, gender may be a significant mediating factor in the relationship between children's health care attitudes and experience. Aho and Erickson (1985) reported that gender was significantly related to frequency and intensity of medical fears. Girls displayed more medical fears and more intense fears than boys. Cultural reasons have been used to explain this phenomenon. In a gender-typed culture, girls are reinforced to express weakness and fear while boys are reinforced to show courage and strength. If girls do display more fear than boys it is plausible to assume that, in relation to the findings on medical fears, girls would report more negative health care attitudes than boys. Research has supported this assumption, that is, girls tend to like the health care system less and avoid it more often than boys (Bush & Holmbeck, 1987; Hackworth & McMahon, 1991; Bachanas & Roberts, 1995).

Cognitive Maturity. Cognitive maturity has also been established as a significant mediating factor in children's health care attitudes. Redpath and Rogers (1984) demonstrated an explicit developmental progression in children's understanding of medical concepts. Preschoolers demonstrated less medical concept understanding than school-age children. Preschoolers could not provide a description of what a hospital does or why children would go to the hospital when they are sick. Likewise, Haight, Black, and DiMatteo (1985) investigated children's understanding of the social roles of the physician and patient. Children at 4 and 5 years of age were observed playing puppet

games of 'Doctor and Patient' and further interviewed about social roles in a medical setting. Children at this age demonstrated clear understanding of the social roles of both the physician and patient. However, they showed limited understanding of the terms illness and treatment which may also reflect limited understanding of the physician's intentions. However, as the child develops his or her concepts of hospitals, doctors, illness and treatment are more meaningful. Several researchers have suggested that the observations of Jean Piaget could provide the background for studying children's cognitive understanding about medical experience (Redpath & Rogers, 1984; Band & Weisz, 1988; Hackworth & McMahon, 1991). For instance, a six-year-old child is beginning to leave the egocentric pre-operational stage, where everything centers on the child, into the concrete operational stage, where the child learns to reason logically about situations as they appear. Children who are cognitively mature are those children who can understand the importance of health care personnel, settings, and procedures. Furthermore, these children also understand that aversive events, which occur during the health care visit, should not be inferred as forms of punishment for past behaviours but as events that are necessary to promote the individual's healthy well being. These children who are able to cognitively understand the importance of health care and health care procedures, whether aversive or non-aversive, will approach the health care system with positive attitudes.

Coping Strategies. Band and Weisz (1988) suggests that it is during the concrete operational stage that the child is cognitively mature enough to incorporate coping strategies prior to and during aversive health care experiences. Information seeking has

been found to be an effective coping strategy used by children to reduce distress levels (Blount, Davis, Powers, and Roberts, 1991). The child may seek out information regarding the event prior to experiencing the event. In this case, prior information regarding the treatment may decrease distress levels by reducing their fear of the unknown. Blount et al. (1991) found that children who sought out information displayed a greater reduction of distress than children who avoided information-seeking behaviors. Manne, Bakeman, Jacobsen, and Redd (1993) investigated the impact of coping behaviours exhibited during a stressful medical procedure. In a sample of children between 3 and 10 years of age, older children demonstrated more use of coping behaviours and fewer distress behaviours. However, they reported that information-seeking behaviour occurred most frequently during the stressful event and not prior to the onset of the event. Presenting information about what will occur during a medical procedure is not useful for children who have already experienced the procedure and showed high levels of distress. Therefore, other coping strategies may be useful to reduce distress levels. Attention diversion, relaxation, or positive self-talk have been successful in helping children cope with fears, aversive medical procedures, and hospitalization (Brown, O'Keeffe, Sanders, Baker, 1986). Positive self-talk was rated the most commonly used strategy in all age groups from 8 to 18 years, although older children used many more coping strategies than the younger children. The research on coping strategies has found that they are effective aids in the reduction of distress and pain experienced by children. By significantly reducing distress and pain that children

experience, children may view their medical experiences as more positive or less aversive, which may greatly reduce negative attitudes that may develop.

Temperament and Locus of Control. Along with coping strategies, temperament and health locus of control (i.e., perception of control over one's own health) are other factors mediating children's attitudes toward health care. Studies have demonstrated the relationship between temperamental factors and children's reaction to the health care system (Carson, Council, & Gravley, 1991). In relation to hospitalization, children who displayed more positive reactions were temperamentally more rhythmical, more open to new experiences, more responsive, and adaptable. These children adjusted to the surgery and hospitalization more effectively than children who were classified as difficult in temperament. Furthermore, it has been suggested that children who display more positive temperamental characteristics (i.e., adaptability, approaching, etc.) during their health care experience are those children who continue to display these characteristics during later health care experiences (B. Muran, personal communication, June 15, 2001). Relating to health care, children with a more external health locus of control have been shown to display more positive attitudes toward the health care system than children with an internal health locus of control (Hackworth & McMahon, 1991; Bachanas & Roberts, 1995). Children with an external health locus of control rated the health care system as more effective (Hackworth & McMahon, 1991), likeable, and approachable (Bachanas & Roberts, 1995) than children with an internal locus of control. This may suggest that these characteristics serve as aids that help children cope with aversive events. Children

who lack these characteristics may be at risk for finding the aversive event extremely distressing and negatively react to aspects of the event or future events.

Pain. Pain may also be considered a relevant mediating factor in determining children's attitudes toward health care. It has been verified that children who display higher levels of behavioural distress report more accounts of pain (Frank, Blount, Smith, Manimala, & Martin, 1995). Therefore, understanding the concept of pain in children is essential to understanding how it may or may not influence their health care attitudes. Significant differences in children's concepts of pain have been found between the ages of 5 and 14 years (Gaffney & Dunne, 1986). Children, at 5 years, define pain in concrete terms such as "Pain is something in my belly" whereas children at 14 years define pain in abstract terms such as "Pain is suffering mentally or physically." This view that younger children hold may lead to greater distress levels during aversive experiences due to their limited understanding of the concept of pain. These children lack the understanding that pain has warning and diagnostic values. Out of 994 children between the ages of 5 and 12 years, only 16.3% could offer a benefit of pain to a researcher (Ross & Ross, 1984). Thus, children who display larger amounts of distress during aversive medical experiences may do so because they feel that the pain that they experienced during treatment is a form of punishment. As such, the distress and pain during the medical event that the children experience may affect their views on the medical event. During recollection of the event, children may remember the distress and pain that they felt and represent this in negative attitudes toward the health care system. Bush and Holmbeck (1987) reported a significant relationship between children's pain ratings and approach as

measured on the CHCAQ. Children who rated stimuli as more painful were less willing to approach the health care system. Similarly, Hackworth and McMahon (1991) reported that children who rated stimuli as more painful also reported liking the health care system less on the CHCAQ.

In summary, the results seem to suggest that children's perceptions of pain are related to children's health care attitudes. Furthermore, pain may play a mediating role within the relationship between aversive experiences and health care attitudes. Children who experience painful aversive events and also report being more sensitive to pain are at increased likelihood to develop negative attitudes toward the health care system. However, children who experience the same aversive event but are less sensitive to pain may not be at risk for developing negative attitudes toward the health care system.

To date, a number of factors mediating the effects of aversive experiences on children's health care attitudes have been reported. Although it has been clearly acknowledged that age, gender, cognitive maturity, coping strategies, temperament, and perceptions of pain contribute significantly in mediating children's health care attitudes, the results from several studies are controversial in nature and not clear-cut like the dental anxiety literature. This may be in part from the utilization of small sample sizes, variable age ranges and/or unequal populations of children. Furthermore, results from these studies are only modest at best, with factors accounting for only a relatively small proportion of the variance in children's healthcare attitudes. Also, only a subset of these studies has explicitly measured children's healthcare attitudes (Bush & Holmbeck, 1987; Hackworth & McMahon, 1991; Bachanas & Roberts, 1995; Peterson et al., 2002). Thus,

conclusions about children's health care attitudes can only be validly made on those studies which explicitly measured children's health care attitudes. As such, assumptions on the mediating roles of other factors can only remain assumptions at best. At this time, no solid conclusions about these mediating factors can be made until research explores the relationship between children's health care attitudes and experience in more detail.

Building on Previous Research. Carole Peterson and colleagues (2002) investigated the effects of prior aversive experiences on children's health care attitudes. As part of a study on children's long-term memory for traumatic events (see Peterson & Bell, 1996; Peterson, 1999; and Peterson & Whalen, 2001, for details), 139 children (Trauma Group), between the ages of 7 and 19 years, who were recruited from a local children's emergency room five years prior, were contacted and given the modified CHCAQ during a 5-year follow-up interview. All children had been to the emergency room for a trauma injury (i.e., broken bones, lacerations requiring sutures, dog bites, etc.). Children were interviewed about their injury 1 week, 6 months, 1 year, 2 years, and 5 years following the injury and hospital treatment. Further, these children were assessed by their parents on the amount of distress displayed during injury and hospital treatment. A comparable group of 1300 schoolchildren (Random Group) were randomly selected from local schools in the same geographical area as children recruited from the emergency room. During school time, these children were also given the modified CHCAQ. Each child was asked about his or her previous medical experiences. Four yes-no questions were attached to the front of the CHCAQ that asked the child to indicate whether or not they (1) had ever stayed overnight in the hospital, (2) had ever had an

operation, (3) had ever gone to the emergency room due to an illness, and (4) had ever gone to the emergency room due to an injury.

The results of the study demonstrated the role of previous experience on children's health care attitudes and they provided support for the mediating effects of age and pain sensitivity on children's health care attitudes. When investigating the effects of experience on children's attitudes in the Random Group, it was found that children who had been to the emergency room for injury liked the emergency room more than children who had not. This is in contrast to other studies which looked at the relationship between experience and attitudes, all of which found that aversive medial experience was associated with more negative, not positive, attitudes (Melamed et al., 1982; Dahlquist et al., 1986; Pate et al., 1996). However, having been to the emergency room only accounted for .4% of the variance in liking the emergency room. Further, it was reported that children who had been to the emergency for illness were more willing to approach the emergency room than children who had not been to the emergency room for illness, accounting for 1.4% of the variance in willingness to approach the emergency room. Similarly, children who reported having had an operation also reported more positive health care attitudes. Children who had not had an operation liked operations less than children who reported having an operation. Further, these children who reported having had an operation also reported less avoidance to having another operation. It was also reported that having stayed overnight in the hospital also had an impact on children's health care attitudes. Children who reported that they had stayed overnight in the hospital reported less avoidance toward having an operation than children who had no experience

staying overnight in the hospital. Thus, overall the results suggest that aversive experiences with the health care system promote positive health care attitudes in children. However, the relationships are modest at best, suggesting that there are other factors that play mediating roles.

Pain sensitivity was also found to be a significant factor in children's health care attitudes. Pain sensitivity was defined as each child's average score on the pain scale portion of the CHCAQ. Approximately 7% of the variance in liking other aspects of the health care system, when emergency rooms and operations were excluded, was accounted for by pain sensitivity and 3.4% of the variance in liking operations. Further, pain sensitivity also accounted for 2.1%, 3.5%, and 4.8% of the variance in willingness to go to the emergency room, have an operation, and approach other aspects of the health care system respectively. Children who were more sensitive to pain were less likely to like and approach the health care system than children who were less sensitive to pain. Comparable findings have also been reported by Bush and Holmbeck (1987), and Hackworth and McMachon (1991).

Other internal factors were also investigated in Peterson et al. (2002). Age was found to mediate the relationship between children's health care attitudes and experience. Supporting findings by Bachanas and Roberts (1995), older children were less likely to like and approach the health care system than younger children. Gender and levels of distress did not relate to children's health care attitudes. Similarly, children's ratings of efficacy of the health care system were not influenced by any of the independent variables (experience, age, gender, distress, pain sensitivity).

Against prior postulations, the results of the study by Peterson et al. (2002) suggest that prior aversive health care experiences lead to more positive health care attitudes in children. This was surprising because in the dental domain, research has consistently found that aversive dental experiences lead to an increase in dental anxiety. Even within the medical domain, it has also been shown that aversive medical experiences lead to negative health care attitudes. However, there were some surprising findings within this study. First, the effect size was relatively small. The largest amount of variance accounted for by any variable was only 7.6%. Thus, this may suggest that other variables are also associated with children's health care attitudes and, as such, are worth investigating. Second, although it was found that contact with the emergency room was associated with more positive health care attitudes toward emergency rooms by children in the Random Group, it was also found that children in the Trauma Group liked the emergency room less than did those children in the Random Group. These two findings seem contradictory. A question that arises from such a seeming contradiction is, what is influencing children in the Trauma Group to report more negative attitudes toward health care? These children were recruited from the emergency room and were consistently interviewed about their experience for a 5-year duration. Furthermore, it was also found that a few children within the Trauma Group indicated on the questionnaire that they had not been to the emergency room for an injury when in fact they actually had. Peterson et al. (2002) suggest that either these children did not understand the question or did not recall the visit. This latter assumption may suggest that memory may also play a

mediating role within the relationship between experience and children's health care attitudes.

A preliminary investigation of memory and children's health care attitudes revealed that memory may indeed play a mediating role (Peterson & Tucker, 2002). In the Trauma Group, children's memory for injury and hospital events, immediately and five years later, related to their overall health care attitudes even though those attitudes were assessed 5 years later. Children who remembered more about their injury and hospital visit had more negative attitudes toward the health care system than children who remembered less about their injury and hospital events. Further, those children in the Trauma Group who indicated that they had not been to the emergency room due to an injury had attitudes that were comparable to children in the Random Group who indicated that they had not been to the emergency room due to an injury (i.e., more negative attitudes). Thus, the investigation suggested that not only is experience with the health care system related to positive attitudes, but how much a child remembers about that experience is also a crucial determinant.

Memory for Medical Experiences

Before the assumption that memory may play a mediating role within the relationship between children's health care attitudes and experience can be explored, the ability of children to be able to accurately retain information regarding their health care experiences and convey this information to others must be documented. Research in the domain of children's memory has demonstrated the remarkable ability children have to recall pleasurable events such as visiting Disney World (Hamond, & Fivush, 1991) or the

birth of a new sibling (Sheingold & Tenney, 1982). Research has also documented the remarkable ability children have to recall aversive or traumatic events (Merritt, Ornstein, & Spicker, 1994; Peterson & Bell, 1996; Peterson, 1999; Peterson & Whalen, 2001).

Terr (1988) documented children's ability to remember traumatic events that occurred when they were between the ages of 6 months and 4 years old. Traumatic events included sexual abuse, accidents, kidnappings, dog bites, etc. She suggested that 2½ to 3 years of age is the period where most children begin to encode and retrieve some sort of verbal memory. However, gender differences were apparent; girls were better able to verbalize parts of the trauma than boys. Repeated events and/or variable events, for example child abuse, were less fully remembered than single episodic events. Startlingly, she also demonstrated that younger children, who had no or little verbal account of their traumatic experience, displayed 'behavioral memories' in the form of play, fears, or personality changes. For example, Terr referred to a young boy referred to as Brent, who played with the dolls in a sexually abusing manner. However, Brent displayed no verbal memory of his own sexual abuse. The results of Terr's study demonstrated that children who are at least 2½ to 3 years of age at the time of traumatic events can provide accurate details of those events and can remember them accurately up to 12 years from the time of the trauma.

Dealing more specifically with children's ability to recall their medical experiences, the work conducted by several researchers has provided ample evidence that children can recall their medical experiences accurately. Baker-Ward, Gordon, Ornstein, Larus, & Clubb (1993) examined the extent to which children 3, 5, and 7 years in age can

encode a salient event, a pediatric examination, and recall this event over delays of up to 6 weeks. Children demonstrated extensive and accurate recall of the event initially and at the three delay periods (1week, 3 weeks, and 6 weeks). Further, the delay interval of up to 6 weeks did not hinder the children's ability to recall the examination. However, significant age differences were reported; older children remembered more of the event. Similarly, Merritt, Ornstein, and Spicker (1994) investigated children's memory for an invasive medical event. Children between the ages of 3 and 7 were interviewed immediately following a voiding cystourethrogram (VCUG) and 6 weeks later. The VCUG is a novel, invasive procedure that requires the physician to have physical contact with the child's genitalia. The procedure involves the child lying on a table and having a catheter inserted through the urethra. The child's bladder is filled with a contrast medium and the child is instructed to void. Thus, the invasive nature and novelty of such a procedure should elicit high levels of distress in the child and should not be influenced by previously acquired knowledge of the event whether by direct or indirect experience. Immediately following the VCUG, children reported 88% of the features of the VCUG. Further, total recall of the event was positively related to age, although younger children did provide satisfactory recall. Following the delay period, relatively little forgetting was noted. Nevertheless, younger children forgot more than older children after the delay period. Overall, the results suggest that children are able to remember aversive medical experiences. However, the amount of distress displayed during the VCUG was negatively related to children's memory. Children who were more distressed during the procedure were likely to recall less about the event than children who were less distressed

at that time. Comparable findings examining children's memory for invasive medical procedures have also been reported by others (Quas, Goodman, Bidrose, Pipe, Craw, and Ablin, 1999; Chen, Zeltzer, Craske, and Katz, 2000). Thus, the results of the studies suggest that children are able to encode and accurately recall their medical experiences up to a 6-week delay period.

In 2000, Principe, Ornstein, Baker-Ward, and Gordon investigated children's memory for a medical examination. Furthermore, they extended their research to include the influence of intervening experiences on children's ability to recall their medical examination. Children between the ages of 3 and 5 were immediately interviewed upon completion of their physical examination and after a 12-week delay. The results indicated that those children who had completed an interview or observed the videotape of the child having an examination during the delay period displayed greater recall during the open-ended recall period at 12 weeks than children in the control group who were not seen during the delay period. The results also suggested that intervening experiences did have a negative effect on children's ability to accurately recall their examination at 12 weeks. However, the effects of the intervening experiences were apparent for 5-year-olds and not 3-year-olds. Overall, the study demonstrated that intervening experiences may facilitate children's ability to recall their medical experiences. However, intervening experiences may also inhibit children's ability to accurately recall their experience.

The three studies presented above suggest that children do have the ability to retain and recall their medical experiences, even with delays of up to 12 weeks and intervening experiences that may occur during the delay period. Further, they suggest

that older children can recall more information about their medical examination than younger children. However, what happens to children's ability to recall their medical experiences when recall is delayed over lengthier periods of time?

Several researchers have documented children's extraordinary ability to recall medical events of up to 1 year. Steward (1993) showed children's ability to recall medical experiences up to 6 months following the event. Children in this study were touched in various places on their bodies and experienced a variety of stressful medical procedures. During the recall session, children were asked about the touch and handling of their bodies, persons present during the medical experience and the placed it occurred. The initial interview revealed the children were able to accurately recall their medical experiences. However, children were less likely to report about body touch experienced. Follow-up interviews revealed children's extraordinary ability to recall their experience but also their ability to provide new, but accurate, information at 6 months. Using a lengthier delay, Goodman, Hirschman, Hepps, and Rudy (1991) investigated children's memory for stressful events such as venipunctures and inoculations received during a medical visit. Children between the ages of 3 and 7 years were tested up to 1 year following their experience. Although Goodman and colleagues reported that a decline in children's memory for stressful events was evident at 1 year, the results clearly showed children's remarkable ability to retain information following a 1-year delay. Further, they reported that children did not show an increase in recall of incorrect information nor was memory related to age, thus suggesting that information retained over the course of 1 year was accurate. Nevertheless, it was reported that high levels of stress during children's

experiences had a "beneficial effect on children's recall" (pg. 109). Children who displayed higher levels of stress accurately recalled more information than children who displayed lower levels of stress. Analogous to the previous study, Stuber, Nader, Yasuda, Pynoos, and Cohen (1991) investigated children's responses following bone marrow transplantations. Children between the ages of 3 and 18 years were interviewed 3, 6, and 12 months following their bone marrow transplants. Following each delay period, the results demonstrated that children not only remembered these experiences well but also displayed intrusive thoughts related to the experience. Accordingly, this overview tells us children's memories for medical experiences, and the ability to recall these experiences accurately up to 12 months later, is outstanding.

Although the research on children's memory for medical experiences has received considerable attention in the literature, relatively few studies investigated children's long-term memories for aversive medical events. A notable exception has been Peterson and her colleagues' longitudinal study on children's memory for traumatic events (Peterson & Bell, 1996; Peterson, 1999; Peterson & Whalen, 2001). Children between the ages of 2 and 13 years were recruited from a local children's hospital emergency room. All children suffered trauma injuries such as broken bones, lacerations requiring sutures, dog bites, second-degree burns, and crushed fingers requiring drainage, and were treated and discharged on the same day. Children were interviewed within 1 week of the initial injury, 6 months, 1 year, 2 years, and 5 years later. The interview format included both free recall (Tell me what happened when you hurt yourself?) and probed recall (What did the doctor do?) questions about the injury and corresponding hospital treatment.

Following the initial interview with the child, adult witnesses to the events were also interviewed in a comparable manner. Further, they were asked to rate the amount of distress that the child displayed during the injury and hospital treatment.

In 1996, Peterson and Bell noted children's extraordinary capacity to recall both their injury and hospital treatment following a 6-month interval from the initial interview, although researchers did note that children remembered less during the 6-month follow-up interview than they did initially. Further, it was reported that older children (9- and 13-year-olds) recalled more information than younger children (2- to 5-year-olds). However, the difference in age groups was more substantial when 2-year-olds were compared to all older age groups. Children's recall was also very accurate; however, older children made significantly fewer errors than younger children both initially and at the 6-month follow-up. The amount of distress children displayed during the injury, as reported by the adult witnesses, failed to relate to children's recall ability about their injury. However, the amount of distress displayed during hospital treatment did decrease children's recall of hospital treatment. Comparable findings were again reported following the 2-year delay interview (Peterson, 1999). Children continually demonstrated remarkable recall of their injury and hospital treatment 2 years prior. However, it was noted that age was not related to more or less forgetting in children. Thus, Peterson concluded, "the passage of time seemed to have a comparable effect on all children regardless of age" (pg. 10). This finding contradicted the finding by Baker-Ward et al. (1993) and others. Furthermore, it was found that children recalled events pertaining to the injury more than events pertaining to hospital treatment. Children were again

interviewed following the 5-year delay from initial injury and treatment (Peterson & Whalen, 2001). Again, findings were consistent with the 6-month and 2-year follow-ups. Children at age 2 initially were able to recall approximately 50% of the injury event and 25% of the hospital events while children at age 12 to 13 initially were able to recall 85% of the injury events and 75% of the hospital events. However, unlike the 6-month follow-up, it was reported that stress was positively related to children's ability to recall hospital central events. Congruent with others (Goodman et al., 1991), children who displayed higher levels of stress during hospital treatment were able to recall their hospital treatment more than children who displayed lower amounts of distress. Children's ability to accurately recall their injury and hospital treatment after a 5-year period provided substantial evidence for children's long-term memory for medical experiences.

Overall, research on children's memory for medical experiences reveal the extraordinary capacity of children to recall their medical experiences. Further, the studies above have indicated a number of important findings dealing with children's memory for medical experiences. First, children can encode and recall their medical experiences with great accuracy when compared to parental reports of their experiences. Second, young children can remember details of their medical experiences well. However, there is an inverse relationship between memory and age, where older children can recall more details about their medical experience than younger children. Third, the amount of distress displayed by children during their medical experience can inhibit or enhance their

memory. And finally, this ability to recall their medical experiences is maintained not only immediately following the event, but after lengthy intervals of up to 5 years.

The Present Study

From the literature, it is clear that a relationship between aversive health care experiences and children's health care attitudes exists. Furthermore, a number of factors are assumed to play a mediating role in the relationship between experience and health care attitudes. However to date, these factors only account for a small proportion of the variance in the relationship between experience and health care attitudes. As such, it can be assumed that other, unrevealed factors also play a mediating role, factors that may be extremely important in determining whether an individual will have negative or positive health care attitudes. These factors may also be important in promoting positive health care behaviours in the future. Thus, it is crucial that research continues to investigate health care attitudes, particularly those of children. It is also clear from the literature that children find highly salient medical events very memorable both initially and long-term. Thus, this suggests that one's memory for health care experiences may play an important mediating role in the relationship between previous aversive health care experiences and children's health care attitudes.

Are our memories important determinants of our attitudes towards persons, places, and procedures? Specifically, can our memories about certain situations influence how we judge that situation in the future, whether those judgments are positive or negative? And if so, are memory fluctuations (increase or decrease) in the amount of detail that we remember about that situation evident in attitudinal change? The purpose of the present

investigation is to address these questions within the domain of children's health care. To investigate the assumption that memory may play a mediating role within the relationship between children's health care attitudes and aversive health care experiences, children between the ages of 6 and 13 years were recruited from the emergency room at the Janeway Children's Hospital. Children were contacted and interviewed at home within 1 week of their hospital experience and following a 6-month delay period. Following each of the interviews, the CHCAQ was administered to each child.

It is hypothesized that the children's memories would be an important determinant of their attitudes towards persons, places, and procedures.

1. In relation to health care experiences, children who remember more details pertaining to their injury and visit to the emergency room will report more negative attitudes toward health care personnel, settings, and procedures than children who remember fewer details pertaining to their injury and emergency room visit both initially and following the 6-month delay and vice versa.
2. Furthermore, it is hypothesized that memory changes in the amount of detail that we remember about an event will also be reflected in attitudinal change for that event and vice versa. Children who remember less about their injury and emergency room visit after the 6-month delay will report more positive health care attitudes than initially. Similarly, children who remember more about their injury and emergency room visit after the 6-month delay will report more negative health care attitudes than initially.

Method

Participants

Children between the ages of 6 and 13 years old were recruited from the emergency room of the Janeway Children's Hospital in Newfoundland, Canada. All children within a 100 mile radius are taken exclusively to this emergency room for treatment, so the children were a cross-section of the population. Children were mostly Caucasian and from mixed socioeconomic backgrounds. All children in the present study suffered trauma injuries, which were clearly defined by the emergency room staff, and required outpatient treatment, including lacerations requiring sutures (N = 13), bone fractures and sprains (N = 24), and other injuries involving being bitten by a dog, dislocation of a joint, and eye injuries (N = 9). In addition, children who visited the emergency room because of illness, who required hospitalization, or who showed signs of being abused were excluded from the study.

There were 46 children who participated in the current study. The age groups were as follows: eight 6-year-olds (5 boys and 3 girls), two 7-year-olds (0 boys and 2 girls), three 8-year-olds (2 boys and 1 girl), four 9-year-olds (2 boys and 2 girls), thirteen 10-year-olds (10 boys and 3 girls), twelve 11-year-olds (6 boys and 6 girls), two 12-year-olds (1 boy and 1girl), and two 13-year-olds (1 boy and 1 girl).

A total of 24 additional children were also recruited but their data was excluded from the present analysis for various reasons: (a) twenty-one children could not be contacted after the six-month interval; (b) two children withdrew from the study prior to

the six-month follow-up; and (c) one child's interview could not be transcribed due to taping problems.

Procedure

The families of all children had been approached in the hospital emergency room where they were asked by a trained recruiter (one of six) to participate in a study of children's memories and health care attitudes. Each family was given an information sheet pertaining to the study and a consent form (see Appendix A) which, once signed, permitted the researcher to contact the family. They were then contacted at home by phone and, if willing, a home visit was set up by one of two trained interviewers. Approximately 65% of all contacted families agreed to participate. At this time, children were interviewed by the researcher about what they recalled about their injuries and subsequent hospital treatment. Following the completion of the standardized interview, the CHCAQ and Distress Scale were administered (see below). During the initial interview, parents and, if necessary, other adult witnesses were interviewed in order to provide a standard against which to evaluate the accuracy and completeness of the children's interview. Further, parents were also asked to complete the Distress Scale. Children were always interviewed first, with the standardized interview described below. The same standardized interview was also given to the parent and other adult witnesses.

The initial interview occurred approximately 1 week following the injury and hospital treatment (mean delay = 12 days; range 1-20 days). Following a 6-month delay period (mean delay = 6 months, 21 days; range 6-8 months), children were again contacted and a second home visit was scheduled. When telephone contact was made,

families were asked not to rehearse the events prior to the visit because the purpose of the study was to investigate children's memory for the events. No such request was made during the initial interview because it was felt that this request would be ignored due to the high salience of the experience. During the follow-up visit, children were re-interviewed about their injury and subsequent hospital treatment using the same standardized interview, and following the interview the CHCAQ was re-administered. Parents were not interviewed at this time. To control for any intervening effects of later experience, parents were asked whether their child had received any medical treatment (i.e., check-ups, E.R. visits, etc.) during the 6-month delay period. However, further hospital experiences by the children were infrequent during the delay and as such their effects were not considered in the analyses.

Measures

Standardized Interview. The format of the interview was an exact replication of a standardized interview successfully used in studies investigating children's memory for traumatic events (Peterson, 1994; Peterson & Bell, 1996; Peterson & Whalen, 2001; see Appendix B for interview). The format of the interview began with a free recall phase. During free recall, the researcher prompted the children with statements such as "Tell me about what happened when you hurt yourself" and "Tell me about what happened when you went to the hospital." During this period, the researcher's responses were limited to gestures such as nodding or simple statements (e.g., "really", "what else", or "yes") which acknowledge to children that the researcher was listening and interested in hearing more about the events. Following free recall, the researcher began the probed recall phase of

the interview. During probed recall, the researcher asked children specific questions using wh-questions (e.g.,Who was with you when it happened?). The researcher refrained from using closed-ended questions that required children to respond in a yes-no manner. However, due to the impossible task of revising all questions into open-ended ones, a few yes-no questions were asked, to obtain any relevant information not provided by children in other ways (e.g., Did you cry?). Responses to such questions were only coded if the child provided elaboration of a yes or no response (e.g., Yes, a lot.) If specific information was given during the free recall phase, children were not questioned about it during the probed recall phase. All interviews were audio-recorded and later transcribed verbatim for scoring.

The parental and adult witness interview was a replication of the standardized interview used with the children. Parents and adult witnesses were given both the free recall and probed recall phases of the interview. However, questions were modified in such a way that they asked what happened to their child (e.g., Tell me about what happened when your child hurt her/himself?). All parental and adult witness interviews were also audio-recorded and later transcribed verbatim.

Children's Health Care Attitudes Questionnaire. Two modified versions of the Children's Health Care Attitudes Questionnaire (CHCAQ) developed by Bush and Holmbeck (1987) were used to assess children's health care attitudes. Version one of the CHCAQ was used for children between the ages of 6 and 10 years. At the beginning of the questionnaire, two additional items were presented which required children to indicate their sex and age. In the CHCAQ, there are three groups of eight multiple-choice

questions that focused on three attitudinal dimensions (like-dislike, attributed effectiveness-ineffectiveness, and approach-avoidance). Four additional items were added that measured children's attitudes for hospital emergency rooms. For the dislike questions (e.g., How do you like doctors?), an array of five faces ranging from a smile to a frown were presented. Children were given directions at the top of the page that told them to circle the letter that they agreed with the most and to use the pictures to help them with their choices. The same array and instructions were used for the attributed effectiveness questions (e.g., When people go to the hospital, what happens?). It was believed that children at this age would be better able to indicate their feelings toward these questions in terms of concrete symbols, such as faces, as opposed to the abstract symbols, such as plus-minus signs, that were presented in the original questionnaire. For the approach-avoidance questions (e.g., Let's say that you were told that you should have a needle?), an array of yes and no symbols were used and children were given the same instructions. Each set of pictures or graphic symbols was presented next to each question, and next to each corresponding answer, rather than presenting each at the top of the page as in the original questionnaire.

The second version of the questionnaire was administered to children between the ages of 11 and 13 years of age. This version was identical to version one except for the removal of the pictures and graphic symbols in the like-dislike, attributed effectiveness-ineffectiveness, and approach-avoidance questions (see Appendix C for questionnaire). The score on the CHCAQ was divided into three parts. Children received a score for each of the attitudinal dimensions (like-dislike, attributed effectiveness-ineffectiveness,

and approach-avoidance). Scores for each attitudinal dimension represented children's overall liking, willingness to approach, and efficacy of the health care system. Scores for each child's responses were obtained by summing multiple-choice answers in the attitudinal dimensions of like and efficacy (A = 1 point; E = 5 points). Low scores on these two dimensions indicated more positive health care attitudes and high scores indicated more negative health care attitudes. However, scoring on the approach questions was reversed (A = 5 points; E = 1 point) so that a high score indicated less willingness to approach and would be consistent with scores on the other attitudinal dimensions of like and efficacy. Because the current study's key focus was on children's health care attitudes in non-dental domains, all questions pertaining to children's attitudes towards dentists and dental procedures were omitted from analyzes.

Distress Scale. Two versions of the distress scale were used; this scale was administered to both children and parents (see Appendix D for scale). Both distress scales included four questions intended to measure how upset children were during the injury and subsequent hospital treatment. Three versions of both the child and parental scale were used corresponding to three different injuries (e.g., lacerations, broken bones, and other injury). Themes covered by the questionnaire included distress ratings at injury, at initial examination, and at treatment. Children and parents were asked to rate the degree of distress exhibited by the child for each question on a 5-point scale (1 = not at all upset; 5 = extremely upset).

Four distress scores were derived from the Distress Scale: distress at time of injury, distress at time of initial examination, distress at time of treatment, and the highest

level of distress exhibited by the child at the hospital. For the amount of distress exhibited by the child at the time of injury, initial examination, and treatment, the distress score was represented as both the child's and parents' rating for each question (i.e., two distress scores representing the parents' score and child's score). However, because not all children received suturing of their lacerations, bandages, and other treatment activities, the distress score for the highest level of distress exhibited by the child at the hospital was represented as the highest rating obtained out of the three hospital questions on the distress scale for both the child and parent.

Data Reduction for Memory Scores

A variation of the prototypical pattern of scoring used by Peterson and colleagues (Peterson, 1991; Peterson & Bell, 1996; Peterson & Whalen, 2001) was employed in the current study. On the basis of prior research, it was believed that because of the relatively short delay period of 6 months, relatively little forgetting would occur in children recalling the major events of the injury and subsequent health care treatment. For example, all children were expected to remember central aspects of their experience such as where they injured themselves, who was present, whether they received x-rays or suturing, etc. However, it was expected that children may forget detailed peripheral information (i.e., whether they received 4 or 6 stitches, the time the injury occurred, the exact location, etc.). Unfortunately, prior scoring procedures failed to score such detailed peripheral information and instead focused on whether or not the child provided the gist of the information. As such, children who recalled that they had stitches would receive

the same score as children who recalled that they received four stitches or similarly, children who recalled that they were in the backyard received the same score as children who recalled that they were in the backyard, down by the corner of the fence, next to a tree. Thus, it was believed that much of the information would be lost in the scoring of the transcripts and as such, a variation of the prototypical pattern of scoring was employed that consisted of a more fine grained analysis of children's recall.

Scoring of the transcripts consisted of using a standard score sheet which directly coincided with the probed recall format of the standardized interview (see Appendix E). Two raters scored 15 % of the transcripts and inter-rater reliability was established at 96%. Transcripts were scored for total recall. Total recall corresponded to the overall amount of information provided during both the free recall and probed recall phases of the interview. Each transcript was scored for two main types of memory that were based on (1) the quantity of recall and (2) the accuracy of recall for both the injury and hospital events. Quantity of recall looked at the overall amount of the information children provided about their injuries and subsequent health care treatments. It was further broken down into three measures of quantity recall that investigated the amount of (a) basic information provided, (b) elaboration on the basic information provided, and (c) the proportion of elaborations per basic information provided. Accuracy of recall looked at how accurate the information provided by children about their injuries and subsequent health care treatments was when this information was directly compared to parental and adult witness reports. This measure was further sub-divided into (a) the accuracy of the basic information provided and (b) the accuracy of the elaboration on the basic

information provided. Thus, children received five memory scores for total recall (three for quantity of recall and two for accuracy of recall) for each of the injury and hospital events. Following is a description of how each of the two main types of memory measures was scored.

Quantity of Recall. As stated above, quantity of recall looked at the amount of information children provided about their injuries and health care treatment. Information provided by children was broken down into six categories: people present (e.g., mom, dad, doctor, nurse), locations (e.g., park, house, backyard, hospital, x-ray room), objects involved (e.g., bike, tree, rock, needle, cast), actions performed (e.g., falling down, running, stitching, breaking), emotions felt (e.g., cry, sad, happy), and time (hours, minutes, days). From these six categories, the amount of information recalled by children was tabulated for both the injury and hospital events separately.

The first measure of quantity of recall dealt with the amount of basic information provided by children. In basic information, items were only counted if they provided unique information pertaining to the event. For example, if a child mentioned that his mother was the first to see him, his mother brought him the cloth, and the cloth was very cold, mother and cloth would be counted only once because the child was not providing any unique information. However, if the child mentioned that he waited in the waiting room, went to the examination room, and then back to the waiting room, the waiting room would be counted twice because the child has provided unique information about his hospital experience. The number of items applicable for each of the six categories was summed to give a total measure of basic information.

The second measure of quantity of recall dealt with the amount of elaboration on the basic information items provided by children. This measure represented the number of elaborations (e.g., adjectives, modifiers, qualifiers, adverbs, etc.) provided by children on the six categories scored above (i.e., people, location, objects, actions, emotions, and time). For example, if a child recalled that his mom's friend Joan was present during the injury, the child would receive credit for 'mom's friend' in the measure for elaboration on the category person and also credit for 'Joan' in the measure for basic information for person. All elaborations were counted because it was believed that elaborations would be unique for each item. For example, a big cut is not the same as a big cloth, thus, both references to big would be counted. Again, the number of elaborations recalled for each category was summed to give a total measure for the amount of elaboration.

The majority of items included in the scoring of the transcripts were applicable to all children (e.g., location of injury, persons present) while other items were applicable to only a subset of children (e.g., having a x-ray, getting a cast). As such, children differed in the number of relevant items pertaining to their injuries and subsequent health care treatment and thus differed in the number of items that could be recalled during the standardized interview. In order to determine whether some children were more elaborative when recalling their injuries and/or hospital treatments or whether children had more information to elaborate on than other children, the third measure for quantity of recall looked at the proportion of elaborative information provided for each item of basic information provided. An overall measure of elaborations per basic information

recalled was calculated. This score was obtained by dividing the total number of elaborations by the total number of basic information items provided.

Accuracy of Recall. To determine the accuracy of children's reports of their injury and hospital treatment, each child's score sheet was compared to their corresponding parental and/or adult witness' interviews. Children received credit only for items correctly confirmed by the parent or adult witness. In the rare event that a child provided information that was neither confirmed nor disconfirmed by adult witnesses, it was ignored and not scored. However, if the information could be readily inferred by the rater, it was scored as accurate. If information was neither confirmed or disconfirmed it was classified as unknown and left out of the calculations. Thus, children's memory scores for accuracy for both injury and hospital events were the proportion of items accurately (i.e., confirmed or inferred) recalled divided by the total number of items recalled (i.e., confirmed, inferred, and disconfirmed) and multiplied by 100. Two measures of accuracy of recall were obtained for both injury and hospital treatment.

The first measure of accuracy of recall looked at how accurate children were when recalling basic information for each of the six categories (i.e., persons, location, objects, actions, emotions, and time). Thus, accuracy of the recall for basic information was the proportion of basic information items recalled accurately divided by the total number of basic information items provided and multiplied by 100. For example, if a child recalled nine items present at injury and 3 items were confirmed, 2 were disconfirmed, and 4 were unknown, the child would receive an accuracy score of 3/5 (or 60%) for recall of basic information.

The second measure of accuracy of recall looked at the accuracy of children's elaborations of the basic information. Thus, accuracy of recall for elaborations was the proportion of elaborations recalled accurately divided by the total number of elaborations provided and multiplied by 100.

Results

In this section we will first look at the overall differences in children's memory and attitudes initially and following the 6-month delay. We will then investigate the relationship between children's memory and their subsequent healthcare attitudes by testing the specific hypotheses presented in the introduction. Following this, we will look at the impact of the amount of distress on children's memory and health care attitudes. Due to the high attrition rate from the initial to the 6-month follow-up interview, a preliminary analysis was performed to determine whether differences in memory recall and health care attitudes initially existed between children who completed the 6-month follow-up interview and children who did not complete the 6-month follow-up interview. Independent t-tests indicated no differences in initial memory recall and health care attitudes were evident between the two groups (*ps* > .05).

Memory

This section will be divided into two sub-sections, differences in children's memory for injury related events and differences in children's memory for hospital related events. Furthermore, each section will examine any age or gender effects evident. For analysis, children were divided into two groups based on age. Older children were classified as children who were 10 years or older (N = 29) while younger children were

classified as children younger than the age of 10 years (N= 17). Justification for this division is based on research which has shown that younger children's memory performance is different than older children's performance (e.g., Peterson & Bell, 1996). Older children are more competent at memory tasks, provide more information than younger children, and are likely to forget less than younger children. All analyses were performed using these two age groups.

Memory for Injury. Tables 1 and 2 display the means and standard deviations for children's quantity and accuracy of recall across the two time periods. One within-subject (time: initial vs. 6 months) and two between-subjects (age: two levels and gender: two levels) ANOVAs were completed separately for each of the dependent measures (i.e., elaborations and basic information scores for both quantity and accuracy of recall and elaborations/basic information scores). Overall, the results displayed few significant differences between children's recall initially and 6 months later. For quantity of elaborations recalled, a main effect for age was found (F (1, 42) = 6.58, p = .01). Overall, older children (M = 49.00) provided more elaborations than younger children (M = 32.71). Furthermore, a significant Time x Gender interaction was found (F (1, 42) = 4.19, p = .05). Females (M = 36.11) were likely to recall less elaborations than males (M = 48.04) at the 6-month time period and both males (M = 41.78) and females (M = 44.37) initially. However for accuracy of recall, a main effect for time was found (F (1, 42) = 10.91, p = .002). Initially recall of elaborations was more accurate than recall of elaborations at 6 months (M = 99.38% vs. M = 96.79%).

A main effect of age was found for children's quantity of recall for basic information (F (1, 42) = 10.02, p = .003). Overall, older children (M = 111.55) provided more basic information than younger children (M = 78.32). Furthermore, it was found that children were more accurate in their recall of basic information initially (M = 99.31%) than at 6 months (M = 96.59%; F (1, 42) = 9.19, p = .004).

An ANOVA was also conducted on children's elaborations per basic information scores. No significant differences were found in children's scores across the two time periods (p >.05). Furthermore, no differences in age or gender were found initially or 6 months later (ps > .05). Therefore, the results would suggest that all children provide a comparable proportion of elaborations per basic information items. On average, children provided approximately 1 elaboration for every 2 basic information items provided both initially and 6 months later.

Overall, the results for children's recall of injury related events suggest that children's recall across the two periods remained consistent. However, accuracy of children's recall did decrease following the 6-month delay: children's recall was less accurate at 6 months than initially. Furthermore, it is apparent that age plays a significant role in children's recall of injury related events: older children recall more information than younger children.

Memory for Hospital. Similar analyses were performed on children's recall of hospital events both initially and at the 6-month time period. Tables 3 and 4 present the means and standard deviations for children's quantity and accuracy of recall scores for both time periods. One within-subject (time) and two between-subjects (age and gender)

ANOVAs were performed on each of the three dependent measures (i.e., elaborations and basic information scores for both quantity and accuracy of recall and elaborations/basic information scores). For quantity of elaborations recalled, a main effect of age was found (F (1, 42) = 5.40, p = .02). Older children (M = 39.95) provided more elaborations than younger children (M = 23.79). Furthermore, main effects of time and age were found for children's accuracy of recall (F (1, 42) = 6.59, p = .014; F (1, 42) = 5.27, p = .02 respectively). Overall, children were more accurate initially (M = 97.94%) than at 6 months (M = 94.04%) and also older children (M = 97.87%) were more accurate than younger children (M = 92.59%). However, a two-way interaction between the two factors, time and age, only approached significance (F (1, 42) = 3.86, p = .056).

For the amount of basic information recalled and the accuracy of recall, two ANOVAs were performed. Overall, only a main effect of age on children's recall of basic information was found (F (1, 42) = 8.14, p = .01). Older children (M = 87.78) recalled more basic information about their hospital events than younger children (M = 52.05) across the two time periods. Unlike children's accuracy of recall for injury events, no differences were found in children's accuracy for hospital events (ps > .05).

An ANOVA was also performed on children's elaborations per basic information scores. Interestingly, a significant three-way interaction among time, gender, and age was found (F (1, 42) = 5.87, p = .02). Figure 1 plots this interaction for males and females. As can be seen from the figure, older males and females remain relatively consistent in the proportion of elaborations per basic information from the initial interview to the 6-month follow-up (p >.05). However, this relationship is not apparent for younger males

and females. Across the two time periods, younger males increase their number of elaborations per basic information, from .40 to .50, while younger females decrease their number of elaborations per basic information, from .46 to .35 (t (1, 15) = 2.47, p = .03).

Children's Health Care Attitudes

As noted, questions about attitudes toward the health care system could be divided into three sections: liking, efficacy, and approach questions. First, an examination of the reliability of the questions in each group was performed. The Cronbach's alpha reliability for the liking items was .71 for the initial interview and .69 for the 6-month interview, .80 and .87 for efficacy items both initially and at 6 months respectively, and .86 and .87 for approach items both initially and at 6 months respectively. The alpha for the entire scale was .37 initially and .49 at 6 months indicating that the items were not all measuring the same construct. As the reliability indicated that the items within each set were measuring the same construct, items in each set were summed together to create three variables, like, efficacy, and approach. Table 5 presents the means and standard deviations for children's attitudinal scores for each of the three dimensions across the two time periods.

Like. A one within-subject (time) and two between-subjects (age and gender) ANOVA was performed on children's attitudinal scores for like. Overall, the analysis showed no differences between the initial and 6-month time periods. (M = 2.87 vs. M = 3.02 respectively). Further, no differences were found with age or gender (ps > .05).

Efficacy. A one within-subject (time) and two between-subjects (age and gender) ANOVA was also performed on children's attitudinal scores for efficacy. No difference between efficacy score initially (M = 1.94) and 6 months later (M = 2.01) was found.

However, analysis revealed a main effect for age (F (1, 42) = 13. 92, p = .001). Younger children (M = 1.74) reported that the health care system was more effective than older children (M = 2.11). No differences were found in children's efficacy scores between males and females (p >.05).

Approach. A one within-subject (time) and two between-subjects (age and gender) ANOVA was also performed on children's attitudinal scores for approach. Again, no significant differences were found between the two time periods (M = 3.00 vs. M = 2.87). Further, no differences were evident between males and females or older and younger children (ps >.05).

Overall, the analyses suggest that children's health care attitudes on each attitudinal dimension remained relatively consistent across the two time periods. Furthermore, the results suggest that that mediating role of age on children's health care attitudes is only apparent when comparing children's attitudes on the overall effectiveness of the health care system. This may therefore suggest that other factors may play a mediating role in children's health care attitudes or that a 6-month delay period is not sufficient time for attitudinal change.

The Relationship between Memory and Children's Health Care Attitudes

The first hypothesis was that children who remember more details pertaining to their injury and visit to the emergency room will report more negative attitudes toward the health care system than children who remember fewer details pertaining to their injury and emergency room visit both initially and following the 6-month delay. To determine whether this relationship exists, partial correlations controlling for the effects of age (in

years) and gender were performed on children's memory scores and children's attitude scores. To decrease the probability of Type I Error, the conventional alpha level of .05 was used to determine significance. Table 6 and 7 provide correlations for these results. However, to simplify the discussion of these results, this section will be sub-divided into two sections. The first section will discuss the results pertaining to the relationship between children's memory for their injuries and their subsequent health care attitudes. The second section will then focus on the relationship between children's memory for their hospital visit and their health care attitudes.

Memory for Injury and Health Care Attitudes. As can be seen from Table 6, the results suggest that children's memory for elaborations or basic information both initially and 6 months later does not relate to children's liking of or willingness to approach the health care system initially or 6 months later (*p*s > .11). Further, the accuracy of the children's memory scores was also not related to children's liking of or willingness to approach the health care system initially or 6 months later (*p*s >.28). For children's efficacy of the health care system, a different pattern emerged. Initially, children's memory scores for elaborations was related to how effective children viewed the health care system (r (42) = .33, p = .03). Children who remembered more elaborations about their injuries were likely to report that the health care system was less effective than children who remembered fewer elaborations about their injuries. Furthermore, efficacy scores were also related to children's memory of basic information for their injuries both initially and 6 months later (r (42) = .40, p = .01 and r (42) = .39, p = .01 respectively). Children who provided more basic information about their injuries, initially and 6 months

later, were also likely to report that the health care system was less effective initially than children who provided fewer details about their injuries.

Memory for Hospital and Health Care Attitudes. In general, a similar pattern of mostly non-significant correlations were found for children's memory for hospital related events and their health care attitudes as for children's memory for injury related events and their health care attitudes (see Table 7). The results suggest that children's memory for hospital related events was not related to their efficacy or approach scores initially or 6 months later (*p*s >.05), although one significant relationship between children's memory and their subsequent health care attitudes emerged. Children who were more accurate in recalling basic information about their hospital visit initially were likely to report less liking of the health care system at 6 months than children who provided less accurate basic information (r (41) = -.37, p = .02).

In general, the results suggest that children's memory for injury and hospital related events may play a minor role in children's health care attitudes, at least when judging the effectiveness of the health care system. Children who provide more elaborations and basic information were less likely to view the health care system as effective. However, how accurate their memories were for injury related events did not relate to their health care attitudes. In contrast, accuracy did play a role in the relationship between children's memory for hospital related events and their health care attitudes. Children who were more accurate in reporting basic information pertaining to their hospital events were more likely to dislike the health care system than children who were less accurate in reporting basic information pertaining to their hospital visit.

The Relationship between Changes in Memory and Children's Health Care Attitudes

The final hypotheses dealing with the relationship between children's memory for their injury and hospital visit and their health care attitudes dealt with changes in memory and attitudes from the initial interview to the 6-month follow-up. It was hypothesized that memory fluctuations in the amount of detail that children remembered about their injury and emergency room visit would be represented in attitudinal change on the CHCAQ. In addition, it was also hypothesized that health care attitudes would remain consistent in those children who displayed no memory fluctuations in their recall for their experiences. To investigate these hypotheses, it was necessary to compute difference scores for children's attitudes, that is, scores which would represent the amount of change in children's attitudes and memory from the initial to the 6-month follow-up. To do so, each initial attitude score was subtracted from its subsequent 6-month score and to this difference a constant of 10 was added to eliminate negative numbers. As such, a difference score less than 10 would indicate a negative change in attitudes, while a difference score greater than 10 would indicate a positive change in attitudes. Difference scores equal to 10 would indicate no change in memory from the initial to the 6-month follow-up. Difference scores were also computed for each memory score in a similar fashion. On the basis of these scores, children were classified as displaying positive change (i.e., child recalled more at 6-month interview as compared to the initial interview), negative change (i.e., child recalled less information at 6 months), or no change (child recalled the same amount of information) in memory for injury and hospital related events. Table 8 displays the number of children who displayed either positive,

negative or no change in memory for both injury and hospital related events. Table 9 provides the mean difference scores for the CHCAQ based on each group.

Differences in Memory for Injury and Health Care Attitudes. To determine whether changes in children's memory for injury were associated with changes in their health care attitudes, partial correlations, controlling for the effects of age and gender, were carried out on each of the four difference scores for memory for injury (elaborations, basic information, and accuracy for both) and the three difference scores on the CHCAQ. The first half of Table 10 provides the results of these correlations. As can be seen from the table, no significant relationships were found between any of the variables (*p*s >. 05). Therefore, children who remembered less following the 6-month delay did not report more positive health care attitudes than initially and similarly, children who remembered more about their injury events did not report more negative health care attitudes than initially. Furthermore, changes in how accurately children recalled their injuries did not influence changes in children's health care attitudes (*p*s > .05).

Differences in Memory for Hospital and Health Care Attitudes. Similar analyses were performed on children's difference scores for their memory for hospital events and difference scores for their health care attitudes. Again, the effects of age and gender were removed from the equation. The lower half of Table 10 displays the results of the analysis. Comparable to the findings for injury related events, no significant relationships were found on any of the variables (*p*s >.05). Thus, the results would suggest that no relationship exists between changes in children's memory for hospital events and changes

in their health care attitudes. As such, children who remember less about their hospital experience do not report more positive health care attitudes and vice versa. Furthermore, changes in the accuracy of children's memories for hospital related events do not lead to changes in their health care attitudes. Therefore, children who become more accurate over time do not report more positive health care attitudes.

In summary, the results suggest that memory does not play a mediating role in children's health care attitudes. Analysis revealed that no relationship exists between changes in children's memory and their subsequent health care attitudes. Therefore, remembering more or less, or even the same amount of, information about their injuries and hospital events does not lead to changes in their health care attitudes.

Distress

Recall that children and parents were also asked to complete a distress scale. This scale was intended to measure the amount of distress children displayed during their injury and hospital experiences. This section will be devoted to the analysis of distress and the role that it plays with memory and also children's health care attitudes. First, this section will look at the role that age and gender have to play in the amount of distress displayed during their injuries and subsequent hospital experiences. Following this, we will then look at the relationship between children's and parents' ratings of distress to determine whether ratings are similar for children and their parents. This will then lead into the role that distress plays in children's memory for their injuries and hospital experience and also the role that it plays in children's health care attitudes.

Age and Gender. Two between-subjects (age and gender) ANOVAs were performed on children's four distress scores (distress at injury, initial examination, treatment, and hospital). Recall that distress at hospital indicated the highest level of distress exhibited by the child at the hospital. Table 11 provides the mean distress scores by age and gender. Distress scores did not differ by age and/or gender (*p*s >.05).

Parents' distress scores for their children were also analyzed to determine if gender or age influenced parents' distress ratings for their child. Table 11 also provides parents' mean distress scores by age and gender for the four ratings. Two between-subjects ANOVAs were performed on the four distress scores. Analyses revealed that gender and age were not related to parents' ratings (*p*s > .05).

Children's Versus Parents' Ratings. To determine whether children's distress ratings were comparable to their parents' distress ratings, Pearson R correlations were performed on the variables. Table 12 provides the correlational matrix for these relationships. As can be seen from the table, children's distress ratings for injury were not related to their parents' ratings of distress ($p > .05$). Similarly, distress ratings for initial examination at the hospital were also not related for parents and child. However, for distress at treatment and overall distress displayed at hospital, a different pattern emerged. Children who reported higher levels of distress during treatment of their injuries were likely to have parents who reported higher levels of distress for their children during treatment ($r\,(37) = .53, p = .001$). Also, a significant positive relationship emerged for children's and parents' distress rating for the overall amount of distress displayed during their hospital experience ($r\,(37) = .47, p = .001$). Therefore, children

with higher levels of distress at hospital were more likely to have parents who reported higher levels of distress at hospital for their children and children who reported lower levels of distress were more likely to have parents that also reported lower levels of distress.

Distress and Memory. Partial correlations, controlling for the effects of age and gender, were completed on children's distress ratings and children's memory scores for injury and hospital events. Tables 13 and 14 provide the results of this analysis. As can be seen from the two Tables, a number of significant relationships were evident. For children's memory for injury related events, analyses revealed that distress for injury or hospital experiences were not related to children's memory for elaborations or basic information initially or 6 months later (*p*s > .05). However, for accuracy of children's memory for injury related events two significant relationships were found. A negative relationship between children's reported distress for the initial examination and children's accuracy for basic information was found (r (33) = -.35, p = .04). Children who reported higher levels of distress during their initial examination were less accurate in recalling basic information initially than children who reported lower levels of distress during the initial examination. Furthermore, it was found that they were also less accurate when recalling basic information when they reported higher levels of distress during their treatment (r (33) = -.47, p = .001).

For the relationship between children's reported distress levels and their memory for hospital experiences, only one significant relationship was evident. It was found that children who reported higher levels of distress during their overall hospital experience

recalled more basic information for their hospital experience than children who reported lower levels of distress (r (33) = .34, p = .04). Overall, the results suggest that distress does not enhance or hinder children's memory for their hospital experiences.

Distress and Children's Health Care Attitudes. Partial correlations were also computed for children's distress scores and their health care attitudes both initially and following the 6-month follow-up. Table 15 provides the correlations for these analyses. As can be seen from the table, a number of relationships were evident. However, as can be also seen from the table, significant relationships were only found for initial health care attitudes. For the attitudinal dimension of like, only one significant relationship was found. Children who reported lower levels of distress during hospital treatment were more likely to report liking the health care system more than children who reported higher levels of distress (r (33) = .34, p = .05). Also, distress at treatment, and distress at initial examination, related to children's efficacy scores. For distress at treatment, those children who reported higher levels of distress at treatment were more likely to report that the health care system was less effective than children who reported lower levels of distress (r (33) = .39, p = .02). For distress at initial examination however, children who reported higher levels of distress were more likely to view the health care system as more effective than children who reported lower levels of distress (r (33) = -.42, p = .01). For approach, the amount of distress reported during hospital treatment had an impact on children's willingness to approach the health care system (r (33) = .72, p =.001). Children who reported higher levels of distress during hospital treatment reported less willingness to approach the health care system than children who reported lower levels of

distress. Overall, results show that the amount of distress displayed during hospital experiences, especially during the initial examination and treatment, does impact children's health care attitudes initially. However, the direction of impact, whether it be negative or positive, depends on specific aspects of the hospital visit (initial examination vs. treatment).

Discussion

The results reported here indicate that in general, children's memory for traumatic events was not strongly related to their subsequent health care attitudes initially or long-term. It was found that children who remembered more information pertaining to their injury and hospital treatment did not report more negative health care attitudes overall as hypothesized. Furthermore, it was found that how accurate children were in reporting the information about their injury and hospital treatment also was not strongly related to their subsequent health care attitudes. Changes in children's memory for their traumatic events, from the initial to the 6-month follow-up interview, was also not found to coincide with changes in children's health care attitudes from the initial to the 6-month assessment. However, it was found that the amount of distress experienced during hospital treatment was negatively related to children's memory and their health care attitudes.

The findings on children's memory for medical experiences coincide with previous findings by other researchers. A number of researchers have demonstrated children's remarkable ability to recall medical experiences up to 5 years later (Goodman et al., 1991; Baker-Ward et al., 1993; Peterson & Whalen, 2001). In this study relatively little forgetting was observed between the two time periods. No differences were found

in children's memory scores for injury or hospital events from the initial to the 6-month interview, albeit the results did demonstrate that accuracy in children's recall of injury and hospital events did decline. Children were less accurate in reporting their events at 6 months. Therefore, the results help to support previous findings that children can retain information for extended periods of time. Furthermore, the results demonstrated that age does play a role in the amount of information that children can recall. It was found that older children provided more information than younger children. Previous research had also demonstrated the role of age on children's memory and findings have been consistent (Merritt et al., 1994). One unexpected finding was the three-way interaction among age, gender, and time for children's elaborations per basic information for the hospital event: whereas younger males increased their proportion of elaborations per basic information, younger females decreased their proportion of elaborations per basic information from the initial to the 6-month follow-up. This may be an artifact of small sample size in the four age by gender groups, and needs to be replicated in a larger sample.

In regards to children's health care attitudes, again children remained consistent over the 6-month period: no differences were found in children's health care attitudes initially and 6 months later. Despite the fact that no differences were evident, the findings add to the current body of research on children's health care attitudes. Similar to findings reported by Bachanas and Roberts (1995) and Peterson et al. (2002), it was found that younger children reported more negative health care attitudes than older children. However, this relationship was found for children's beliefs about the efficacy of the health care system, a finding which has not been reported prior to this study. Earlier

research has only demonstrated differences in age groups for children's liking and willingness to approach the health care system. Therefore, this finding adds to the previous findings on the mediating role of age on children's health care attitudes.

Although the picture is consistent with an overall null relationship between children's memory for traumatic events and their health care attitudes, a few relationships were evident. For one, it was found that children's beliefs about the efficacy of the health care system were influenced by the amount of information that children remembered. Children who remembered more elaborations (e.g., a *big* cut on their *left* knee) about their injuries initially were more likely to report that the health care system was less effective than children who remembered fewer elaborations about their injuries. Furthermore, children who remembered more detailed (e.g., *Mom gave* me a *wet cloth*) information about their injuries, initially and 6-months later, were also more likely to report that the health care system was less effective initially than children who provided fewer details about their injuries. However, in relation to children's memory for hospital events, only one relationship was found. Children who were accurate in recalling basic information initially were more likely to report less liking of the health care system at 6 months than children who provided less accurate information. Therefore the results of these relationships may suggest that memory may play a minor role in children's health care attitudes.

Although the study demonstrates that memory may play a minor role in children's health care attitudes, it does not suggest why memory for injury related events would be related to children's beliefs about the efficacy of the health care system while memory for

hospital related events would be related to children's liking of the health care system. A plausible explanation for why memory for injury-related events is related to children's efficacy may be children's overall perceptions of the amount of pain experienced at the time injury and hospital treatment. All children in this study had traumatic injuries; children received broken bones, lacerations, dog bites, etc. Regardless of the type of event, the majority of children experienced a considerable amount of pain at the time of injury. However for hospital treatment, the amount of pain experienced during treatment may have been quite variable. Some children received extremely painful treatments (e.g., sutures) while other children received relatively less painful treatments (e.g., x-rays). As such, when children are asked to judge the effectiveness of the health care system they may be internally comparing the amount of pain experienced during the injury and after the hospital visit and not what actually happened during the visit. Therefore, children who remember more about their injuries may be remembering more details about how much pain they were in when they got hurt and using this to judge how effective the health care system was in alleviating the pain of the injury. These children may have also left the hospital still feeling the negative impact of the injury and treatment. Hackworth and McMahon (1991) suggested that children with the experience of chronic illness do not experience dramatic improvements in pain reduction after treatment and therefore may develop more negative attitudes toward medical entities. When children are asked to judge whether they liked, or disliked, the health care system however, children may recall specific details about previous health care experiences (e.g., was the nurse nice) and

based their attitudes on these recollections of the health care system and not directly on what actually caused them to go the hospital.

An unanticipated finding in the current study was the role that distress played on children's memory and their health care attitudes. In relation to memory, children who experienced more distress at the initial examination and during hospital treatment were less likely to accurately recall basic information pertaining to their injury than children who were less distressed at the initial examination and during hospital treatment. However, children who were more distressed during their overall hospital visit recalled more basic information pertaining to their hospital visit than children who were less distressed at that time. This finding is consistent with previous research which has suggested beneficial effects of stress on children's memory for medical experiences (Goodman et al., 1991; Peterson & Whalen, 2001). These findings are, however, inconsistent with other researchers who have reported null (Baker-Ward, Gordon, Ornstein, Larus, & Clubb, 1993) or negative effects of stress on children's memory for medical experiences (Merrit, Ornstein, & Spicker, 1994).

Unlike previous research however, distress also played an important role in children's health attitudes. Recall that distress levels were strongly related to children's health care attitudes. Children who reported higher distress during their hospital visit reported more negative health care attitudes (i.e., dislike, ineffectiveness, and less approach) than children who reported less distress during their overall hospital visit. Peterson et al. (2002) reported that the amount of distress children experienced during their injury and hospital treatment was not related to their health care attitudes. However,

Peterson et al. compared children's distress ratings which were measured 5 years prior to completing the CHCAQ. Recall that in the present study no relationships were found between children's CHCAQ scores 6 months after their injury and their distress ratings that were reported 6 months earlier. As such, this may suggest that the amount of distress children experienced during their health care visit may be an important determinant of their health care attitude, albeit for only a short period of time. Why, however, does distress play a role in children's health care attitudes for only a short period of time? It may be that children are still rehashing the amount of pain that they experienced during their hospital treatment, and then, when asked about their health care attitudes in a relatively short time period from the emotional event, children base their judgments on the amount of pain that they experienced. Once children are given a sufficient amount time to 'emotionally heal' from the traumatic event, many children may base their attitudes on other factors.

There are, however, a number of limitations to the present study. Of greatest importance is the reduction in sample size from the initial to the 6-month follow-up. Recall that initially, 70 children were recruited from the study while only 46 children completed the 6-month follow-up. Although no differences were found in children's memory and attitudes initially between those children who completed both portions of the study and those children who did not, the sample size was relatively small, especially in light of prior research which has shown relatively small effect sizes when investigating other mediating factors of children's health care attitudes (Peterson et al., 2002). In addition, one cannot determine whether differences in memory and health care attitudes

would be apparent in those children who did not complete the 6-month follow-up. It may be that these children did not participate because they had in fact forgotten much more detail than the children who did participate in the 6-month follow-up. As has been suggested previously, it is also clear that the delay period was inadequate for changes in memory. Children displayed consistent recall in memory of injury and hospital related events over the 6-month delay period. Furthermore, no differences in children's health care attitudes were evident over the 6-month delay period. In fact, many children suggested at the 6-month follow-up that they actually recalled their replies on the CHCAQ during the initial interview. As such, this recollection of the previous assessment may have biased their responses on the CHCAQ 6 months later. This would suggest that a longer delay period would be necessary in order to control for the effect of prior recollection. Recall, that distress was rated retrospectively (approximately 1 week after the experience) by both parents and children and, as such, this methodology may in fact bring forth another limitation upon the current investigation. Having parents and children to recall the amount of distress experienced during their injury and hospital experience retrospectively may have had caused distress ratings to be overestimated, or even underestimated! The most accurate way to rate distress would be to have parents and children rate distress at the exact moment of time the experience occurred, however due to ethical reasons, this is not plausible. As such, retrospection is the only method by which to rate the amount of distress experienced by children and has been used by other researchers (Peterson & Bell, 1996). Another limitation which needs to be addressed is the comparability of children's hospital experiences in relation to the findings between

distress and memory and health care attitudes. It may be that children who remembered more about their experience in fact experienced more salient injuries and more involved health care treatment. A direct result of this saliency may be that these children experienced more distress and as such, the saliency of the experience may be a mediating factor within the relationship between distress and memory and also health care attitudes.

In order to determine whether these limitations have indeed had a bearing on the present study, future research in the area of memory and health care attitudes should continue. In order to determine whether changes in memory for hospital experiences are related to subsequent changes in children's health care attitudes future research with lengthier delay periods (e.g., 1 year) between the initial and follow-up assessments are necessary. Goodman and colleagues (1991) reported a decline in children's memory for stressful events following a 1-year delay. Until changes in children's memory for their health care experiences are evident, no specific conclusions about the relationship between children's health care attitudes and memory can be validated. Due to the small effect sizes apparent in this study, it is also necessary that larger sample sizes be utilized. Furthermore, research may also continue to investigate the mediating role of distress. It may be that changes in children's perceptions of how distressed they were during their injury and health care experience may be related to changes in children's health care attitudes. In addition, future research may also investigate the role of peer relations as another potential mediating factor in children's health care attitudes, especially in school-aged children as peer relationships become an integral part of a child's development.

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Table 1

Means (Standard Deviations) for Quantity of Recall for Injury as a Function of Time, Age, and Gender.

	Recall		
	Elaborations	Basic Information	Elaborations/Basic Information
Initial (n = 46)	42.85 (17.33)	100.71 (36.72)	.44 (.12)
Young			
Male (n = 9)	27.89 (13.21)	70.56 (15.19)	.39 (0.16)
Female (n = 8)	40.50 (14.81)	93.00 (35.58)	.43 (0.01)
Total (n = 17)	33.82 (15.01)	81.12 (28.33)	.41 (0.12)
Old			
Male (n = 18)	48.72 (18.84)	109.39 (39.83)	.48 (0.14)
Female (n = 11)	47.18 (12.87)	116.82 (31.81)	.41 (0.01)
Total (n = 29)	48.14 (16.59)	112.21 (36.57)	.45 (0.01)
6 Months (n = 46)	43.11 (27.61)	97.83 (44.88)	.42 (0.14)
Young			
Male (n = 9)	30.33 (13.10)	75.56 (24.56)	.42 (0.18)
Female(n = 8)	33.00 (12.58)	75.50 (24.96)	.44 (0.01)
Total (n = 17)	31.58 (12.53)	75.53 (23.96)	.43 (0.14)
Old			
Male (n = 18)	56.89 (36.91)	112.22 (57.11)	.45 (0.14)
Female (n = 11)	38.36 (16.45)	108.73 (35.37)	.36 (0.01)
Total (n = 29)	49.86 (31.73)	110.90 (49.29)	.41 (0.13)

Table 2

Means (Standard Deviations) for Recall Accuracy (%) for Injury as a Function of Time, Age, and Gender.

	Recall Accuracy (%)	
	Elaborations	Basic Information
Initial (n = 46)	99.38 (1.32)	99.31 (1.53)
Young		
Male (n = 9)	98.39 (2.40)	98.28 (2.74)
Female (n = 8)	99.75 (0.70)	99.75 (0.71)
Total (n= 17)	99.03 (1.89)	98.97 (2.13)
Old		
Male (n = 18)	99.67 (0.70)	99.61 (0.63)
Female (n = 11)	99.45 (0.96)	99.36 (1.48)
Total (n = 29)	99.58 (0.81)	99.52 (1.02)
6 Months (n = 46)	96.79 (5.20)	96.59 (6.18)
Young		
Male (n = 9)	94.50 (7.97)	95.94 (6.62)
Female (n = 8)	96.81 (4.44)	94.87 (8.79)
Total (n = 17)	95.58 (6.47)	95.44 (7.49)
Old		
Male (n = 18)	97.61 (3.22)	97.56 (3.16)
Female (n = 11)	97.32 (5.75)	96.77 (7.84)
Total (n = 29)	97.50 (4.46)	97.27 (5.31)

Table 3

Means (Standard Deviations) for Quantity of Recall for Hospital as a Function of Time, Age and Gender.

	Recall		
	Elaborations	Basic Information	Elaborations/Basic Information
Initial (n = 46)	35.26 (22.41)	77.24 (37.52)	.44 (0.17)
Young			
Male (n = 9)	19.56 (16.97)	43.67 (15.65)	.40 (0.24)
Female (n = 8)	29.25 (15.89)	64.62 (32.34)	.46 (0.11)
Total (n = 17)	24.12 (16.71)	53.53 (26.39)	.43 (0.19)
Old			
Male (n = 18)	44.56 (24.82)	93.50 (44.63)	.47 (0.13)
Female (n = 11)	37.27 (19.87)	87.27 (39.55)	.41 (0.13)
Total (n = 29)	41.79 (22.98)	91.14 (42.16)	.45 (0.13)
6 Months (n = 46)	32.70 (23.97)	71.91 (52.16)	.45 (0.19)
Young			
Male (n = 9)	22.78 (18.44)	39.89 (18.71)	.51 (0.30)
Female (n = 8)	24.50 (19.35)	62.62 (40.26)	.35 (0.11)
Total (n = 17)	23.47 (18.29)	50.59 (31.95)	.43 (0.24)
Old			
Male (n = 18)	41.28 (30.67)	88.44 (69.55)	.48 (0.18)
Female (n = 11)	32.91 (13.27)	77.82 (32.91)	.45 (0.14)
Total (n = 29)	38.10 (25.51)	84.41 (57.89)	.47 (0.17)

Table 4

Means (Standard Deviations) for Recall Accuracy (%) for Hospital as a Function of Time, Age, and Gender.

	Recall Accuracy (%)	
	Elaborations	Basic Information
Initial (n = 46)	97.94 (4.53)	99.14 (1.99)
Young		
Male (n = 9)	96.56 (5.90)	99.28 (1.20)
Female (n = 8)	97.94 (3.84)	99.87 (0.35)
Total (n = 17)	97.25 (4.86)	99.56 (0.93)
Old		
Male (n = 18)	97.61 (5.41)	98.83 (2.02)
Female (n = 11)	99.50 (1.16)	99.00 (3.00)
Total (n = 29)	98.33 (4.37)	98.90 (2.39)
6 Months (n = 46)	94.04 (14.12)	97.07 (4.42)
Young		
Male (n = 9)	81.19 (29.40)	95.33 (7.70)
Female (n = 8)	94.69 (9.78)	96.75 (3.67)
Total (n = 17)	87.94 (22.28)	96.00 (6.00)
Old		
Male (n = 18)	97.72 (2.73)	97.61 (3.40)
Female (n = 11)	96.91 (5.16)	97.86 (2.76)
Total (n = 29)	97.42 (3.77)	97.71 (3.12)

Table 5

Means (Standard Deviations) for CHCAQ Scores as a Function of Time, Age, and Gender.

	CHCAQ		
	Like	Efficacy	Approach
Initial (n = 46)	2.86 (0.61)	1.94 (0.50)	3.00 (1.00)
Young			
Male (n = 9)	2.89 (0.62)	1.70 (0.44)	2.71 (0.80)
Female (n = 8)	2.75 (0.60)	1.51 (0.54)	2.47 (1.10)
Total (n = 17)	2.82 (0.59)	1.61 (0.49)	2.60 (0.93)
Old			
Male (n = 18)	2.77 (0.60)	2.15 (0.47)	2.70 (1.03)
Female (n = 11)	3.11 (0.62)	2.08 (0.29)	3.05 (1.09)
Total (n = 29)	2.89 (0.62)	2.13 (0.41)	2.83 (1.04)
6 Months (n = 46)	3.02 (0.32)	2.01 (0.47)	2.87 (0.99)
Young			
Male (n = 9)	3.01 (0.32)	1.88 (0.59)	2.85 (0.88)
Female (n = 8)	2.83 (0.80)	1.85 (0.58)	2.81 (1.13)
Total (n = 17)	2.93 (0.59)	1.86 (0.57)	2.83 (0.97)
Old			
Male (n = 18)	3.04 (0.54)	1.91 (0.30)	2.79 (1.03)
Female (n = 11)	3.14 (0.69)	2.32 (0.42)	3.06 (1.01)
Total (n = 29)	3.08 (0.59)	2.10 0.38)	2.89 (1.01)

Note. For CHCAQ items 1 = Positive Attitudes and 5 = Negative Attitudes.

Table 6

Partial Correlations between Children's Memory for Injury Events and the CHCAQ Both Initially and at 6 Months.

	Initial			6 Months		
	Like	Approach	Efficacy	Like	Approach	Efficacy
Initial						
Elaborations	.13	.01	.33*	-.50	.24	.13
Accuracy of Elaborations	-.10	.26	.24	.08	.16	-.03
Basic Information	.06	.08	.40*	-.08	.22	.17
Accuracy of Basic Information	.16	.04	.20	-.01	.16	-.27
6 Months						
Elaborations	.09	.07	.22	.14	.18	.06
Accuracy of Elaborations	.11	.02	.17	.05	.04	-.002
Basic Information	.09	.04	.39*	.02	.16	.10
Accuracy of Basic Information	.23	.07	.17	.07	.13	.20

*$p < .05$

Note. Positive correlations indicate more negative health care attitudes as more memory information is remembered while negative correlations indicate more positive health care attitudes as more memory information is remembered; df = 42.

Table 7

Partial Correlations between Children's Memory for Hospital Events and the CHCAQ Initially and at 6 Months.

	Initial			6 Months		
	Like	Approach	Efficacy	Like	Approach	Efficacy
Initial						
Elaborations	.11	.05	.06	.07	.11	.003
Accuracy of Elaborations	-.07	.14	.26	.06	.10	.03
Basic Information	.15	.05	.15	.19	.05	.06
Accuracy of Basic Information	-.17	.02	.14	-.37*	.11	-.26
6 Months						
Elaborations	.05	.06	.06	.03	.15	.05
Accuracy of Elaborations	-.26	.15	.19	-.03	.13	-.23
Basic Information	-.04	.10	.14	.06	.13	.003
Accuracy of Basic Information	.08	.01	.12	.21	.02	.06

*$p < .05$.

Note. Positive correlations indicate more negative health care attitudes as more memory information is remembered while negative correlations indicate more positive health care attitudes as more memory information is remembered; df = 41.

Table 8

Number of Younger and Older Children Displaying Either a Negative, Positive, or No Change in Memory Scores for Both Injury and Hospital Events.

	Young	Old	Young	Old
	Injury		Hospital	
Elaborations				
1. Negative Change	10	18	8	18
2. Positive Change	7	11	9	10
3. No Change	0	0	0	1
Accuracy of Elaborations				
1. Negative Change	10	13	9	13
2. Positive Change	2	3	3	6
3. No Change	5	13	4	10
Basic Information				
1. Negative	11	14	7	20
2. Positive Change	6	15	9	8
3. No Change	0	0	1	1
Accuracy of Basic Information				
1. Negative Change	7	17	9	17
2. Positive Change	2	1	2	5
3. No Change	8	11	6	7

Table 9

Mean Difference Scores on the CHCAQ as a Function of Type of Memory Change for Both Injury and Hospital Events.

	Like	Efficacy	Approach	Like	Efficacy	Approach
		Injury			Hospital	
Elaborations						
1. Negative Change	9.82	9.87	9.74	9.80	9.96	9.99
2. Positive Change	9.88	10.00	10.10	9.21	9.90	9.70
3. No Change	-	-	-	9.62	9.22	10.38
Accuracy of Elaborations						
1. Negative Change	9.71	10.02	9.95	9.86	9.79	9.82
2. Positive Change	10.17	9.51	9.93	9.65	9.85	9.66
3. No Change	9.92	9.90	9.78	9.93	10.14	10.09
Basic Information						
1. Negative Change	9.76	9.92	9.79	9.77	9.91	9.82
2. Positive Change	9.94	9.93	9.99	9.98	9.93	10.10
3. No Change	-	-	-	9.69	10.00	8.75
Accuracy of Basic Information						
1. Negative Change	9.78	9.95	10.03	9.91	9.94	9.99
2. Positive Change	9.37	9.59	9.38	9.50	9.43	9.43
3. No Change	10.01	9.94	9.77	9.89	10.16	9.90

Note. A constant of 10 was added to children's difference scores for attitudes. For all items on the CHCAQ, means greater than 10 indicate a positive change in attitudes and means less than 10 indicate a negative change. Means equivalent to 10 indicate no change in attitudes.

Table 10

Correlations between Difference Scores on the CHCAQ and Memory for Both Injury and Hospital Events.

	Like	Approach	Efficacy
Injury			
Elaborations	.18	.03	-.04
Accuracy of Elaborations	-.09	.001	-.07
Basic Information	.02	.18	-.13
Accuracy of Basic Information	.11	.13	.13
Hospital			
Elaborations	.03	.07	.06
Accuracy of Elaborations	.17	.01	-.27
Basic Information	.01	.10	-.07
Accuracy of Basic Information	.18	.03	.12

Note. Positive correlations indicate more negative health care attitudes as more memory information is remembered while negative correlations indicate more positive health care attitudes as more memory information is remembered; df = 42.

Table 11

Children's and Parents' Mean (Standard Deviation) Distress Ratings for Injury and Hospital as a Function of Age and Gender.

	Young (n = 17)		Old (n = 29)	
	Male (n = 9)	Female (n = 8)	Male (n = 18)	Female (n = 11)
Children's Distress Ratings				
Injury	2.89 (1.61)	2.25 (1.03)	2.89 (1.18)	2.81 (1.17)
Initial Examination	1.67 (.87)	2.50 (1.85)	1.83 (1.09)	1.91 (.94)
Treatment	2.40 (1.67)	1.43 (.53)	1.75 (1.39)	2.00 (1.41)
Overall Hospital	2.00 (1.32)	3.00 (1.69)	2.50 (1.42)	2.91 (1.51)
Parents' Distress Ratings				
Injury	3.44 (1.42)	3.87 (.64)	3.11 (.96)	3.36 (1.21)
Initial Examination	1.67 (.87)	2.00 (1.07)	2.00 (1.50)	2.18 (.75)
Treatment	2.00 (1.41)	1.43 (.53)	1.76 (1.20)	1.56 (.88)
Overall Hospital	1.89 (1.27)	2.00 (1.07)	2.11 (1.49)	2.36 (1.12)

Table 12

Correlations between Children's Distress Ratings and Parents' Distress Ratings.

	Children's Distress Ratings				Parents' Distress Ratings			
	Injury	Initial Exam	Treatment	Overall Hospital	Injury	Initial Exam	Treatment	Overall Hospital
Children's Distress Ratings								
Injury		-.11	-.04	-.01	.18	.18	.24	.14
Initial Examination			.17	.67*	-.06	.20	-.07	.14
Treatment				.55	.09	.36*	.53*	.43*
Overall Hospital					-.11	.42*	.29	.47*
Parents' Distress Ratings								
Injury						.20	.21	.15
Initial Examination							.65*	.90*
Treatment								.76*
Overall Hospital								

* $p < .025$.

Note. df = 37.

Table 13

Correlations between Children's Reported Distress at Injury and Hospital and Children's Memory for the Injury Event Initially and at 6 Months.

	Distress			
	Injury	Initial Examination	Treatment	Overall Hospital
Memory at Initial				
Elaborations	.16	.01	.26	.14
Accuracy of Elaborations	-.17	-.07	-.02	.04
Basic Information	.19	.00	.13	.09
Accuracy of Basic Information	.04	-.35*	-.47*	-.27
Memory at 6 Months				
Elaborations	-.11	-.22	.14	-.09
Accuracy of Elaborations	.16	-.08	.09	.01
Basic Information	-.07	-.20	.16	.06
Accuracy of Basic Information	-.07	-.26	.21	-.03

* $p < .04$.

Note. df = 33.

Table 14

Correlations between Children's Reported Distress at Injury and Hospital and Children's Memory for the Hospital Event Initially and at 6 Months.

	Distress			
	Injury	Initial Examination	Treatment	Overall Hospital
Memory at Initial				
Elaborations	.11	-.03	26	.24
Accuracy of Elaborations	-.13	.11	.01	.03
Basic Information	.12	.05	.28	.34*
Accuracy of Basic Information	.02	.10	-.04	.11
Memory at 6 Months				
Elaborations	-.12	-.22	.25	.07
Accuracy of Elaborations	-.16	-.12	-.01	-.12
Basic Information	-.31	-.22	.10	.01
Accuracy of Basic Information	-.14	.14	-.06	-.04

* $p < .04$.

Note. df = 33.

Table 15

Correlations between Children's Reported Distress for Injury and Hospital Events and the CHCAQ Initially and at 6 Months.

	Initial			6 Months		
	Like	Approach	Efficacy	Like	Approach	Efficacy
Distress						
Injury	.09	.04	.05	-.17	.02	.12
Initial Examination	-.27	.29	-.42*	-.17	.01	-.21
Treatment	.34*	.72*	.39*	.31	.03	.28
Overall Hospital	.13	.02	.06	-.08	.03	-.05

*$p < .05$.

Note. Positive correlations indicate more negative health care attitudes as distress ratings increase while negative correlations indicate more positive health care attitudes as distress ratings decrease; df = 33.

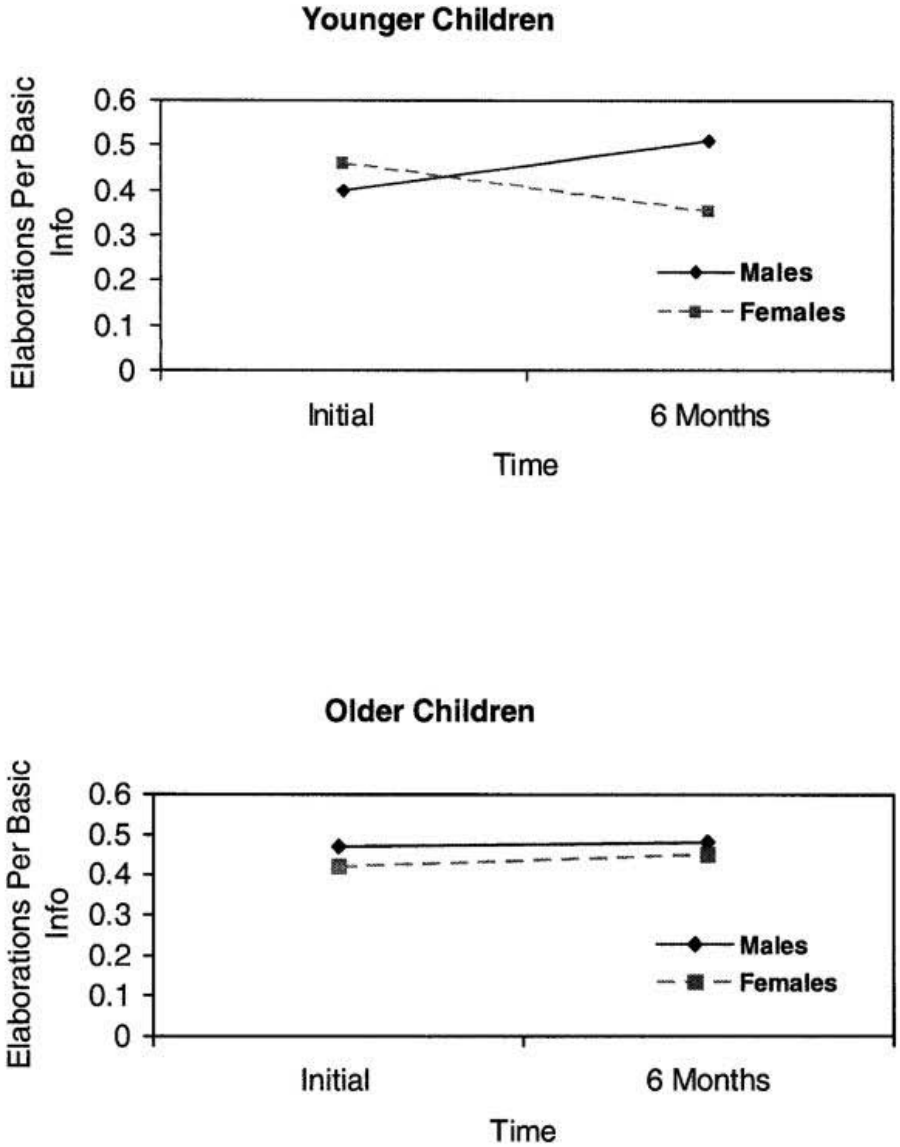

Figure 1. Mean proportional recall for elaborations per basic information for hospital related events as a function of time, age, and gender.

Appendix A

Ethical Approval Form

Information Sheet

Consent Form

Memorial
University of Newfoundland

Human Investigation Committee
Research and Graduate Studies
Faculty of Medicine
The Health Sciences Centre

May 18, 2001

Reference #01.23

Dr. Carole Peterson
Department of Psychology
Memorial University of Newfoundland

Dear Dr. Peterson:

This will acknowledge your correspondence dated April 10, 2001, wherein you provide clarification of issues for your research study entitled **"Effect of children's memory or hospital experiences on attitudes toward healthcare"**.

At a meeting held on **May 17, 2001**, the Human Investigation Committee ratified the Chairs' decision to grant full approval of your research study.

We wish you success with your study.

Sincerely,

Sharon K. Buehler, PhD
Co-Chair
Human Investigation Committee

Catherine Popadiuk, M.D., F.R.C.S.(C)
Co-Chair
Human Investigation Committee

SKB\CP:jjm

C Dr. C. Loomis, Acting Vice-President (Research)
Dr. R. Williams, Vice-President, Medical Affairs, HCC

DEPARTMENT OF PSYCHOLOGY
MEMORIAL UNIVERSITY OF NEWFOUNDLAND
ST. JOHN'S, NEWFOUNDLAND A1B 3X9

CONSENT TO PARTICIPATE IN BIO-MEDICAL RESEARCH

TITLE: EFFECT OF CHILDREN'S MEMORY FOR HOSPITAL EXPERIENCES ON ATTITUDES TOWARD HEALTHCARE

INVESTIGATOR: Dr. Carole Peterson

I am a child developmental psychologist whose child, like yours, has been brought to the Janeway for injuries at various times, and I would like to ask you to participate in a research study. In a few days your child will probably be delighted to show off bumps, casts, and stitches, and talk about his or her accident. We would like to talk to you and your child at that time, if your child is between 6 and 13 years of age. Your participation in this study is entirely voluntary. You may decide not to participate or may withdraw from the study at any time without affecting your normal treatment. The investigator will maintain confidentiality of information concerning participants. The investigator will be available during the study at all times should you have any problems or questions.

Purpose of Study

It is very important to understand what children do and do not remember, when they are emotionally upset when they are hurt. Most of what we now know about children's memory when they are upset comes from talking to other children like yours, who were previously treated in the Janeway Emergency Room. We would like to interview your child too, to see how much he or she remembers about the accident and how accurate the memory is. We are also studying long-term memory for stressful events, and would like to revisit and re-interview your child after 6 months to see what your child still remembers.

How much children remember about their healthcare experience may affect their attitudes about health care and their behaviour. This is why we are trying to find out whether children who remember more about their injury and hospital treatment have different healthcare attitudes. Thus, we will ask your child about what he or she remembers as well as about his or her healthcare attitudes.

Description of Procedures and Tests

If you agree to take part, a researcher will telephone you in a couple of days and ask permission to visit you at your home, at a time that is convenient for you. She will explain the study in more detail and ask if you are still interested in participating. If you are, she will talk to you and your child about what happened in your child's injury and treatment. She will bring along paper, crayons and markers for drawing, to make the interview more playful and fun for your child. We have found that this often makes children less shy and more willing to talk with us. In our extensive experience of talking with young children, we have found that children love to talk about these injuries after they have occurred. We will also ask your child to tell us about a happy occasion, such as a birthday party or special outing, for comparison. Often children remember more when talking to parents; thus we will ask you to ask your child to tell you about their experiences too.

Duration of Participation
We will interview you and your child within a few days of the injury, and then again after 6 months. This will allow us to see what children remember and don't remember long after the event occurred. A healthcare attitude questionnaire will also be filled out. Each visit will take about half an hour.

Foreseeable Risks, Discomforts or Inconveniences
It is possible that your child may become upset when talking about his or her injuries. If so, we will immediately stop the interview. However, in our experience, children love to talk about injuries and show off casts and stitches. We will minimize the inconvenience by visiting you at your home, at your convenience.

Liability Disclaimer Statement:
Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the investigators or involved institutions from their legal and professional responsibilities.

Other Relevant Information
You can end any of our interviews at any point or you can tell us when we phone that you do not wish to be visited. Your child's data will be added to that of other children of his or her age, to see what children of that age in general remember and what their attitudes are. Your child will never be individually identified - we are interested in overall memory and attitudes of children of different ages.
If you would be interested in finding out the results of this study, we will gladly mail you a copy of any research publications. If you would like additional information, please contact Dr. Carole Peterson at 737-7682 or 895-6549. Thank you very much for your consideration.

Sincerely,

Dr. Carole Peterson
Professor of Psychology

Signature Page

Title of Project: Effect of Children's Memory for Hospital Experiences on Attitudes Toward Healthcare.

Name of Principal Investigator: Dr. Carole Peterson

To be signed by participant

I, , the undersigned, agree to my participation or to the participation of (my child, ward, relative) in the research study described above.

Any questions have been answered and I understand what is involved in the study. I realise that participation is voluntary and that there is no guarantee that I will benefit from my involvement.

I acknowledge that a copy of this form has been given to me.

(Signature of Participant) (Date)

(Signature of Witness) (Date)

To be signed by investigator

To the best of my ability I have fully explained the nature of this research study. I have invited questions and provided answers. I believe that the participant fully understands the implications and voluntary nature of the study.

(Signature of Investigator) (Date)

Phone Number

Assent of minor participant (if appropriate)

(Signature of Minor Participant) (Age _____)

Relationship to Participant Named Above

Appendix B

Standardized Interview

Standardized Interview

Free Recall:

- Tell me what you know about what happened when you hurt yourself?
- What else do you remember?
- Tell me what you know about what happened when you went to the hospital?
- What else do you remember?

Probed Recall:

I am going to ask you some questions to make sure that I understand what happened.

- What were you doing before it happened?
  - Were you playing, running, etc.?
- How did it happen?
  - Why were you doing that?
- Who was with you?
  - Who is that?
- Who did it?
  - Why did they do that?
  - How did they do that?
- Where were you when it happened?
  - Were you inside or outside?
- What things were around when it happened?
  - What else was around?
- What time of day was it when you hurt yourself?
  - Was it light or dark out?
  - Was it suppertime, lunchtime, or breakfast time?
- What season was it when it happened?
  - Was it summer, winter, fall, or spring?
  - Was it warm or cold outside?

- What did you do as soon as it happened?
    - Who was the first person you saw after it happened?
    - So did you go to find then or did they come to you?
    - Where were they before you found them?
    - What did they do as soon as they saw you?
        - How did they treat your injury?
        - What did they use?
        - What color was it (cloth, bandage, etc.)?
    - Who was with them?

- How much did it hurt?
    - Did it hurt a lot or a little?

- How much did you cry?
    - Did you cry a lot or a little?

- How long did you cry for?
    - Did you cry for a long time or short time?

- How much did it bleed?
    - Did it bleed a lot or a little?

- Where did you go before you went to the hospital?
    - What happened there?
    - Who was there?

- How long did you wait before you went to the hospital?

- How did you get to the hospital?
    - What did you go in?

- Who came with you to the hospital?

- What happened when you first got to the hospital?

- Before you saw the doctor, what did the nurse do?
    - Was the nurse a male or female?

- What did you do while you were waiting to see the doctor?
    - What did you read, watch, play with, etc.?
    - Who did you do that with?

- Who else?

- How long did you have to wait to see the doctor?
  - Was it a long time or short time?

- When you saw the doctor was it a male or female?
  - What did he/she do?
  - What else did he/she do?
  - Who was in the room with you when you were with the doctor?
    - Who else?

- Did you have to get a needle?
  - Tell me where on your body you got it?
  - How many needles did you get?
  - Who gave you the needle?
  - Was it a male or female?
  - Was it the same person as before?
  - How did they give you the needle?
  - How much did the needle hurt?
    - Did it hurt a lot or a little?
    - How much did you cry?
    - Did you cry a lot or a little?
  - Who was with you when you got your needle?
    - Who else?

For a broken bone:

- Tell me what happened who you got your x-rays taken?
  - Who gave you your x-rays?
  - Was it a male or female?
  - Was it the same person as before?
  - How many x-rays did they take?
  - How much did your x-rays hurt?
    - Did they hurt a lot or a little?
  - Who was in the room with you when you got your x-rays taken?
    - Who else?
  - What happened after you got your x-rays taken?

- Did you have to get a cast put on?
  - Who put the cast on?
  - Was it a male or female?
  - Was it the same person as before?

- How did he/she put the cast on?
- Who was with you when you got your cast put on?
  - Who else?

For lacerations:

- Did you have to get stitches?
  - Who gave you the stitches?
  - Was it a male or female?
  - Was it the same person as before?
  - How did he/she put the stitches in?
  - How many stitches did you get?
  - How much did the stitches hurt?
    - Did they hurt a lot or a little?
  - How much did you cry?
    - Did you cry a lot or a little?
  - Did you get a bandage?
  - What did the bandage look like?
  - What color was it?
  - Who was in the room with you when you were getting your stitches put in?
    - Who else?

- Did the doctors give you anything special before you left the hospital?
  - What color was it?

- What happened when you left the hospital?
  - Where did you go?
  - Who was there?
    - Who else?

- What happened when you got home?

- Who did you tell about your injury?

Appendix C

Children's Health Care Attitudes Questionnaire

Children's Health Care Attitudes Questionnaire

Boy: _____ Girl: _____

Age: _____

We want to know how you feel about hospitals, doctors, and dentists. This is not a test so there are no right or wrong answers. Answer all of the questions as carefully as you can.

For each question, circle the letter (A, B, C, D, or E) that you agree with the most.

1) How do you like hospitals?

A	I really like them a lot.
B	I like them.
C	I don't like them or hate them.
D	I don't like them.
E	I really hate them.

2) How do you like doctors?

A	I really like them a lot.
B	I like them.
C	I don't like them or hate them.
D	I don't like them.
E	I really hate them.

3) How do you like taking medicine?

A	I really like it a lot.
B	I like it.
C	I don't like it or hate it.
D	I don't like it.
E	I really hate it.

4) How do you like dentists?

A	I really like them a lot.
B	I like them.
C	I don't like them or hate them.
D	I don't like them.
E	I really hate them.

5) How do you like needles?

A	I really like them a lot.
B	I like them.
C	I don't like them or hate them.
D	I don't like them.
E	I really hate them.

6) How do you like nurses?

A	I really like them a lot.
B	I like them.
C	I don't like them or hate them.
D	I don't like them.
E	I really hate them.

7) How do you like it when you get your finger pricked to get a drop of blood for a blood test?

A	I really like it a lot.
B	I like it.
C	I don't like it or hate it.
D	I don't like it.
E	I really hate it.

8) How would you like an operation?

A	I really like it a lot.
B	I like it.
C	I don't like it or hate it.
D	I don't like it.
E	I really hate it.

9) How do you like the emergency room?

A	I really like it a lot.
B	I like it.
C	I don't like it or hate it.
D	I don't like it.
E	I really hate it.

For each question, circle the letter (A, B, C, D, or E) that you agree with the most. You can use the pictures to help you remember what your choices are.

10) When people go to the hospital, what happens?

A	It always helps them.
B	It usually helps them.
C	It might help them or it might not.
D	It usually makes them worse.
E	They get worse.

11) When people are sick and they go to see a doctor, what happens?

A	It always helps them.
B	It usually helps them.
C	It might help them or it might not.
D	It usually makes them worse.
E	They get worse.

12) When people are sick and the doctor gives them some medicine, what happens?

A	It always helps them.
B	It usually helps them.
C	It might help them or it might not.
D	It usually makes them worse.
E	They get worse.

13) When people have problems with their teeth and they go to see a dentist, what happens?

A	It always helps them.
B	It usually helps them.
C	It might help them or it might not.
D	It usually makes them worse.
E	They get worse.

14) When people are sick and the doctor gives them a needle, what happens?

A	It always helps them.
B	It usually helps them.
C	It might help them or it might not.
D	It usually makes them worse.
E	They get worse.

15) When people are sick and they go to see a nurse, what happens?

A	It always helps them.
B	It usually helps them.
C	It might help them or it might not.
D	It usually makes them worse.
E	They get worse.

16) When people are sick and the doctor pricks their finger to get a drop of blood for a blood test, what happens?

A	It always helps them.
B	It usually helps them.
C	It might help them or it might not.
D	It usually makes them worse.
E	They get worse.

17) When people are sick and they have an operation, what happens?

A	It always helps them.
B	It usually helps them.
C	It might help them or it might not.
D	It usually makes them worse.
E	They get worse.

18) When people are sick and they go to the emergency room, what happens?

A	It always helps them.
B	It usually helps them.
C	It might help them or it might not.
D	It usually makes them worse.
E	They get worse.

19) When people are injured and they go to the emergency room, what happens?

A	It always helps them.
B	It usually helps them.
C	It might help them or it might not.
D	It usually makes them worse.
E	They get worse.

For each question, circle the letter (A, B, C, D, or E) that you agree with the most. You can use the big words to help you remember what your choices are.

20) Let's say you were told that you might have to go to the hospital.

A	I would try not to go to the hospital no matter what.
B	I would go even though I would not want to.
C	I'm not sure what I would do.
D	I would want to go but only if I was very sick.
E	I would want to go to the hospital.

21) Let's say you were told that you might have to go see a doctor.

A	I would try not to go see a doctor no matter what.
B	I would go even though I would not want to.
C	I'm not sure what I would do.
D	I would want to go but only if I was very sick.
E	I would want to go go see a doctor

22) Let's say you were told that you should take some medicine.

A	I would try not to take the medicine no matter what.
B	I would take the medicine even though I would not want to.
C	I'm not sure what I would do.
D	I would want to take the medicine but only if I was very sick.
E	I would want to take the medicine.

23) Let's say you were told that you might have to go see a dentist.

A	I would try not to go see a dentist no matter what.
B	I would go even though I would not want to.
C	I'm not sure what I would do.
D	I would want to go but only if I was very sick.
E	I would want to go see a dentist.

24) Let's say you were told that you should have a needle.

A	I would try not to have the needle no matter what.
B	I would have the needle even though I would not want to.
C	I'm not sure what I would do.
D	I would want to have the needle but only if I was very sick.
E	I would want to have the needle.

25) Let's say you were told that you might have to go see a nurse.

A	I would try not to go see a nurse no matter what.
B	I would go even though I would not want to.
C	I'm not sure what I would do.
D	I would want to go but only if I was very sick.
E	I would want to go see a nurse.

26) Let's say you were told that you should get your finger pricked to get a drop of blood for a blood test.

A	I would try not to have a blood test no matter what.
B	I would have a blood test even though I would not want to.
C	I'm not sure what I would do.
D	I would want to have a blood test but only if I was very sick.
E	I would want to have a blood test.

27) Let's say you were told that you might have an operation.

A	I would try not to have the operation no matter what.
B	I would have the operation even though I would not want to.
C	I'm not sure what I would do.
D	I would want to have the operation but only if I was very sick.
E	I would want to have the operation.

28) Let's say you were told that you might have to go to the emergency room.

A	I would try not to go to the emergency room no matter what.
B	I would go even though I would not want to.
C	I'm not sure what I would do.
D	I would want to go but only if I was very sick.
E	I would want to go to the emergency room

Appendix D

Distress Scales

Broken Bones/Sprains
How Your Child Felt

Name: _____

Child's Name: _____

Date: _____

We would like to know your child's stress level during the injury and hospital treatment. From not all upset to extremely upset please circle the number that best describes **your child's stress level.**

1. At the time the injury occurred.

not all upset	a little upset	moderately upset	very upset	extremely upset

2. At the time of the doctor's examination.

not all upset	a little upset	moderately upset	very upset	extremely upset

3. At the time of the x-ray.

not all upset	a little upset	moderately upset	very upset	extremely upset

4. At the time of the casting of the broken bone or the bandaging of the sprain.

not all upset	a little upset	moderately upset	very upset	extremely upset

Broken Bones/Sprains
How You Felt

Name: _____

Date: _____

We would like to know how upset you were during the injury and hospital treatment. From not all upset to extremely upset please circle the number that best describes how **upset you felt.**

1. When you got injured.

1	2	3	4	5
not all upset	a little upset	moderately upset	very upset	extremely upset

2. When the doctor examined you.

1	2	3	4	5
not all upset	a little upset	moderately upset	very upset	extremely upset

3. When you got your x-ray.

1	2	3	4	5
not all upset	a little upset	moderately upset	very upset	extremely upset

4. When you got your cast on your broken bone or bandage on the sprain.

1	2	3	4	5
not all upset	a little upset	moderately upset	very upset	extremely upset

Laceration
How Your Child Felt

Name: _____

Child's Name: _____

Date: _____

We would like to know your child's stress level during the injury and hospital treatment. From not all upset to extremely upset, please circle the answer that best describes **your child's stress level**.

1. At the time the injury occurred.

not all upset	a little upset	moderately upset	very upset	extremely upset

2. At the time of the doctor's examination.

not all upset	a little upset	moderately upset	very upset	extremely upset

3. At the time of the stitching or suturing of the cut.

not all upset	a little upset	moderately upset	very upset	extremely upset

4. At the time of the needle (if applicable).

not all upset	a little upset	moderately upset	very upset	extremely upset

Laceration
How You Felt

Name: _____

Date: _____

We would like to know how upset you were during the injury and hospital treatment. From not all upset to extremely upset please circle the number that best describes how **upset you felt.**

1. When you got injured.

1	2	3	4	5
not all upset	a little upset	moderately upset	very upset	extremely upset

2. When the doctor examined you.

1	2	3	4	5
not all upset	a little upset	moderately upset	very upset	extremely upset

3. When the doctor was giving you stitches or suturing the cut.

1	2	3	4	5
not all upset	a little upset	moderately upset	very upset	extremely upset

4. When you got a needle (if applicable).

1	2	3	4	5
not all upset	a little upset	moderately upset	very upset	extremely upset

Other Injury

How Your Child Felt

Name: _____

Child's Name: _____

Date: _____

We would like to know your child's stress level during the injury and hospital treatment. From not all upset to extremely upset, please circle the number that best describes **your child's stress level**.

1. At the time the injury occurred.

not all upset	a little upset	moderately upset	very upset	extremely upset

2. At the time of the doctor's examination.

not all upset	a little upset	moderately upset	very upset	extremely upset

3. At the time of the treatment by the doctor.

not all upset	a little upset	moderately upset	very upset	extremely upset

4. Other? (please specify) _____

not all upset	a little upset	moderately upset	very upset	extremely upset

Other Injury
How You Felt

Name: _____

Date: _____

We would like to know how upset you were during the injury and hospital treatment. From not all upset to extremely upset please circle the number that best describes how **upset you felt.**

1. When you got injured.

1	2	3	4	5
not all upset	a little upset	moderately upset	very upset	extremely upset

2. When the doctor examined you.

1	2	3	4	5
not all upset	a little upset	moderately upset	very upset	extremely upset

3. When the doctor treated your injury.

1	2	3	4	5
not all upset	a little upset	moderately upset	very upset	extremely upset

4. Other? (please specify)_____

1	2	3	4	5
not all upset	a little upset	moderately upset	very upset	extremely upset

Appendix E

Score Sheet for Transcripts

Score Sheet for Transcripts

INJURY	BASIC INFORMATION	ELABORATIONS
PREINJURY ACTIONS OF CHILD		
PRINJURY ACTIONS OF OTHERS		
TIME OF INJURY		
PLACE		
WHO WAS THERE		
WHO ELSE WAS THERE		
WHAT HAPPENED		
HOW INJURY OCCURRED		
OBJECTS INVOLVED IN INJURY		
OTHER OBJECTS AROUND		
WHO CAUSED INJURY		
HURT		
CRY		
BLOOD		
WHO FIRST RESPONDED TO CHILD		

WHO CHILD NOTIFIED FIRST		
RESPONSE ACTIONS TO INJURY		
HOME TREATMENT OBJECTS		
WHO ELSE HELPED		
1ST WENT WITHIN INJURY LOCATION		
1ST WENT OUTSIDE INJURY LOCATION		
GP VISIT OR OTHER DELAY		
DELAY TIME		
WENT TO HOSPITAL		
TRIP TIME		
WHO DROVE		
WHO ELSE WENT		

HOSPITAL	BASIC INFORMATION	ELABORATIONS
REGISTER		
NURSE		
VITALS		
WAITING ROOM		
TIME IN WAITING ROOM		
WAITING ROOM ACTIONS		
WAITING ROOM OBJECTS		
INITIAL EXAM DOCTOR		
INITIAL EXAM ACTIONS		
INITIAL EXAM OBJECTS		
INITIAL EXAM FAMILY		
X-RAY TECHINIAN		
X-RAY ROOM		
X-RAY OBJECTS		
X-RAY ACTIONS		

X-RAY WAITING TIME		
FAMILY AT X-RAY		
X-RAY CRY		
X-RAY HURT		
CAST ROOM		
CAST TECHNICIAN		
CAST OBJECTS		
CAST ACTIONS		
CAST WAITING TIME		
FAMILY AT CASTING		
CAST CRY		
CAST HURT		
SUTURE ROOM		
NEEDLE /STITICHING TECHNICIAN		
NEEDLE OBJECTS		
NEEDLE ACTIONS		
NEEDLE CRY		
NEEDLE HURT		

STITCHES OBJECTS		
STITCHES ACTIONS		
STITCHES WAITING TIME		
FAMILY AT STITCHES		
STITCHES CRY		
STITCHES HURT		
SHEET		
BANDAGE		
OTHER TREATMENT OBJECTS		
POPSICLE		
OTHER PROCEDURE DETAILS		
WENT HOME		