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Abstract

Objectives: Examine the association between children's distress and coping during venepuncture with parent's and healthcare professional's behavior in a sample from the United Kingdom (UK).

Method: 50 children aged 7-16 years accompanied by a carer were videotaped whilst having venepuncture. Verbalizations of children, parents, and healthcare professionals were coded using the Child-Adult Medical Procedure Interaction Scale-Revised (Blount et al., 1997).

Results: Children's distress was associated with child's age, anxiety, and distress promoting behavior of adults (R^2=.91). Children's coping was associated with age, anxiety, and coping promoting behaviors of adults (R^2=.57). Associations were stronger between healthcare professional's behavior and child coping; and between parent's behaviors and child distress. Empathizing, apologizing and criticism were not frequently used by adults in this sample (< 12%).

Conclusion: This study supports and extends previous research showing adult's behavior is important in children's distress and coping during needle procedures. Clinical implications and methodological issues are discussed.

Keywords: Children, Adolescents, Anxiety, Coping, Parenting Style, Health Care Services

Many children consider needle procedures to be one of the most distressing experiences of medical related care (Cummings, Reid, Finley, McGrath, & Ritchie, 1996; Horn & McCarthy, 1999). Severe needle distress and phobia in pediatric medicine has an estimated prevalence of 2 - 4% (Willemsen, Chowdhury, & Briscall, 2002). Increasing numbers of invasive needle procedures are associated with increased levels of medical fears, reduced perceived control over their health, and increased post-traumatic stress responses in children six months after discharge (Rennick, Johnston, Dougherty, Platt, & Ritchie, 2002). Moreover, there is evidence that such needle related fears and anxieties continue into adulthood, generating high adult fear, increased procedural pain and, occasionally, avoidance and refusal of medical care (Jones, DeMore, Cohen, O'Connell, & Jones, 2008; Kennedy, Luhmann, & Zempsky, 2008; Pate, Blount, Cohen, & Smith, 1996; Pringle et al., 2001; Young, 2005; Zambanini & Feher, 1997).

These findings demonstrate the need for research into pediatric needle procedures to increase knowledge and find appropriate methods of reducing needle related distress. Previous research into the understanding and the treatment of needle distress and phobias has examined the interaction between children, adults and healthcare professionals carrying out needle procedures, as well as various environmental factors that may influence children's distress. A number of factors have been highlighted as important. For example, research has found that needle related distress is higher in younger children (Young, 2005) and when a parent is not present (Blount, Landolf-Fritsche, Powers, & Sturges, 1991).

Behavior of parents and healthcare professionals has also been associated with children's distress and coping during needle procedures. Children's *coping* during needle procedures has been correlated with a number of adult behaviors, including adults' instructions to use coping strategies, humor and non-procedural talk during needle procedures (Cohen 2008; Khan & Weisman, 2007; Blount, Piina, Cohen, & Cheng, 2006; Powers, 1999;

Schechter et al., 2007; Uman, Chambers, McGrath, & Kisely, 2008). Behaviors associated with children's *distress* include visible parental anxiety (Blount, Powers, Cotter, Swan, & Free, 1994; Jay, Ozolins, Elliot, & Caldwell, 1983; Khan & Weisman, 2007), giving apologies, empathetic comments, praise and reassurance to the child (Dahlquist, Power & Carlson, 1995; Dahlquist, Power, Cox, & Fernbach, 1994; Manne et al., 1992; Schechter et al., 2007; Spagrud et al., 2008; von Baeyer, Marche, Rocha & Salmon, 2004).

However, research is not consistent in some of these areas, particularly in the role of reassurance and empathy. This may be due to a number of factors. First, the cross-sectional nature of much of the research means it is difficult to determine the direction of causality between child and adult behaviors. Experimental studies that manipulate whether reassurance is given to children have similarly inconsistent results with some finding reassurance does not increase distress (Gonzalez, Routh, & Armstrong 1993) and others finding that, although it may not increase global distress, it does lead to higher verbal fear (Manimala, Blout & Cohen, 2000). In addition, recent naturalistic studies find that supportive communication, including empathy, is associated with decreased distress in children (Cline et al., 2006; Peterson et al., 2001).

Second, variation in the measurement of constructs such as empathy may contribute to inconsistencies. For example, early behavioral research defined verbal repetition of the child's distress as a low level of empathy. The development and validation of scales, such as the Child-Adult Medical Procedure Interaction Scale-Revised (Blount et al., 1997), helps address this. However, it is not clear whether these scales are valid in different populations. This relates to a third possible reason for inconsistent findings, which is that the interaction between adult and child behaviors during needle procedures may vary in different countries. It is therefore important to examine this interaction in samples from different countries to get a cultural-specific understanding of influences on child distress during needle procedures.

Much of the available evidence into the nature and cause of needle related distress has been based on populations from the United States of America (US) and Australia. Populations from the United Kingdom (UK) have not been so well studied. Cultural differences may exist which influence adults' and children's behavior, reactions, and responses to pain and distress during needle procedures (McCarthy, & Kleiber, 2006; Pedro, Barros, & Moleiro, 2009). For example, research indicates that in comparison to Northern Europeans, Southern Europeans are more likely to verbalise their distress (Pedro, Barros, & Moleiro, 2009). Moreover, cultural origin may further influence parents' anxieties during invasive procedures (Pfefferbaum, Adams, & Aceves 1990). Such differences between cultures could mean that behavior displayed during venepuncture in a UK sample potentially differs to those found in US samples. Furthermore, UK healthcare is state funded which may result in different time constraints and availability of resources. There may also be differences in the training of healthcare professionals between healthcare systems. These factors may further influence behavior in the treatment room.

In addition to cultural differences, variation in type of needle procedure and illness history of the child may be important in needle related distress. Most research into needle procedures has been based on specific pediatric populations, such as children with cancer, or particular needle procedures such as immunization, lumbar puncture, or bone marrow aspiration. Less research has been carried out into needle distress in children undergoing routine intravenous procedures such as outpatient venepuncture (Kleiber, Craft-Rosenburg & Harper, 2001). Blount, Piina, Cohen, and Cheng, (2006) argue that each type of needle procedure deserves dedicated research to aid knowledge into reducing needle distress within that unique clinical situation.

Venepuncture is one of the most commonly experienced outpatient procedures by children (Gupta, et al., 2006; Leahy et al., 2008; Rogers & Ostrow, 2004) and 50% of

children experience significant levels of distress during venepuncture (Fradet et al., 1990). It is possible that distress in these children may be influenced by different factors. First, this may be their first experience of venepuncture, so they will not have previous experience or coping strategies to draw on (Duff, 2003). Second, this may be the first contact these children have with a hospital setting (Melhuish & Payne, 2006) so the environment will be novel and unfamiliar. Children may therefore be highly anxious, which is associated with increased needle related distress and pain (Goodenough et al., 1999). Venepuncture also differs from other needle procedures such as immunization in that it is longer, involves other medical equipment such as tourniquets, and finding an appropriate vein and drawing blood is more difficult than most injections. Moreover, venepuncture is only carried out if medically implicated, thus is associated with illness.

The aim of this study is therefore to examine how naturally occurring adult (healthcare professionals and carers) verbal behaviors are related to child coping and distress during outpatient venepuncture in a UK sample. In line with previous research, it is hypothesized that child distress will be associated with adult distress promoting behaviors; and that child coping behavior will be associated with adult coping promoting behaviors.

Method

Participants

Children were aged 7-16 years (Mean=11.6 years, SD=2.7): 22 males and 28 females. Parents or carers were aged 20-70 years (Mean=42.8, SD=9.2) and comprised 43 parents and 7 guardians or carers (for ease we hereafter refer to this group as ‘parents’). Procedural variables are shown in Table 1. Venepunctures were carried out by seven different healthcare professionals aged 24 – 55 years (Mean= 39 years, SD=8.89). The majority of children (92%) were not familiar with the healthcare professional performing the venepuncture. The majority

of children (84%) received ethyl chloride spray, EMLA cream or entonox analgesia for the procedure. Thirty percent of children were having venepuncture for the first time. Procedural variables were not associated with child distress or coping.

- insert Table 1 about here –

Inclusion criteria were that children were aged seven years or older, fluent in English, accompanied by a parent or carer, and having venepuncture for the purpose of obtaining a blood sample. Seventy-one child-parent dyads were approached to take part in the study and 51 (72%) agreed to participate. However, one dyad had to be excluded due to poor recording so the eventual sample was 50 child-parent dyads. Participants who did not want to take part usually declined because of time restraints. Table 2 shows the demographic characteristics of adults accompanying children. The majority of children were accompanied by their mother. Nearly all of the carers were married individuals and of white European origin, which is representative of the area the research was conducted (UK Statistics Authority: Census, 2001).

- insert Table 2 about here –

There were 21 different clinical indications for venepuncture, the most common being tests for hypothyroidism, arthritis, and Epstein Barr virus. The time since onset of symptoms or diagnosis ranged from 3 days to 15 years (Mean=2.26 years, SD=3.81). Of the seven children who had more than five needle procedures in the preceding year, two had been diagnosed with a disease for under a year. Children's mean score for anxiety before venepuncture on a visual analogue scale (range 0 – 10) was 4.58 (SD = 3.32), indicating that most children were slightly anxious before the procedure.

Procedure

Ethical approval was obtained from the regional National Health Service research ethics committee. Where possible, letters giving information about the research were sent to

potential participants before their appointment. Participants were then approached at the hospital by the researcher and asked if they were interested in participating and given an information sheet about the study. Informed consent and assent were obtained from the parent and child respectively and the parent completed a demographic questionnaire. Medical information was obtained from medical notes or participants. The child completed a measure of anxiety before venepuncture.

Participants were then video-recorded during the venepuncture. Video recording started as soon as the participants entered the treatment room and ended as they left the room. The length of footage captured ranged from 1 minute 28 seconds to 8 minutes 24 seconds (Mean=4 minutes 18 seconds, SD=1.83). No one manned the camera during recording so the researcher was not present in the treatment room whilst venepuncture took place. Video footage was converted to AVI files for coding. All video footage and data collected were stored anonymously and any identifying information of participants removed.

Measures

A simple demographic questionnaire was used to measure basic sociodemographic information. Medical records were examined to obtain information on how long the child had been diagnosed with their current illness, severity of pathology, and if they had suffered any complications of the disease. Parents were asked to provide information on the child's familiarity with the healthcare professional performing venepuncture; types of previous invasive procedures experienced; type of analgesia/treatment used in the procedure and the number of needle procedures experienced in the past year by the child/adolescent.

Anxiety was measured using a scale from "not anxious at all" (0) through to "moderately anxious" (5) to "severely anxious" (10). The child was shown the scale and asked by the researcher to rate the level of anxiety they were currently feeling about the venepuncture they were going to have. If children had difficulty understanding this concept,

the scale was explained using synonyms such as “worry” and “nervousness”. The researcher also involved parents in the explanation in order to get an appropriate rating from the child. This provided a quick and simple method of gaining ratings of anxiety, which was appropriate for the age group of children and the brief time participants had prior to the needle procedure (Kindler, Harms, Amsler, Ihde-Scholl, & Scheidegger, 2000).

Analysis

Verbal content of video footage was coded using the Child-Adult Medical Procedure Interaction Scale-Revised (Blount et al., 1997) (CAMPIS-R), a standardized observational rating scale developed to code verbal interactions in pediatric settings. The CAMPIS-R has good concurrent validity with objective and subjective measures of children’s distress, pain and fear (Blount et al., 1997). The CAMPIS-R defines 35 different codes of vocalizations for adults and children. These make up subscales of (1) child coping (making coping statements, non-procedural related talk, audible deep breathing and humor); (2) child distress (crying, screaming, verbal resistance, request emotional support, verbal fear, verbal pain, verbal emotion, and information seeking); (3) adult coping promoting behaviors (humor directed to child, nonprocedural-related talk to child, command to engage in coping strategy); (4) adult distress promoting behaviors (criticism, reassuring comment, giving control to the child, apology, and empathy). Adult and child neutral behaviors are not described here as they are not part of the hypotheses or the focus of further analysis.

Vocalizations were coded for each person present during venepuncture for the whole time they were in the treatment room (Manimala, Blount & Cohen, 2000; Pedro, Barros & Moleiro, 2009). Mean ratings of each superordinate category of behavior were calculated by dividing the number of incidences of each category of behavior occurred by the total duration of the procedure. Reliability of coding was checked in ten percent of the participant videos which were selected at random and coded by an independent researcher. Kappa scores for

verbal behavior during venepuncture were .70 for children vocalizations; .90 for parent vocalizations; .83 for healthcare professionals indicating good and very good reliability.

Statistical Analysis

Many variables were positively skewed so non-parametric tests (Spearman's rank correlations) were used to explore associations between variables. Data from one participant were excluded from multivariate analyses due to being an extreme multivariate outlier. Another participant was an outlier for child coping so was excluded from analysis of this variable only. Hierarchical multiple regressions were used to look at predictors of child distress and coping. Outcome variables of child coping and distress were skewed so were transformed for these analyses. Square root transformation of child coping restored it to normality (SR-coping). However, transformations were not able to restore child distress to normality so raw data were used. Conclusions drawn from this regression must therefore be interpreted with caution.

Results

The most common distress behaviors by children were verbal pain (40%), fear (24%), and other expression of emotion (22%). The most frequent coping behavior was non-procedural talk (74%). The behavior of parents and staff is summarized in Table 3. The most common behavior by parents and healthcare professionals was the use of nonprocedural talk, reassurance and humor. Healthcare professionals also gave children more coping strategies and control. Both parents and staff engaged in more coping promoting behavior than distress promoting behavior. Whilst many of these findings are similar to previous research findings (Blount et al., 1997; Dahlquist et al., 1995; Manimala, Cohen & Blount, 2000) it can be seen that some behaviors were very infrequent in this sample compared to previous research– particularly making apologies, empathic comments or criticism which only occurred in 0% to 12% of parents or healthcare professionals, the significance of which will be discussed later.

- insert Table 3 about here –

Associations between parents' behavior, healthcare professionals' behavior, and children's coping and distress

Table 4 shows correlations between parents, children's and healthcare professional's verbal behaviors, child age, anxiety of the child, and the number of needle procedures experienced in the previous year. Higher anxiety in children before venepuncture was associated with more distress during venepuncture, younger age, and fewer previous needle procedures experienced by the child. Child's age was also negatively associated with coping promoting behavior by healthcare professionals. The degree of anxiety felt by the child before outpatient venepuncture was also positively correlated to parent and healthcare professionals distress-promoting behaviors.

In line with hypotheses, significant correlations were found between the behavior of children, parents, and healthcare professionals during venepuncture. Coping behaviors were positively associated between children, parents, and healthcare professionals. Similarly, distress behaviors were positively correlated between children, parents, and healthcare professionals.

- insert Table 4 about here-

Multivariate models of children's distress and coping during venepuncture

Two hierarchical regression analyses were conducted to determine which factors were associated with child SR-coping and distress during venepuncture. Child's age and anxiety were controlled for by entering them on the first and second step respectively. Following this, parents' behaviors were entered in the third step; and healthcare professionals' behavior in the fourth. Results are shown in Tables 5 and 6. This shows that child's age was not a significant predictor of children's coping or distress. Anxiety was initially predictive of

children's distress but no longer contributed significantly to the model once parent variables were entered. In both models, parent's and healthcare professional's behavior significantly predicted children's SR-coping and distress, with the final models accounting for 57% of the variance in children's SR-coping and 91% of the variance in children's distress. It can be seen that healthcare professional behavior accounts for the highest degree of variance in children's SR-coping whereas parent's behavior accounts for the most variance in children's distress.

-insert Tables 5 & 6 about here -

Discussion

The findings of this study are consistent with previous research in non-UK samples showing that children's behavior and distress are associated with behaviors of parents and healthcare professionals (Blount et al., 1997; Dahlquist, et al., 1995; Frank, Blount, Smith, Manimala, & Martin, 1995; Manimala, Cohen, & Blount, 2000). However, in contrast to previous research, child factors such as age and anxiety were not related to distress during venepuncture once parent's and healthcare professional's behaviors were taken into account. This study demonstrates the importance of parent's and healthcare professional's behavior, which accounted for almost all the variance in children's levels of distress during venepuncture, and over half the variance in children's coping during venepuncture. Of particular interest was that healthcare professionals' behavior had a stronger correlation with children's coping than parents' behavior and, conversely, that parents' behavior had a stronger correlation with children's distress than healthcare professionals' behavior. These results are discussed in turn.

Child characteristics and distress

In contrast to previous research (Fradet et al., 1990; Young, 2005), child age was not significantly associated with distress behaviors. This could be partly due to the finding that

healthcare professionals used less coping promoting behavior with older children. In addition, healthcare professionals coping promoting behaviors were not significantly associated with how anxious children were. This suggests health practitioners may react to children's age rather than clinical need, which could result in them not using important coping promoting behaviors such as distraction.

Previous experience of needle procedures was also not associated with child coping or distress, indicating that increased experience of venepuncture does not necessarily lead to habituation or sensitisation. Longitudinal or qualitative research is needed to examine why some children are able to effectively cope with needle procedure and why some cannot.

Parents' and healthcare professionals' behavior

The role of parents' behavior in child distress has been debated in the literature (Cline et al., 2006) - particularly behaviors such as reassurance or empathy, which seem supportive but have been inconsistently associated with increased child distress. The current study found a relationship between parent distress promoting behaviors and child distress, which is consistent with previous research (Blount et al., 2006). However, in the current sample parents' distress promoting behaviors mostly consisted of giving reassurance and very few parents used other behaviors of apologizing, empathizing or giving control to their child. We return to this later when discussing the implications of this study for understanding cultural differences in behaviors during needle procedures.

Nonetheless, what is interesting about this study is the degree of variance (68%) that parents' behavior contributed to predicting the child distress. This study also supports previous research indicating that parents' behavior is more significantly associated with child distress than healthcare professionals' behavior (Cohen, Bernard, Greco, & McClellan, 2002). Conversely, health professionals' behavior appeared to have a stronger association with children's coping behaviors. This is broadly consistent with previous research (Cohen et

al., 2002; Sweet & McGrath, 1998) and extends previous knowledge by demonstrating that such a relationship occurs in a wide range of chronic and acute pathologies in children who have differing experience of needle procedures, and in a UK sample. This suggests the relationship is stable across diverse situations and in different samples of children. It also gives credence to the idea that as a novel, authoritative figure, healthcare professionals are in a more empowered position than parents during venepuncture, and may have more influence on children's coping behavior (Cohen et al., 2002).

This study showed that parents and healthcare professionals used similar behaviors. Significant correlations were found between the healthcare professionals and parents for both coping and distress promoting behaviors. This highlights the complex interplay between childrens', parents', and healthcare professionals' behaviors in such situations (Spagrud et al., 2008). The cross-sectional nature of this study means it is impossible to determine the direction of causality, but the relationship between adult and child behaviors is likely to be bi-directional (Spagrud et al., 2008). Initial reactions of children to the needle procedure may be important in influencing the behavior of adults. As found in this study, reassurance is the most common adult distress promoting behavior which may represent a natural reaction to, rather than cause of, child distress. There is some indication from previous research that adult distress promoting vocalizations may be antecedent to child distress vocalizations (Spagrud et al., 2008).

This inter-relatedness of adult and child behavior emphasizes the importance of healthcare professionals using coping promoting behaviors. The rationale for this is two fold, not only is healthcare professionals' behavior significantly related to children's coping behavior, but may also promote parental coping promoting behavior. Furthermore, research suggests that parents not trained in coping techniques are more likely to follow the healthcare professionals lead (Cohen, Blount & Panopoulos, 1997).

Finally, there is some suggestion from this study of cultural differences in behaviors. Humor and non-procedural talk were more common in UK adults than in studies conducted in US samples. In addition, behaviors such as apologizing, criticizing and making empathic comments were rarely used. This is an interesting finding as it suggests that the frequency of specific adult behaviors may vary between the UK and US. In addition, children's verbalized pain and fear were common behaviors, indicating that children from the UK may verbalize distress more frequently. These findings provide insight into how culture may influence the behavior of adults and children during needle procedures. Cross-cultural research is needed in this area to explore this further.

Another implication of this is that the CAMPIS-R subscales may not be as relevant or reliable in UK samples. Factor analysis of the CAMPIS-R in a US sample suggests the subscales may not group together as originally proposed (MacLaren, Cohen & Cohen, 2007). The sample of the current study is too small to carry out psychometric analyses. Therefore it is important that future research tests the psychometric properties of this scale in UK samples.

Methodological issues

Before drawing conclusions it is important to consider methodological issues of measurement, design and sample. Firstly, this study shows that some of the CAMPIS-R codes are not frequent in this sample. For example, apologizing, empathizing and criticizing were only used by < 12% of parents or healthcare professionals. The subscales of adult distress promoting behaviors therefore predominantly reflected behaviors such as reassurance (from parents and healthcare professionals) and giving the child control (from healthcare professionals). This has also been found in other European samples. For example, a Portuguese study found that less than 4% of parents and healthcare professionals apologized or used humor during immunizations (Pedro et al., 2009). Further research is therefore

necessary to explore the frequency of different behaviors in UK and European samples. It would also be helpful to explore the structure of the CAMPIS-R in a larger sample from the UK.

Secondly the study is limited by the cross-sectional design and relatively small sample. As mentioned, the cross-sectional design of the study makes it difficult to assess cause and effect between behavior of children, parents, and healthcare professionals. The relatively small sample size and the age range of children restrict the generalization of findings and raises issues of power. However, it can be seen from Table 4 that the sample was powered to identify moderate to large effects (Cohen, 1988). Despite these limitations this study presents interesting preliminary data on the way that healthcare professional and parent behaviors are related to child coping and distress behaviors during venepuncture in a UK sample.

Implications for clinical practice

The finding that healthcare professionals' and parents' behaviors have different associations with child distress and coping means there is a need to increase awareness of adult roles during venepuncture. Healthcare professionals might need to be more attentive as to how their behavior might be associated with child behavior, and take the lead during venepuncture to try to promote child coping. In addition, healthcare professionals need to engage in more coping behavior in response to a child's anxiety or need, rather than their age. Similarly, parents can be trained effectively in a variety of methods to promote child coping (Cohen et al., 2002; Sweet, & McGrath, 1998). Therefore, future research needs to design and evaluate cost-effective interventions to influence parents' behavior that are practical for use in busy clinical situations.

Whilst not correlated significantly to child behavior, what might be considered concerning is that 12.3% of subjects received no analgesia. Previous research shows wide

variation in the use of analgesic methods by individual practitioners (Howard, 2003). Therefore some healthcare practitioners may be overlooking a proven intervention that could decrease child distress during painful procedures (Young 2005; Lander, Weltman, & So, 2006; Moore, Straube, & McQuay 2009; Zempsky 2008).

In summary, venepuncture is a relatively common, stressful procedure for children and adolescents. This study aimed to examine distress during venepuncture in children and adolescents suffering from a wide range of pathology. It presents the relationships between adults' and children's behavior during venepuncture. Of particular importance, this study reveals the association between healthcare professionals' behavior and children's coping behaviors. Future research is needed to substantiate these results in larger samples and to examine measurement issues.

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Table 1. Procedural Variables

		Children N=50 *n* (%)
Healthcare professional doing the procedure	Phlebotomist 1	27 (54%)
	Phlebotomist 2	12 (24%)
	Phlebotomist 3	6 (12%)
	Phlebotomist & Nurse	3 (6%)
	Nurse	2 (4%)
Whether children were familiar the person doing venepuncture	Familiar	4 (8%)
	Not Familiar	46 (92%)
Type of analgesia given	Ethyl Chloride Spray	30 (60%)
	EMLA Cream	10 (20%)
	Ethyl Chloride Spray & Entonox Gas	1 (2%)
	Ethyl Chloride Spray & EMLA Cream	1 (2%)
	None	8 (16%)
Number of needle procedures in the previous year	0 to 5	43 (86%)
	10 to 15	6 (12%)
	15+	1 (2%)
Type of previous needle procedures	Immunisations	13 (26%)
	Immunisations & Venepuncture	33 (66%)
	Venepuncture	1 (2%)
	Immunisations & Digital Block	1 (2%)
	Immunisations, Cannulas & Venepuncture	1 (2%)
	None	1 (2%)

Table 2. Demographic characteristics of adults accompanying children to venepuncture

Sample Characteristics		Total sample N=50 *n* (%)
Relation To The Child	Mother	40 (80%)
	Father	3 (6%)
	Sister	1 (2%)
	Grandparent	4 (8%)
	Legal Guardian	2 (4%)
Ethnic Origin	White European	49 (98%)
	Indian	1 (2%)
Education	None	9 (18%)
	GCSE[a]	15 (30%)
	A-Levels[a]	5 (10%)
	Vocational Qualification	9 (18%)
	Degree	5 (10%)
	Professional Qualification	7 (14%)
Socioeconomic Status	Class 1	1 (2%)
	Class 2	12 (24%)
	Class 3 Non-Manual	7 (14%)
	Class 3 Manual	6 (12%)
	Unemployed	24 (48%)
Many Other Children Did They Have	Zero	2 (4%)
	One	8 (16%)
	Two	17 (34%)
	Three	11 (22%))
	Four +	12 (24%)
Age of Other Children	Below 12 years	56 (43.4%)
	Between 12-18	55 (42.6%)
	18+ years	18 (14%)
Marital Status	Single	4 (8%)
	Divorced/Separated	5 (10%)
	Cohabiting	8 (16%)
	Married	33 (66%)

[a] GCSE = General Certificate of Secondary Education (usually taken aged 16); A Levels = Advanced level Qualification (usually taken aged 18)

Table 3. Verbal behavior of parents and healthcare professionals during venepuncture

	Parents				Healthcare Professionals			
	% [a]	Range	Mean	SD	% [a]	Range	Mean	SD
Total distress promoting behavior	48%	0 - 4.81	0.67	1.17	80%	0 – 3.3	0.73	0.87
Criticism	12%	0 – 5.0	0.30	1.04	2%	0 – 2.0	0.04	0.28
Reassuring comments	46%	0 – 14.0	2.18	3.81	58%	0 – 17.0	2.20	3.54
Giving control	4%	0 – 2.0	0.06	0.31	42%	0 – 2.0	0.56	0.73
Apologies	0%	0	0	0	6%	0 – 8.0	0.20	1.14
Empathetic comments	6%	0 – 3.0	0.10	0.46	10%	0 – 2.0	0.12	0.39
Total coping promoting behavior	70%	0 – 4.0	0.84	0.86	88%	0 – 4.3	1.44	1.12
Nonprocedural talk	60%	0 – 10.0	2.44	2.89	84%	0 – 16.0	4.04	3.85
Humor	32%	0 – 8.0	0.92	1.74	30%	0 – 7.0	0.82	1.63
Command to use coping strategies	14%	0 – 6.0	0.38	1.14	42%	0 – 17.0	1.24	2.69

[a] Percentage of sample who used each behavior.
[b] Descriptive statistics for total coping and distress promoting behaviors are in terms of rates per minute

Table 4. Correlations between child, parent and healthcare professionals behaviour during venepuncture

		1	2	3	4	5	6	7	8
1	Child coping behavior[a]								
2	Child distress behavior	-.22							
3	Parent coping promoting behavior	.41**	.01						
4	Parent distress promoting behavior	-.23	.75**	.03					
5	Healthcare professional coping promoting behavior[a]	.70**	-.14	.32*	-.18				
6	Healthcare professional distress promoting behavior	-.09	.66**	-.00	.55**	-.14			
7	Child's age	-.05	-.26	-.22	-.25	-.32*	.03		
8	Child anxiety	-.08	.63**	.26	.61**	.08	.48**	-.29*	
9	No. of needle procedures in preceding year	.23	-.10	-.10	-.26	.03	.14	.28	-.32*

* $p < .05$, ** $p < .01$

[a] = Where the number of participants included in the data analysis = 48 triads

Table 5. Hierarchical regression of variables associated with children's SR-coping during venepuncture (n=48 triads)

Variable	R^2	R^2 Change	F	B	β	T
Step 1	0.06		0.28			
Child's age				-0.10	-0.08	-0.52
Step 2	0.01	0.06	0.28			
Child's age				-0.03	-0.1	-0.66
Child's anxiety				-0.02	-0.08	-0.55
Step 3	0.20*	0.15*	3.73			
Child's age				0.00	0.02	0.12
Child's anxiety				-0.03	-0.14	-0.98
Parent/Carer coping promoting behavior rate				0.35	0.46	3.24
Step 4	0.57**	0.37**	14.72**			
Child's age				0.04	0.16	1.49
Child's anxiety				-0.01	-0.06	-0.57
Parent/Carer coping promoting behavior rate				0.25*	0.32*	3.04*
Healthcare professional coping promoting behavior rate				0.39**	0.65**	6.20**

*p<.001; **p<.001

Table 6. Hierarchical regression of variables associated with children's distress during venepuncture (n=49 triads)

Variable	R^2	R^2 Change	F	B	β	T
Step 1	0.09		4.4			
Child's age				-0.259	-0.294	-2.108
Step 2	0.23*	0.15*	6.97**			
Child's age				-0.16	-0.18	-1.33
Child's anxiety				2.90*	0.40*	2.96*
Step 3	0.87***	0.64***	99.04***			
Child's age				-0.03	-0.03	-0.53
Child's anxiety				0.06	0.08	1.31
Parent/Carer distress promoting behavior rate				1.88***	0.89***	14.75***
Step 4	0.91***	0.04***	109.52***			
Child's age				-0.08	-0.09	-1.73
Child's anxiety				-0.00	-0.00	-0.07
Parent/Carer distress promoting behavior rate				1.49***	0.70***	10.78***
Healthcare professional distress promoting behavior rate				0.81***	0.30***	4.41***

* p<.005; ** p<.002; *** p<.001