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Cognitive Behavioral and Behavioral Interventions Help Young Children Cope During a Voiding Cystourethrogram

Nataliya Zelikovsky,[1] PhD, ***James R. Rodrigue,***[1] PhD, ***Christine A. Gidycz,***[2] PhD, and ***Melissa A. Davis,***[1] BA
[1]University of Florida and [2]Ohio University

Objective: **To reduce young children's distress and increase coping behavior among children undergoing a voiding cystourethrogram (VCU).**

Methods: **Three- to seven-year-old children were stratified based on prior VCU experience and randomly assigned to an intervention (n = 20) or a standard care (n = 20) condition. The intervention included provision of information, coping skills training, and parent coaching. We hypothesized that the intervention would reduce children's distress as assessed by child report, parent and technician ratings, and behavioral observations.**

Results: **Children in the intervention displayed fewer distress behaviors and greater coping behaviors and were rated as more cooperative than children receiving standard care. Children's fear and pain ratings did not differ significantly between groups.**

Conclusions: **A cognitive-behavioral treatment package effectively reduced children's distress, increased coping, and increased cooperation during voiding cystourethrogram procedures. This type of an intervention should be integrated into routine pediatric radiological procedures.**

Key words: *child distress; interventions; invasive medical procedure; coping skills training; parent coaching; voiding cystourethrogram.*

In 1991, approximately 31 million children were hospitalized and approximately 20 million children underwent diagnostic or nonsurgical medical procedures (Centers for Disease Control and Prevention, 1994). Compared to a normative sample, children awaiting invasive medical procedures have significantly higher state and trait anxiety (Wachtel, Rodrigue, Geffken, Graham-Pole, & Turner, 1994). Repeated exposure to anxiety-provoking medical events early in life may lead to adult dysfunctional cognitions and avoidant attitudes toward health care (Pate, Blount, Cohen, & Smith, 1996). Therefore, developing effective interventions to reduce children's distress during medical events is important and can have immediate and long-term benefits.

Different types of short-term interventions have been used to reduce children's distress during medical procedures (i.e., information, modeling, cognitive-behavioral therapy). Coping skills training based on cognitive-behavioral principles has been

All correspondence should be sent to Nataliya Zelikovsky, Psychology Department, CSH-109, The Children's Hospital of Philadelphia, 34th Street & Civic Center Blvd., Philadelphia, PA 19104-4399. E-mail: zelikovsky@email.chop.edu.

most widely used and evaluated. The critical components of coping skills training typically include breathing exercises, distraction techniques, visual imagery, and muscle relaxation. Indeed, cognitive behavioral therapy has been demonstrated to be an empirically supported treatment for pediatric procedural pain (Powers, 1999). However, we need demonstrations of the efficacy of such treatment with previously unevaluated medical procedures.

The medical procedure of interest in this study was the voiding cystourethrogram (VCU). Children are referred for VCU procedures due to a history of recurrent urinary tract infections in order to determine the cause of the infections. Most of these children are otherwise healthy and therefore have little experience with medical events. During this diagnostic procedure, a catheter is inserted in the urethra (without anesthesia), the bladder is filled with a contrast medium, and x-ray images are taken during filling and voiding of the bladder to determine whether the child has a reflux. A reflux is a condition in which the urine flows from the bladder back to the kidneys rather than being expelled through the urethra. Failure to treat this condition may cause recurrent urinary tract infections. The VCU procedure is invasive, uncomfortable, and potentially anxiety-provoking for children, yet it has not been the focus of study among pediatric psychologists.

Only a few studies have systematically examined the benefit of parental involvement in children's interventions (Blount, Powers, Cotter, Swan, & Free, 1994; Campbell, Clark, & Kirkpatrick, 1986; Manne et al., 1990; Powers, Blount, Bachanas, Cotter, & Swan, 1993). This is surprising given the strong relationship between parental anxiety and behavior and children's reactions to the medical situation (Blount et al., 1989; Dahlquist, Power, Cox, & Fernbach, 1994; Manne et al., 1992). Additionally, early studies found that trained children may not use coping strategies during a medical procedure (Dahlquist et al., 1986) and that their distress may be managed more effectively when a trainer or coach is present (Blount et al., 1989). For these reasons, it seems crucial to involve parents in children's preparation for medical procedures.

The primary aim of this study was to examine the effectiveness of a coping skills training and parent coaching intervention for children undergoing a voiding cystourethrogram. We evaluated three hypotheses. First, we hypothesized that children assigned to the intervention condition would report lower fear and pain ratings, demonstrate fewer distress behaviors and more coping behaviors, and receive lower fear and higher cooperativeness ratings from parents and technicians during the procedure than children who received standard care. Second, we hypothesized that children receiving the intervention would demonstrate a significant reduction in distress from baseline to the pre-procedural assessment and a slight increase during the medical procedure. In contrast, we supposed that children receiving standard care would show similar levels of distress during the first two assessments and a significant increase in distress during the VCU procedure. Third, exploratory hypotheses examined the relationship between prior VCU experience and children's age and their distress during the procedure. Younger children supposedly would be more fearful and less cooperative and display more distress behavior and less coping behavior than older children. A significant relationship was predicted between children's prior VCU history and their distress during the medical procedure.

Method

Participants

Forty children between the ages of 3 and 7 (M = 4.75, SD = 1.54) who were scheduled for a VCU procedure and their parents participated in the study. Most parents who participated were mothers (85%). Thirty-five children were girls (85%), consistent with the higher rate of urinary tract infections among girls (Miller, 1996). Thirty-four children were Caucasian (85%), four children were African American (10%), and two children were Hispanic (5%).

All children participating in the study were referred for a diagnostic VCU because they had a history of recurrent urinary tract infections. Children with severe chronic disabilities, significant cognitive delay, or myelomeningocele were excluded from the study. Additionally, children receiving local anesthesia were excluded from the study because they were numbed to the physical discomfort experienced during the VCU procedure, distinguishing this minority of children from the rest of the sample who did not receive any local anesthesia.

Procedures

Families were recruited for participation in the study in a pediatric radiology clinic over a 6-month period. Only one eligible family refused participa-

tion (due to time contraints), with a total participation rate of 98%. Because prior experience with a medical procedure may be related to children's reactions to a medical procedure (Dahlquist et al., 1986; Faust & Melamed, 1984; Melamed, Dearborn, & Hermecz, 1983), participants were stratified based on this factor prior to random assignment. Once we determined whether the child had a VCU procedure in the past, the investigator pulled a piece of paper (labeled "standard care" or "intervention") out of the appropriate bag labeled "VCU experience" or "No VCU experience" to determine which condition the child was randomized to. Through this process, an approximately equal number of children with and without prior VCU experience was assigned to each condition.

Institutional review board (IRB) approval was obtained from the University of Florida and Ohio University. Oral and written consent was obtained from parents and assent was obtained from children who were 7 years of age and older. Parents in both groups completed a medical history questionnaire and rated their child's anticipatory fear. Children rated their anticipatory fear (baseline phase). After completion of the questionnaires, families assigned to the intervention condition received information about the VCU and a demonstration of the procedure using an anatomically correct doll. Children were taught coping strategies and parents were trained to coach their child (described below). Families assigned to the standard care condition did not receive any information or coping skills training. They were engaged in nonprocedure-related conversations (i.e., school, hobbies). The time allotted to spend with families in both conditions was approximately the same (15 minutes).

After the preparation or a waiting period, children indicated their level of anticipatory fear and parents rated their child's fear (pre-procedural phase). The procedure was audiotaped and the Child-Adult Medical Procedures Interaction Scale-Revised (CAMPIS-R) was used to rate children's behavior. After the VCU, children indicated the level of fear and pain that they experienced during the procedure (procedural phase). Parents and radiology technicians also rated the child's procedural fear and cooperation.

A counter-expectancy rationale was used to keep the technicians blind to the specific hypotheses of the study. The nature of the intervention or the fact that there were two separate conditions was not disclosed. Technicians were told that although in some cases they may not observe the children using coping strategies, all children participated in an intervention and could be using cognitive techniques not overtly observed. However, the technicians could not be kept blind to the child's prior history with VCU procedures because this information is accessible in the child's medical record.

Intervention Program: Provision of Information

Information was provided to children in age-appropriate language and included procedural and sensory components. To increase children's familiarity with the medical situation, they were told what to expect at each stage, including the introduction to the exam room, catheterization, filling of the bladder with contrast medium, and voiding on the exam table. The procedure was demonstrated using an anatomically correct, gender-appropriate doll and basic medical equipment (i.e., catheter, antiseptic soap, wipes, contrast bottle). In addition to a description of the procedure, sensory information was provided. Children were told what the room and the equipment would look like (visual), what the medical staff would ask them to do (auditory), and what each aspect of the procedure would feel like (tactile).

Coping Skills Training

Breathing Exercises. A party blower was used to teach children in a concrete manner how to breathe deeply and slowly. This technique was intended to regulate their breathing and to serve as a distractor. Although children were permitted to use the party blower throughout the procedure, they were especially encouraged to use it during the catheterization and voiding periods. Jay and colleagues (Jay, Elliott, Katz, & Siegel, 1987) reported that 40% of the children in their study found that breathing exercises effectively reduced their distress.

Positive Statements. Children were given positive feedback about their listening skills and active participation during the training session. Positive statements (i.e., "I'm so brave," "I can use my party blower to relax") were recorded on the audiotape of a "talking bear" to provide positive feedback to the child and to encourage coping skills training during the medical procedure. This technique is similar to the use of positive self-statements with adults but was adapted here to be more developmentally appropriate for young children.

Distraction. Both the party blower and the "talk-

ing bear" diverted the child's attention to an activity and, therefore, served as distractors. In a study using similar coping strategies, (Jay, Ozolins, Elliott, & Caldwell, 1983), 23% of trained children found distraction to be a helpful strategy. Distraction has been particularly effective in reducing children's distress when a brief period of time was available prior to the procedure (McCaul & Malott, 1984), which was the case in our study.

Modeling and Behavioral Rehearsal

During the initial demonstration of the medical procedure on the doll, the principal investigator role-played the physician performing the procedure while the research assistant held the doll and pretended to be the patient. The investigator provided explanations throughout the demonstration and coached the research assistant to use coping skills at the appropriate times. The parent and the child observed the first demonstration. Then the demonstration was repeated with the principal investigator remaining in the role of the physician, but this time the child held the doll and pretended to be the patient. The parent was asked to provide explanations and coach the child in the use of the coping skills during the second demonstration. Although they were encouraged to use these coping strategies whenever they felt worried or scared, they were told that the strategies would be particularly useful during insertion of the catheter and during voiding, the most stressful aspects of the VCU procedure.

During the VCU procedure, parents were positioned at the head of the examination table, allowing them to have direct eye contact with the child in order to provide verbal support and to coach their child to use coping strategies. At times, parents held the child's hands, either to provide comfort or to restrain the child from moving around. Parents were encouraged to assist their child in holding the party blower and the bear, and the amount of assistance provided by the parents depended on the age and cooperation of the child.

To reinforce behavior, children received praise throughout the training session and were given stickers after the medical procedure. Children also received a bravery certificate and a coupon to a local fast food restaurant for their participation.

Instruments

Children's ratings of fear and parent's ratings of children's fear were obtained at baseline, preprocedure, and during the procedure. Behavioral observations and technician reports were obtained only at the procedural assessment.

Background Questionnaire. Parents completed a background questionnaire, consisting of demographic information and the child's medical history.

Child-Adult Medical Procedures Interaction Scale-Revised (CAMPIS-R). The CAMPIS-R (Blount et al., 1997) includes three child codes: Coping, Distress, and Neutral behaviors, and three adult codes: Coping Promoting, Distress Promoting, and Adult Neutral behaviors. For the purpose of this study, only child coping and distress behaviors were examined. The coding procedures were conducted in a fashion similar to that used by Blount and his colleagues (Blount et al., 1989); however, videotaping was not done due to the invasive nature of the medical procedure and the risk of embarrassment to the child. Instead, the procedure was audiotaped and transcribed by the research assistant who was present during the actual procedure to assure accuracy. Each transcription was verified by a second research assistant.

For coding purposes, the VCU procedure was divided into three phases. The *catheterization* phase (5–10 minutes) began when the physician entered the exam room and included buckling the child with a belt, cleansing the site, and inserting the catheter. Children are buckled to the examination table with a wide plastic belt to minimize movement and to prevent them from turning away from the radiologist during the medical procedure. Once the catheter was properly inserted, the *filling phase* (15–20 minutes) began and included placement of the x-ray machine over the child, filling of the bladder with a contrast medium, and taking x-ray images. The *voiding phase* (5–10 minutes) began when the child stated that he or she had to urinate, either voluntarily or in response to an inquiry. It included voiding on the exam table and taking x-ray images and ended when the child was taken off the exam table. The duration of each procedural phase may depend on several factors. First, the child may be uncooperative and refuse to undress or lie down on the exam table. Second, the radiologist may have difficulty inserting the catheter properly and may have to repeat the procedure several times. Third, since children's bladder sizes vary, the amount of time taken to fill the bladder with the contrast solution also varies. Additionally, the child may void earlier if the physical discomfort is too difficult to bear.

The child target behaviors were coded continuously during each of the three phases of the medical procedure. The proportion of distress and coping behaviors was determined by dividing the number of occurrences of each type of behavior during each phase by the total number of child behaviors during that phase. The same process was used to calculate the proportion of child behaviors during the entire procedure. The principal investigator and several research assistants were trained to 80% interrater reliability. The criterion level was calculated by dividing the number of agreements by the total number of agreements plus disagreements. Random reliability checks were conducted for 12 of the transcriptions (30%) during the course of the study. Discrepancies were discussed and decisions regarding final codes were agreed upon. Interrater reliability for child behaviors during the entire procedure ranged from 81% to 97%, with a mean of 88%. Blount et al. (1997) reported the reliability of the CAMPIS-R categories to range from 67% to 100%, with a mean of 89%.

Children's Self-Report. The FACES measure depicts seven faces ranging in emotional reactions from "1" (i.e., happy and smiling) to "7" (i.e., sad and crying). Children pointed to a face that represented how afraid they felt or how much pain they experienced (McGrath, 1990).

Parent and Technician Report. Parents and technicians rated their child's fear using a Likert scale ranging from "1" (not at all fearful) to "10" (extremely fearful). They also rated the child's cooperativeness during the procedure on a scale ranging from "1" (not at all cooperative) to "10" (extremely cooperative). The reliability and validity of parent and medical staff ratings has been noted to be adequate (Dahlquist et al., 1986; Dahlquist et al., 1994).

Results

First, chi-square analyses and *t* tests were calculated to examine group differences in demographic variables and baseline ratings of fear. Second, *t* tests were calculated to examine group differences in procedural distress (Hypothesis 1). Third, repeated measure analyses of variance (ANOVAs) were conducted to examine change in distress over time (Hypothesis 2). The between-subjects factor was group (intervention, standard care) and the within-subjects factor was time (baseline, pre-procedural, procedural). If differences were found at baseline, analyses of covariance (ANCOVAs) were employed instead. Third, *t* tests and correlational analyses were calculated to examine the effects of previous VCU experience and children's age (Hypothesis 3).

Table I. Children's Fear, Pain, and Cooperation During the VCU

	Control	Intervention
Measure	Means (*SD*)	Means (*SD*)
Faces		
Child fear	5.90 (1.70)	4.25 (2.30)
Child pain	5.45 (2.18)	4.70 (2.18)
Parent report		
Child fear	7.60 (2.72)	6.45 (3.17)
Child cooperation[a]	5.65 (4.08)	7.95 (2.39)
Technician report		
Child fear	4.60 (2.76)	4.65 (2.66)
Child cooperation[a]	5.30 (3.26)	7.25 (2.57)

[a] $p < .05$.

Preliminary Analyses

Participants in the intervention and standard care conditions did not differ significantly on age, ethnicity, race, religion, and income. However, significant group differences were found at baseline in child reported fear, $t(37) = 1.79$, $p < .05$, with higher fear among children in the standard care condition. Additional tests indicated that normality assumptions were not violated for any of the dependent measures. Means and standard deviations for dependent measures are presented in Tables I-III.

Procedural Distress

Behavioral Distress. Analyses of the CAMPIS-R revealed that children in the intervention condition displayed more coping behaviors, $t(38) = -3.00$, $p < .005$, and fewer distress behaviors, $t(38) = 2.30$, $p < .05$, than children in the standard care condition. A closer look at child behavior during each of the three phases of the medical procedure reveals significantly more coping behaviors, $t(38) = -1.80$, $p < .05$, and fewer distress behaviors, $t(38) = 1.82$, $p < .05$, during catheterization among children in the intervention than children in the standard care condition. Similarly, children in the intervention condition displayed more coping behaviors, $t(38) = -2.93$, $p < .005$, and fewer distress behaviors, $t(38) = 1.86$, $p < .05$, during voiding. No group differences were found with regard to the filling phase of the VCU. Means and standard deviations for each phase of the VCU procedure are provided in Table II.

Table II. CAMPIS-R: Children's Distress and Coping Behavior During the VCU

Measure	Control Means (*SD*)	Intervention Means (*SD*)
Total child distress behavior[a]	.78 (.23)	.58 (.30)
Catheterization[a]	.74 (.31)	.55 (.34)
Filling of the bladder	.65 (.36)	.51 (.37)
Voiding[a]	.74 (.27)	.56 (.33)
Total child coping behavior[b]	.11 (.17)	.31 (.24)
Catheterization[b]	.19 (.30)	.36 (.31)
Filling of the bladder	.17 (.22)	.28 (.30)
Voiding[b]	.03 (.04)	.19 (.24)

Numbers represent proportion of distress and coping behavior out of total behaviors emitted during the VCU. Neutral behaviors were not examined; therefore, data does not add up to 100%.
[a]$p < .05$.
[b]$p < .005$.

Table III. Change in Children's Fear Over Time: Parent and Child Report

Measure	Control Means (*SD*)	Intervention Means (*SD*)
Child fear (self-report)		
Baseline	4.73 (2.08)	3.50 (2.24)
Pre-procedural	4.74 (2.26)	3.84 (2.61)
Procedural	5.90 (1.68)	4.25 (2.31)
Child fear (parent report)		
Baseline	5.75 (3.81)	5.25 (2.67)
Pre-procedural	5.35 (3.99)	4.70 (2.89)
Procedural	7.60 (2.72)	6.45 (3.17)

Child Report. The level of procedural fear or pain did not differ significantly between the groups. Children who were more afraid displayed more distress behaviors ($r = .39$, $p < .01$) and fewer coping behaviors ($r = -.37$, $p < .01$). Higher levels of fear were associated with higher levels of pain ($r = .42$, $p < .005$).

Parent and Technician Report. Children in the intervention condition were more cooperative during the procedure, as rated by parents, $t(38) = -2.17$, $p < .05$, and technicians, $t(38) = -2.10$, $p < .05$. Parent and technician ratings of children's fear, however, did not differ significantly between the groups. There was an inverse relationship between parent perceptions of the child's fear and their report of the child's cooperativeness ($r = -.43$, $p < .005$) as well as between technician perceptions of the child's fear and their report of the child's cooperativeness ($r = -.55$, $p < .0001$). It is noteworthy that although the technicians were blind to the condition the children were assigned to, their perception of children's fear and cooperation was consistent with that of the parents.

Time Effects

Children's Reported Fear. Examining children's fear ratings over time did not reveal a significant main or interaction effect.

Parent Ratings of Fear. Parents in both conditions perceived a significant change in their children's level of fear over the three time periods, $F(2, 37) = 6.71$, $p < .005$. Although no change was observed from baseline to the pre-procedural period, there was a significant increase, $t(39) = -3.75$, $p = .0005$, in children's fear from the pre-procedural phase ($M = 5.03$, $SD = 3.45$) to the procedural phase ($M = 7.03$, $SD = 2.97$). The treatment condition $\times$ time interaction was not statistically significant.

Secondary Analyses

Previous VCU Experience. Children with prior experience were perceived as more fearful during the procedure, as rated by technicians, $t(38) = -2.46$, $p < .01$, but not by parents or children themselves. There is insufficient statistical power to examine whether an interaction may exist between treatment condition and past experience. To examine whether the number of prior VCU experiences was associated with child distress during the procedure, we conducted correlational analysis. Children who had more past VCUs were perceived as somewhat less cooperative during the current VCU procedure by parents ($r = -.32$, $p < .05$) and technicians ($r = -.34$, $p < .05$) than children with a history of fewer VCUs.

Children's Age. In general, younger children were perceived by their parents as more afraid ($r = -.41$, $p < .005$) and somewhat less cooperative ($r = .31$, $p < .05$) and they displayed significantly more distress behaviors ($r = -.55$, $p < .0001$) and fewer coping behaviors ($r = .50$, $p < .0001$) during the medical procedure.

Discussion

The primary aim of this study was to evaluate a cognitive-behavioral intervention aimed at reducing child distress during a voiding cystourethrogram. Consistent with research focusing on invasive medical procedures (Blount et al., 1994; Powers et al.,

1993), parents and technicians rated children who received the intervention as more cooperative with the procedure than children who received standard care. Further, children who participated in the intervention displayed less distress behavior and more coping behavior as assessed by the CAMPIS-R.

Attempts by the children to engage in coping behavior were strongest during the most stressful aspects of the medical procedure, catheterization and voiding, supporting the notion that each procedural phase presents its own stressor and needs to be examined separately (Peterson, Oliver, & Saldana, 1997). Although the catheterization phase is brief, it presents the most acute discomfort. Urinating on the examination table appeared to be quite stressful for children, possibly because the presence of several people created pressure and embarrassment for the child. In addition, young children who have only recently been toilet trained may not understand the necessity of voiding on the table. It would be important to reassure children that even though they are toilet trained it is acceptable to urinate on the table during the medical procedure. Another clinical implication of these findings is that children need to understand that the physician is allowed to perform the procedure for medical reasons. Even though they have been taught that it is inappropriate for someone to touch their private parts, they need to understand that it is necessary in this case in order to treat their medical problem and that they should not be ashamed of the procedure.

Despite the behavioral change, children's emotional distress was not significantly alleviated by participation in the intervention. Parents and technicians perceived children in both conditions to have similar fear reactions during the VCU, as well as similar changes in fear over time. That is, children in both conditions were perceived by parents to have a significant increase in fear at the start of the VCU. Consistent with parent and technician perceptions, children's self-reported fear and pain ratings did not differ significantly between the conditions. Although significant group differences were not secured, the fear and pain ratings by children and parents were consistently lower for the intervention condition, suggesting that significant group differences may be revealed with a larger sample size. Nevertheless, even though children displayed less distress behavior, they remained somewhat fearful during the procedure. This discrepancy between behavioral and emotional distress was also discussed by Campbell et al. (1986), who found that despite children's reported fear during cardiac catheterization, children who participated in the stress management program with their parents were more cooperative during the procedure. Collectively, the findings suggest that children who learn coping strategies and receive assistance from their parents may be better able to manage their distress, even if they feel scared.

The fact that children assigned to the intervention reported lower levels of fear at baseline is puzzling, given random assignment to the conditions. Some parents commented that they had not told their child about the procedure prior to coming to the hospital, and therefore, their child was not afraid of the procedure at that moment. Although this information was not tracked across subjects, it is possible that more children in the intervention condition lacked knowledge, possibly accounting for the lower fear ratings for that group. Parents reportedly did not know how to tell their children about the procedure, being afraid to raise their anxiety. Some parents did not even know themselves what the VCU would entail, suggesting a vast communication gap between medical staff and patients prior to this procedure. It would be useful to send a brochure to the parents prior to the medical appointment, describing the VCU procedure and providing phone numbers should the parents have questions or concerns.

The finding that there was a significant change in children's behavior without the concurrent reduction in fear may be explained by the young age of children in the study. Jay et al. (1983) noted that younger children's emotional distress is more likely to persist and be less amiable to change. In fact, younger children in this study were perceived by their parents as more afraid and less cooperative and displayed more distress behavior and less coping behavior during the medical procedure. Further, younger children may need more time to process information, particularly if the preparation is the same day as the procedure (Melamed et al., 1983). The intervention might not have successfully reduced children's emotional states in such a brief period of time and so close to the time of the procedure. The coping skills training, however, provided specific suggestions for altering behavior (i.e., blow the party blower when you feel upset, void on the table when you feel full). It may, therefore, take several experiences with a medical procedure, during which the child is taught coping skills and is able

to cope effectively, before fear of the procedure subsides. For this reason, children undergoing repeated VCU procedures would benefit from participating in such interventions prior to each procedure with a focus on improving their coping skills over time.

It has been suggested that children's past experience with a medical procedure may affect how they react to the procedure. Melamed et al. (1983), for example, found that experienced surgical patients were more sensitized by information. In our study, children who had a VCU in the past were perceived to be more fearful than inexperienced children, but only by technicians. Although children's prior VCU history was known to both parents and technicians, technicians might have assumed that the previous experience was very negative and reported higher fear ratings for those children, while the parents were present during the previous VCU and might have had more realistic expectations. Children who participated in our intervention may have been less sensitized by the information because they were concurrently taught coping strategies to manage their distress. Additionally, the amount of previous experience may affect how children react to the medical situation (Melamed et al., 1983). Indeed, children with more VCU experiences were perceived as less cooperative by both parents and technicians. Several parents explained that their child was sensitized by their previous negative VCU experience, supporting the notion that the quality of children's past experience may be a better predictor of distress and cooperation than the number of exposures to the procedure (Dahlquist et al., 1986). Thus, providing an opportunity for children to discuss their previous experience prior to teaching them coping skills may be beneficial.

Overall, efficacy of the behavioral intervention in reducing children's distress during the VCU procedure was clearly demonstrated. Nevertheless, the research in this area could be expanded in several directions in the future. Since the intervention program consisted of several components, it is difficult to know what to attribute its efficacy to. First, the technicians provided a verbal explanation of the procedure once the family entered the examination room. The demonstration component of our intervention might have provided a benefit beyond the explanation provided by the technician, but this remains to be explored. Second, it would be important to assess which of the coping skills strategies were more helpful in reducing distress, as well as to assess the differential benefits of information provision and coping skills training. Future studies could also focus on medical procedures utilizing sedation and local anesthesia with children. Interventions that teach children coping skills and pain management strategies may not only reduce their distress but increase their cooperation and ability to hold still during the procedure, possibly reducing the need to rely heavily on medication. In conclusion, the results clearly demonstrated that it would be beneficial to integrate child interventions comprised of coping skills training and parent coaching into service delivery for children undergoing VCU procedures.

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