Matching Preparatory Intervention to Coping Style: The Effects on Children’s Distress in the Dental Setting

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Objective: Investigate the effects of matching preparatory interventions to patients' coping styles.

Methods: Participants were 61 children, with a restricted age range of 6 through 9 years old (mean age was 7.9 years), who underwent dental restoration. Participants were randomly assigned to an information intervention, a relaxation intervention, or a control condition. Play and parent-report of sensitization/repression were indices of coping style. The first hypothesis, that play would relate to sensitization/repression, was tested using Pearson correlations. The second hypothesis, that interventions that were congruent with patients' coping styles would be more effective than incongruent interventions, was tested using MANCOVAs.

Results: No relation was found between play and coping style. The “congruency hypothesis” was supported for self-reported distress immediately following the intervention. On behavioral distress variables, the interaction between sensitization/repression and condition was contrary to the congruency hypothesis.

Conclusions: Implications for future research and clinical intervention with pediatric populations were discussed.

Key words: play; coping; dental; preparatory intervention.

As most children have ongoing dental contact and have little control over the occurrence of stressful dental procedures (Ross & Ross, 1985; Siegel, 1988), identifying and facilitating effective coping in the dental setting are important endeavors. Previous investigations have indentified coping strategies children use during dental treatment (Curry & Russ, 1985); found relations between play, frequency/variety of coping attempts, and self-reported distress (Christiano & Russ, 1996); and supported the efficacy of preparatory interventions for pediatric patients (Norcella & Kaplan, 1982). This study investigated the relation between the play behavior and coping style of periodontic patients and evaluated the effects of matching preparatory interventions to patients' coping styles.

Coping style refers to the tendency to consistently implement certain coping strategies either across different stressors or at different times in the context of the same stressor (Compas, 1987). Coping styles demonstrated in medical and dental settings include those involving attention to information about a procedure and those involving avoidance of procedural information (Field, Alpert, Vego-Lahr, Goldstein, & Perry, 1988; Miller & Green, 1984; Roth & Cohn, 1986; Peterson, 1989). This study used the sensitization/repression classi-
fication of coping style, initially applied to adult patients (Byrne, 1964) and, more recently, applied to pediatric pateints (Field et al., 1988; Smith, Ackerson, & Blotcky, 1989). As defined in previous research, "the sensitizer actively seeks information in order to prepare for a stressful event, whereas the repressor tends to avoid information and focus on thoughts unrelated to an upcoming stressor" (Blount, Davis, Powers, & Roberts, 1991, p. 109). Sensitization/repression has been found to relate to play behavior, information-seeking behavior, behavioral distress, and pain (Field et al., 1988; Brown, O'Keefe, Sanders, & Baker, 1986). In terms of the relation between play and coping, the ability to engage in fantasy play has been positively related to frequency and variety of coping strategies used in the dental setting and negatively related to self-reported distress (Christiano & Russ, 1996). Also, play has been associated with a coping style characterized by an orientation toward information about a stressful situation (Burstein & Meichenbaum, 1979; Field et al., 1988). For example, children who played with stress-related toys (e.g., a toy doctor's kit) prior to surgery were rated as lower in defensiveness than children who avoided such toys (Burstein & Meichenbaum, 1979). In addition, pediatric surgery patients who were classified as sensitizers expressed more positive affect in their play and were more active and talkative during their play with medically- and non-medically-related toys than patients classified as repressors (Field et al., 1988).

Although the efficacy of multicomponent preparatory interventions for children undergoing invasive medical and dental procedures has been well documented (see Jay, 1988; Siegel, 1988), few studies have focused on matching isolated treatment components to child characteristics, such as coping style. The congruency hypothesis refers to the notion that interventions that match, or are congruent to, the patient's coping style will be more effective in decreasing distress and facilitating adaptive coping than those interventions that are incongruent to the patient's coping style (Auerbach, Kendall, Cuttler, & Levitt, 1976). Research on adult patients supports the congruency hypothesis; in general, interventions that match patients' levels of preference for procedural information are more effective than mismatched interventions (Auerbach, Martelli, & Mercuri, 1987; Miller & Mangan, 1983).

Few studies have tested the congruency hypothesis in pediatric populations. In an analogue study of 8- to 10-year-olds' pain during a cold-pressor task (Fanurick, Zeltzer, Roberts, & Blount, 1993), children were classified as "attenders" (those who focused on the task and their reactions to it) and "distractors" (those who focused away from the task and their reactions to it) on the basis of their spontaneous coping as reported following baseline exposure to the cold-pressor task. Two weeks later, the children were assigned to either a "sensory focusing," an "imagery," or a control condition and then completed the cold-pressor task. Consistent with the congruency hypothesis, distractors in the imagery condition demonstrated greater tolerance (i.e., kept their arms immersed longer) than attenders in the imagery condition and reported less pain than distractors in the sensory focusing intervention. In a study of pediatric oncology patients, Smith et al. (1989) investigated the efficacy of matching interventions to the patients' coping styles. Patients were classified as sensitizers or repressors, on the basis of a semi-structured interview, and were randomly assigned to either a sensory information intervention or a verbal distraction intervention. Results were contrary to the congruency hypothesis; children classified as repressors who were given sensory information and children classified as sensitizers who were verbally distracted reported the lowest pain ratings and children classified as repressors who were verbally distracted reported the highest pain ratings. As sensitizers had a longer disease history and more exposure to invasive procedures than repressors, the relation between coping style and intervention efficacy is confounded by medical history. Also, developmental differences in coping and behavioral distress were not considered. Further research on matching interventions to children's coping is needed, as the results of previous studies are inconsistent and do not control for medical and developmental factors.

This study tested the congruency hypothesis in a group of 6- to 9-year-olds who experienced an acute dental stressor. There following hypotheses were tested: (1) children who were expressive during play would be classified as sensitizers and children who were not expressive during play would be classified as repressors, and (2) children who were given preparatory interventions that were congruent with their coping styles would use more effective coping and express less distress during an invasive dental procedure than children who were given preparatory interventions incongruent with their coping styles (i.e., an information intervention would be effective in facilitating coping and decreasing distress in children who were able to engage in fantasy play and children who were clas-
Preparatory Interventions and Coping Style

sified as sensitizers, and a relaxation intervention would be effective in facilitating coping and decreasing distress in children who were unable to engage in fantasy play and children who were classified as repressors).

Method

Participants

Participants were 61 children (33 girls and 28 boys) scheduled for dental restoration involving the placement of a rubber dam, anesthetic injection, and drilling. Children between 6 and 9 years old were recruited. This age-range was identified on the basis of research concerning the validity of children's self-reports (Jay, 1988) and the development and standardization of the measures used in this study (Curry, 1985; Russ & Grossman-McKee, 1990; Russ, 1993). Information regarding patients' dental history and coping style was completed by the adult who accompanied the child to his/her appointment: 51 mothers, 9 fathers, and 1 grandmother. Participants were assessed in a dental clinic and three private pedodontic practices in the Cleveland area.

Independent Measures

The Sensitizer/Repressor Scale for Children (SRSC)

The SRSC (Field et al., 1988) is a 20-item true-false measure and consists of items related to medically-related behaviors ("Does [child] cry/scream when the doctor gives [child] a shot?") and non-medically-related behaviors ("Does [child] sometimes get very mad?"). In previous research (Field et al., 1988) children were classified as sensitizers or repressors according to a median split based on the parent-report. Field et al. (1988) found that sensitizers, as compared to repressors, were significantly more active and expressive during play, significantly more sensitive during injection procedures, significantly more fearful during injection procedures, and spent significantly less postoperative time in intensive care.

Affect in Play Scale (APS)

The APS (Russ, 1993) assesses the affective and cognitive dimensions of children's play. While seated at a small table, the child is presented with 2 puppets and several small blocks and is instructed to play with them "in any way you want for 5 minutes." The task is videotaped. The exact instructions for the APS, a detailed description of the scoring, and definitions of the affect categories are presented by Russ (1993). Four APS scores were considered in the current study: the total frequency of expressions of affect; the variety of affect categories expressed; the child's overall comfort with the play task, rated on a scale from 1 to 5; and the mean quality of fantasy, which is based on ratings, from 1 to 5, on each of 4 dimensions (organization, elaboration, imaginativeness, and repetitiveness). Interrater reliabilities for these scores are good, ranging from $r = .85$ to $r = .95$ (Russ, 1993). APS scores are not related to IQ scores (Niec & Russ, 1996; Russ & Grossman-McKee, 1990) and have predicted creative problem-solving and coping ability (Christiano & Russ, 1996; Russ, 1993).

Dental History Form

This Dental History Form, developed for use in a previous study (Christiano & Russ, 1996), is a parent-report of the child's previous dental experience. This form asked each parent to "List your child's previous dental experiences" and asks "Has your child had any negative or upsetting experiences at the dentist?" Parents are asked to describe their child's negative dental experiences. These data were treated as categorical variables.

Dependent Measures

Cognitive Coping Interview-Revised (CCI-R)

The CCI-R is a modified version of the Cognitive Coping Interview (CCI), developed by Curry and Russ (1985) as an index of the cognitive coping strategies children use during dental treatment. The five coping strategies which were assessed—reality-oriented working through, cognitive reappraisal, emotion-regulating cognitions, behavior-regulation, and diversionary thinking—were based on a synthesis of other coping research (e.g., Lazarus, 1966). To facilitate recall, children were shown illustrations of two phases of treatment—the exploratory examination and the anesthetic injection—and were instructed to "imagine the boy/girl is really a picture of you when you were with the dentist" (Curry, 1984, p. 93). The child was asked to retrospectively report his/her actions, thoughts, and self-statements during each of these two phases of the treatment. The CCI-R was scored for frequency and variety of coping strategies. Interrater reliability for the CCI frequency and variety scores were
r = .87 (Christiano & Russ, 1996) and r = .82 (Curry, 1985), respectively. Frequency of "catastrophizing" self-statements (Brown, O'Keefe, Sanders, and Baker, 1986) were also scored; these included negative affect, self-denigration, anxious anticipation, and escape.

Distress Scale-Revised (DS-R)
The DS-R, modified from Curry's (1984) Distress Scale (DS), is a self-report measure that asks the child to rate how happy he/she felt, how much he/she felt like going home, how afraid he/she felt, and how much he/she felt like crying, on a Likert-type scale, from 1 (not at all) to 5 (very much) during dental treatment. The DS-R was administered twice prior to the procedure, immediately after the play task, and immediately after the intervention or control condition. After the dental procedure, the child was asked to retrospectively rate his/her emotions during the exploratory examination and during the injection. Illustrations were used to facilitated recall (Curry, 1994, 1995). For each administration, a pain thermometer (Jay, 1988) was used to provide a visual representation of the numerical rating scale. The split-half correlation coefficient for the DS is good (r = .91) (Curry, 1995). The DS was significantly positively correlated with a measures of children's self-reported dental fears and dentist-reported overt anxiety and cooperation during dental (Curry, 1984, 1985) and was significantly negatively correlated with children's use of fantasy play prior to dental treatment (Christiano & Russ, 1996).

Behavior Profile Rating Scale (BPRS)
The BPRS is an observer-report of children's disruptive behaviors during dental treatment (Melamed, Weinstein, Hawes, & Katin-Borland, 1975). Behaviors that are monitored include "attempts to dislodge instruments," "refuses to open mouth," "crying," and "kicks." In this study, the scoring procedure was modified in the following ways: the child's behavior upon separation from his/her parent was not monitored; the presence/absence of each behavior was noted for 1-minute intervals; and, in addition to obtaining a total score across the entire procedure, a separate score for the minute interval in which the injection was given was derived. In previous research, interrater reliability coefficients for the total BPRS score range from r = .91 (Curry, 1984) to r = .98 (Melamed et al., 1975). The total score was significantly negatively related to the frequency and variety of cognitive coping strategies children used during dental treatment (Curry, 1995) and significantly positively related to dentists' ratings of anxiety (Curry, 1994, 1995).

Procedure
The first author (BC) was the examiner for the first 49 children who participated in the study. A clinical psychology doctoral student was trained to criterion on administration of the measures and served as the examiner for the remaining 12 participants. The examiner obtained the names and phone numbers of eligible patients from the pedodontic offices and contacted each child's parent to explain the study and obtain verbal consent for the child to participate; for patients seen in one private practice, the receptionist screened parents of eligible patients to determine their willingness to be contacted by the examiner. On the day of the appointment, the examiner met the parent and the child in the waiting area. Written consent was obtained from the parent and assent was obtained by the child. Then, the parent was asked to complete the Dental History Form (Christiano & Russ, 1996) and the SRSC (Field et al., 1988) and the child accompanied the examiner to a small office, adjacent to the examination area to begin the research protocol.

First, the APS (Russ, 1993) was administered by the examiner. Immediately following the APS, the DS-R (modified from Curry, 1985) was administered. Next, the child was randomly assigned to either an information intervention, a relaxation intervention, or a control condition. The design of the information and relaxation interventions was informed by several sources, including consultations with pediatric dentists and protocols developed by other researchers (Klingman, Melamed, Cuthbert, & Hermecz, 1984; Mansson, Fredrikzon, & Rosberg, 1992; Melamed, Yurcheson, Fleece, Hutcheson, & Hawes, 1978; Peterson, Schulthesis, Ridley-Johnson, Miller, & Tracy, 1984; Siegel & Peterson, 1980). Because the interventions were developed for use in busy pediatric dental practices, they were brief, taking approximately 3 minutes to complete. The length of the interventions was substantially shorter than interventions used in most previous research (Peterson et al., 1984; Powers, Blount, Bachanas, Cotter, & Swan, 1993; Siegel & Peterson, 1980); consequently, the children had less time for rehearsal. Although distinct in their content, the interventions shared several features. Both entailed puppet modeling and patient participation, techniques that have been found to enhance the efficacy of preparatory interventions (Klingman
et al., 1984; Mansson et al., 1992; Peterson et al., 1984). For both interventions, a tape-recorded script was first played while the content was modeled by the examiner using a dentist and a child puppet. The tape was played a second time while the child rehearsed the content using puppets identical to the examiner's. The gender referents in each script were matched to the gender of the child. Puppets were matched for the genders of the child and the dentist.

The information and relaxation interventions were distinct from each other in content. The information intervention contained procedural information, sensory information, and instruction in procedure-relevant self-talk. It was similar in content and length to the "short demonstration" condition designed by Melamed and her colleagues (Melamed et al., 1978). The inclusion of sensory information was modeled after Siegel and Peterson's (1980) protocol. The script for the information condition (for a girl) follows:

This puppet show is called "Going to the Dentist." Please listen carefully. This little girl is waiting to see the dentist. She feels a little scared as she is sitting in the dentist's chair. She wonders what the dentist is going to do. She asks the dentist, "What are you going to do?" The dentist says, "First, I'm going to use some sleepy medicine on your tooth. When I put the sleepy medicine on your tooth, your tooth will begin to tingle and feel warm. Your lip will feel big when your tooth is asleep." The dentist is preparing to give the girl the sleepy medicine. The dentist gets the medicine and the tools ready. The little girl is scared. She calms down by thinking about what the dentist is going to do and how it is going to feel. She thinks, "I'll think about something happy instead of thinking about being scared." What should she think about to make her happy? She thinks about [whatever the child suggests] for a minute. The dentist is ready to work on the girl's teeth. The little girl is scared. She thinks, "I need to take deep breaths to help me relax." She takes a deep breath in and then lets it out. She takes another deep breath and lets it out. She takes another deep breath and lets it out. She thinks, "I need to relax my muscles while I breath in and out. While I'm breathing in and out I'll think of the word relax." She breaths in and out and relaxes her whole body. Before long the dentist is all finished.

The control condition controlled for exposure to dental themes and interaction with the examiner. The control condition was similar to the intervention conditions in its use of gender-matched puppets and tape-recorded script. Also, it was also comparable in length to the interventions. However, the control condition did not provide procedure-related information or coping skills training. The script for the control condition was an excerpt from a children's story about losing baby teeth (Showers, 1991). The control condition script (for a girl) follows:

This puppet show is called "How Many Teeth?" Please listen carefully. This is Samantha. Samantha has 20 teeth. She has 10 upper teeth and 10 lower teeth. Her front teeth have sharp edges. She uses them to bite things. Her back teeth are flat. She uses them to chew things. Most of Samantha's friends have 20 teeth—10 upper teeth and 10 lower teeth. This is Samantha's dentist. The dentist is bigger than Samantha and has more teeth. The dentist has 32 teeth; 16 upper teeth and 16 lower teeth. Samantha has a loose front tooth. She wiggles it with her toothbrush. She wiggles it with her finger. She wiggles it with her tongue. It feels good to wiggle it. A new tooth is growing under that loose tooth. The new tooth keeps pushing. That makes the old tooth loose. Soon the old tooth will fall out. Then there will be room for the new tooth. The new tooth will be bigger than the old one. Samantha is growing up. She is getting her grown-up teeth. She will have them for a long, long time.
Immediately following the intervention or control condition, the DS-R (modified from Curry, 1985) was administered a second time. The child was then taken into the dental examination area. The dental procedure was videotaped and later scored for behaviors indicative of anxiety using the BPRS (Melamed et al., 1975). After the procedure, retrospective reports of the child's distress and coping during the exploratory examination and the anesthetic injection were obtained using the DS-R (modified from Curry, 1985) and the CCI-R (modified from Curry & Russ, 1985).

Results

Descriptive Data

The 61 participants (33 girls and 28 boys) ranged in age from 6.0 years to 9.9 years (M = 7.9 years, SD = 13.58 months). Because some participants were recruited by a dental office receptionist, information regarding the rate of refusal was not consistently gathered. Fifty-six of the participants were Caucasian and 5 were African-American. Ten children (16%) had not had prior dental fillings, 13 children (21%) had their parent present during the procedure, and 24 children (39%) had previous negative experiences at the dentist, as reported by their parents. Examples of negative experiences parents described were verbal expressions of pain during dental restorations, use of physical restraint, and criticism by the dentist.

T-tests were conducted for the purpose of identifying gender, age, and experimenter differences, on any of the play, coping, and distress variables. No group differences were found. Also, as children were seen by one of 5 dentists, t-tests were conducted to test for the effects of dentist. Because approximately half of the children (31 out of 61) were seen by Dentist 3, a subset of 10 of Dentist 3's patients was randomly selected and compared to children seen by Dentist 1, 2, and 4 (only 2 children were seen by Dentist 5; therefore these children were not included in the analysis of dentist effects). No effects due to dentist were found. In addition, t-tests were conducted to test for differences between children for whom this was their first filling and children who have had prior fillings; children who have had previous negative experiences at the dentist and those who have not; and children whose parent was present during the procedure and children whose parent was not present. No group differences were found.

Interrater Reliabilities

Interrater reliabilities, for the APS scores, were analyzed using Pearson product-moment correlations for a random subset of 20 subjects. All reliability coefficients were substantial: frequency of expressions of affect, r(18) = .90; variety of affect categories, r(18) = .88; quality of fantasy, r(18) = .87; comfort, r(18) = .85. Interrater reliabilities for the BPRS scores were calculated for a different subset of 20 randomly selected subjects. Reliabilities coefficients were good for the total score, r(18) = .86, and for the score for minute interval in which injection was administered, r(18) = .82.

Tests of the Hypotheses

Relation Between APS and SRSC Scores

To test for the hypothesized relation between play and sensitization/ repression, Pearson product-moment correlations, between APS and SRSC scores, were calculated. Bonferroni correction criteria, with p-level set at .01, were used to control for Type 1 error. None of the correlations between APS and SRSC scores was significant.

Statistical Analyses

Since there were no significant correlations between play scores and sensitizer/ repressor scores, the congruency hypothesis was tested by using separate High/ Low Play Group x Condition and Sensitizer/ Repressor Group x Condition designs. For each 2 x 3 design, multivariate analyses of variance (MANOVAs) were conducted to test main effects and interaction effects. The following dependent variables were entered into the MANOVA models: distress reported immediately following the intervention; distress retrospectively reported during the anticipatory phase of the procedure; distress retrospectively reported during the injection; total behavioral distress; behavioral distress exhibited during the injection interval; frequency of coping strategies reported; frequency of catastrophizing statements reported; and, variety of coping strategies reported. As a disproportionate number of parents whose children received the information intervention were present during the procedure, $\chi^2 = 6.72, p < .05$, parent presence was entered as a covariate for each MANOVA model.
High/Low Play Group × Condition Design

A priori, “high players” were conceptualized as children who obtained high scores on individual affective and cognitive scores on the APS; “low players” were conceptualized as children who obtained low scores on individual affective and cognitive scores on the APS. High and low play groups were defined on the basis of the mean composite score ($x = .02, SD = 3.60$)—the mean of the sum of $z$-scores for each of the 4 APS scores. The mean score was chosen as the basis of group classification because it coincided with a natural break in the distribution of composite scores. Thirty-one subjects were classified as high players and 30 were classified as low players. No significant main effects or group × condition interaction effects were found.

Sensitizer/Repressor Group × Condition Design

As done in previous research (Field et al., 1988), sensitizer and repressor groups were defined on the basis of a median split of SRSC scores. The median SRSC score for the total sample ($N = .61$) was 9.00. Thirty-three participants were classified sensitizers; 28 were classified as repressors. Significantly more sensitizers than repressors had a history of negative dental experience (according to parental report), $\chi^2 = 3.99, p = .05$, and reported more anxiety prior to the intervention, $F = 5.86, p = .02$; therefore, these variables, along with parent presence, were entered into the MANOVA model as covariates.

As indicated by Pillai’s Trace, a sensitizer/repessor group × condition interaction was found, $F = 1.66, p = .07$. Although this finding did not meet traditional criteria for statistical significance ($p < .05$), the authors believe that it warrants attention on the basis of its practical significance and its potential to suggest directions for future research. Also, it is possible that statistical significance would have been reached with a larger sample size (Bakan, 1966). The sample size of this study would make it difficult to detect small-to-medium effects. Univariate analyses revealed group × condition differences in self-reported distress immediately following the intervention, $F = 3.42, p < .05$, with repressors in the relaxation condition reporting significantly less distress than sensitizers in the relaxation condition ($M = 8.86$ vs. $M = 12.67$). Also, sensitizers in the information condition exhibited significantly more behavioral distress across the entire procedure ($M = 2.10$ vs. $M = .20$), $F = 8.13, p < .05$, and during the injection interval ($M = 5.36$ vs. $M = .40$), $F = 16.46, p < .01$, than repressors in the information condition. Sensitizers and repressors in the relaxation and control conditions did not differ in behavioral distress. One within-group difference emerged; repressors in the information condition exhibited less behavioral distress during the injection interval than repressors in the control condition ($M = .40$ vs. $M = 3.45$), $F = 3.42, p < .05$. Table I presents the means and standard deviations of the dependent variables for the sensitizer/repressor group × condition design.

**Discussion**

This study’s first hypothesis, that the ability to engage in play would be positively related to a sensitizing coping style, was not supported. This result is inconsistent with previous research (Field et al., 1988), which found that sensitizers, compared to repressors, were more talkative, expressive, and active during a hospital free-play situation. However, in the current study, it is likely that children’s affective expression was blunted due to the imminence of the stressor (Christiano & Russ, 1996). Thirty percent of children were either unable to complete the play task or played without expressing affect. Studies assessing play in nonstressful situations (Niec & Russ, 1996; Russ & Grossman-McKee, 1990) have found significantly lower rates of inability to complete the play task (approximately 8%) and greater expression of affect. The restricted range of affect expressed may have obscured differences between sensitizers and repressors. When play was used as an index of coping style, the second hypothesis tested in this study, the congruency hypothesis, was not supported. These findings suggest that play behavior, as assessed prior to a stressful dental procedure, is not a valid index of coping style and is not useful in identifying children who would benefit from one intervention over another.

Some support was found for the congruency hypothesis when coping style was defined on the basis of the SRSC. Within intervention conditions, differences between sensitizers and repressors were found on self-reported distress and behavioral distress variables. Lending support to the congruency hypothesis, repressors who received a relaxation intervention reported less distress immediately following the intervention than sensitizers who received a relaxation intervention. One explanation for this finding is that relaxation is more consistent with a repressive coping style than a sensitizing
Table I. Means and Standard Deviations of Dependent Variables for Sensitizer/Repressor Group X Condition

<table>
<thead>
<tr>
<th>Information variable</th>
<th>Sensitizer M (SD)</th>
<th>Repressor M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-reported distress after the intervention</td>
<td>10.80 (6.36)</td>
<td>12.27 (7.11)</td>
</tr>
<tr>
<td>Self-reported distress during the examination</td>
<td>11.10 (5.43)</td>
<td>13.45 (5.75)</td>
</tr>
<tr>
<td>Self-reported distress during the injection</td>
<td>11.90 (4.61)</td>
<td>16.00 (6.13)</td>
</tr>
<tr>
<td>Frequency of coping strategies reported</td>
<td>4.18 (4.53)</td>
<td>2.90 (2.18)</td>
</tr>
<tr>
<td>Variety of coping strategies reported</td>
<td>1.91 (1.38)</td>
<td>1.70 (1.16)</td>
</tr>
<tr>
<td>Frequency of catastrophizing statements reported</td>
<td>2.18 (1.94)</td>
<td>1.70 (2.36)</td>
</tr>
<tr>
<td>Total behavioral distress</td>
<td>2.10 (2.08)*</td>
<td>.40 (.31)*</td>
</tr>
<tr>
<td>Behavioral distress during injection interval</td>
<td>5.36 (3.78)*</td>
<td>2.00 (2.53)</td>
</tr>
<tr>
<td>Relaxation variable</td>
<td></td>
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<tr>
<td>Self-reported distress after the intervention</td>
<td>12.67 (4.68)*</td>
<td>8.86 (4.04)*</td>
</tr>
<tr>
<td>Self-reported distress during the examination</td>
<td>14.50 (5.39)</td>
<td>9.57 (4.96)</td>
</tr>
<tr>
<td>Self-reported distress during the injection</td>
<td>15.17 (5.71)</td>
<td>9.86 (5.11)</td>
</tr>
<tr>
<td>Frequency of coping strategies reported</td>
<td>4.33 (2.58)</td>
<td>3.50 (2.44)</td>
</tr>
<tr>
<td>Variety of coping strategies reported</td>
<td>2.50 (2.26)</td>
<td>2.07 (1.94)</td>
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<tr>
<td>Frequency of catastrophizing statements reported</td>
<td>.17 (.41)</td>
<td>.64 (1.15)</td>
</tr>
<tr>
<td>Total behavioral distress</td>
<td>.45 (.53)</td>
<td>.90 (1.35)</td>
</tr>
<tr>
<td>Behavioral distress during injection interval</td>
<td>2.00 (2.53)</td>
<td>2.00 (2.96)</td>
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<tr>
<td>Control variable</td>
<td></td>
<td></td>
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<tr>
<td>Self-reported distress prior to intervention</td>
<td>9.56 (4.75)</td>
<td>11.82 (6.52)</td>
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<tr>
<td>Self-reported distress during examination</td>
<td>11.22 (5.72)</td>
<td>12.36 (5.90)</td>
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<tr>
<td>Self-reported distress during injection</td>
<td>11.00 (5.77)</td>
<td>12.91 (6.64)</td>
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<tr>
<td>Frequency of coping strategies reported</td>
<td>4.00 (3.39)</td>
<td>3.09 (3.56)</td>
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<tr>
<td>Variety of coping strategies reported</td>
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<td>1.55 (1.37)</td>
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<td>Frequency of catastrophizing statements reported</td>
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<td>1.45 (1.37)</td>
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<td>.78 (.75)</td>
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<tr>
<td>Behavioral distress during injection interval</td>
<td>3.00 (2.78)</td>
<td>3.45 (2.91)*</td>
</tr>
</tbody>
</table>

* F = 8.13, p < .01.
** F = 16.46, p < .01.
*** F = 3.81, p < .05.
**** F = 3.42, p < .05.

Coping style; it would follow that repressors, compared to sensitizers, would be more comfortable being exposed to instruction in relaxation skills and that sensitizers may experience more distress because they are encountering a technique that they cannot readily integrate into their coping repertoire.

The finding that children in matching interventions (i.e., sensitizers in the information condition and repressors in the relaxation condition) did not report less distress than children in mismatched conditions limits the extent to which the congruency hypothesis is supported by these results and is inconsistent with previous research (Fanurick et al., 1993). Also, contrary to the congruency hypothesis, sensitizers given procedural/sensory information displayed more, rather than less, behavioral distress during the procedure than repressors given procedural/sensory information. In other words, the information intervention accentuated differences in the behavioral styles of sensitizers and repressors, with the sensitizers more likely to display disruptive behaviors than the repressors. This result is consistent with Smith et al.'s (1989) finding that preparatory information was associated with lower pain ratings for repressors than for sensitizers. The fact that only sensitizers and repressors who were exposed to an information intervention differed in behavioral distress qualifies the results of previous research (Field et al., 1988), which found that sensitizers engaged in more "protest behaviors," (e.g., crying, biting, and screaming) during blood tests and preoperative injections than repressors. Repressors appeared to benefit from the procedural/sensory information, as they displayed less behavioral distress than repressors in the control condition during the injection interval.
In summary, findings related to self-reported distress were consistent with the congruency hypothesis; however, findings related to behavioral distress were inconsistent with the congruency hypothesis. This discrepancy, while complicating interpretation of the results, provokes important questions. First, why is the relaxation intervention associated with higher self-reported distress in the sensitizers, relative to the repressors, immediately following the intervention, but did not with higher levels of behavioral distress? One possibility is that, for sensitizers in the relaxation group, encountering an intervention that is incongruent with their coping style may have promoted the “work of worrying” (Janis, 1958) during the period following the intervention and facilitated their ultimate adjustment during the procedure. Second, why do repressors and sensitizers in the information intervention differ on behavioral distress measures, but not on self-reported distress following the intervention? A similar explanation based on Janis’s (1958) model is offered. For repressors in the information intervention, who may have underreported their distress during the postintervention period (Drotar, Agle, Eckl, & Thompson, 1996), the work of worrying facilitated their adjustment during the procedure.

Interpretation and generalization of these results is limited due to methodological factors. In terms of limitations related to assessment instruments, play as assessed by the APS does not appear to be measuring coping style. In addition, it is possible that the SRSC assesses behavioral style rather than the tendency to approach or avoid information about a stressor—most of the items on the SRSC query about externalizing behavior (e.g., “Does [child] ever get so mad that he/she throws toys around the house and breaks them?”) and negative affect (e.g., “Does [child] get upset/scared when you say you will take him/her to the doctor for a visit?”), rather than the child’s style of approaching or avoiding procedure-relevant information. Also, the lack of potency of the interventions limits the results of this study. The interventions were brief, did not allow adequate time for rehearsal, and did not demonstrate effects on any of the coping outcome variables. Because children did not have time to practice these skills, the effectiveness of the intervention could have been diminished. Last, the reporting of a multivariate interaction effect that did not reach statistical significance, traditionally defined as $p < .05$, was a departure from convention that may limit the extent to which the findings will be regarded as meaningful and generalizable. These limitations speak to the need for research conducted to replicate and extend the results of this study.

Suggestions for Future Research

Despite its limitations, this study highlighted the importance of tailoring preparatory interventions to individual patients. For example, as suggested by this study, an intervention that focuses on procedural/sensory information may not benefit children who are classified as sensitizers, or those who tend to exhibit an externalizing behavioral style, as behavioral distress may be accentuated. We hope that the results of this study will motivate future investigations of the interaction between individual difference variables and type of intervention in determining patients’ adjustment to invasive procedures.

We have some specific suggestions for the conduct of future research in this area. First, toward the goal of bridging the gap between research and clinical practice, the most potent interventions will be those that are both empirically grounded and compatible with “real-world” clinical settings. Future research should focus on designing, piloting, and refining brief interventions that are both potent and applicable for routine use in pediatric settings. Brief interventions should be thoroughly piloted for effectiveness before being implemented in a research study. Second, it is important to take a developmental perspective when researching coping and the effectiveness of preparatory interventions. Consequently, the age range of participants should be restricted, or results should be analyzed by developmental level, and the recruitment pool of participants should be large enough to ensure an adequate sample size. Third, research should continue to focus on the role of parental variables in facilitating children’s coping during acute procedures and over the course of medical procedures and chronic illness. Identifying parents who could benefit from specialized interventions, in which they learn skills to enhance their coping skills and those of their children, is an important endeavor. Fourth, outcome studies should utilize a variety of outcome measures and analyze convergent and divergent patterns of results. Global measures of behavioral distress, specific behavioral indices of pain (Tarbell, Cohen, & Marsh, 1992), self-reports of coping and distress, and parent reports of their own coping and
distress, should be included. Fifth, although a substantial body of literature exists on coping in pediatric populations, the implications of this literature are limited due to inconsistencies in how coping is conceptualized and measured. Future research should refine measures of coping; for instance, by monitoring coping behaviors (e.g., seeking information, focusing on distracting stimuli) that are demonstrated in the pediatric setting. It is important that behavioral measures of coping style be developed. Finally, the relation between coping style and medical history is consistent with a conceptualization of coping as a dynamic and flexible process, rather than as a stagnant and rigid characteristic. Future research should track changes in coping style over the course of repeated medical procedures and chronic illness.

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