Reducing Distress During Invasive Medical Procedures:
Relating Behavioral Interventions to Preferred Coping Style in Pediatric Cancer Patients

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The hypothesis that matching children's preferred coping styles (repression, sensitization) with behavioral interventions (distraction, sensory information) during invasive medical procedures will reduce self-reports of fear and pain, anticipatory heart rate, and observable signs of distress was tested in 28 children with cancer. A significant coping style by intervention interaction for the self-report of experienced pain was found. However, those groups using an intervention that matched their preferred coping style actually reported higher experienced pain ratings. Trends for differences between coping style on factors indicative of the chronicity of the disease were found. Chronicity, which reflects the degree of past experience with inva-

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Studies of strategies for preparing children for medical procedures have led to identification of several interventions that help children cope with invasive procedures. These include sensory information (Johnson, Kirchoff, & Endress, 1975; Siegel & Peterson, 1980, 1981), modeling (Melamed & Siegel, 1975), distraction (Kelley, Jarvie, Middlebrook, McNeer, & Drabman, 1984), hypnosis (Hilgard & LeBaron, 1980; Zeltzer & LeBaron, 1982), and multicomponent behavioral interventions (Jay, Elliott, Katz, & Siegel, 1984). Associated individual variables that may affect an intervention's effectiveness are the patient's age (Faust & Melamed, 1984), quality of previous experience with the procedure (Dahlquist et al., 1986), and coping style (Peterson & Toler, 1986). The goal of this area of active research is to individualize pain management techniques so that interventions are matched to the psychological needs and past experiences of the patient.

Investigations with adults undergoing a medical procedure have documented differences in how people cope with this type of stressful event (e.g., Roth & Cohen, 1986). Although nomenclature differs among investigators, coping style has commonly been conceptualized as a tendency to repress, minimize, or avoid information on one extreme to a more sensitized awareness, vigilant focus, or active information-seeking style on the other (Byrne, 1964; Lipowski, 1970). Assessing coping styles is a relatively new area of research in pediatric pain management but Peterson and Toler (1986) described and documented a similar continuum for conceptualizing the responses of children to acute medical procedures. Behavioral interventions used to help children control pain have reflected this same hypothetical construct as both sensory information approaches (Johnson et al., 1975; Siegel & Peterson, 1980, 1981) and distraction techniques (Kelley et al., 1984; Zeltzer & LeBaron, 1982) have been used successfully to reduce anxiety and/or pain in children, during medical procedures.

In investigations of pain and anxiety reduction in children with cancer, distraction interventions have been tested, including counting numbers, focusing attention on objects in the room during procedures (Zeltzer & LeBaron, 1982), guided imagery (Jay et al., 1984), and hypnosis (Zeltzer & LeBaron, 1982). Sensory information in the form of filmed modeling and behavioral rehearsal has also been included in the treatment package developed by Jay et al. (1986). Studies using multiple interventions have been difficult to interpret, however, with respect to the efficacy of specific pain management strategies. Furthermore, the impact of individual personality
and experience parameters on interventions has not been carefully evaluated for procedures that are experienced repeatedly.

The purpose of the present study was to match two relatively well-defined, single-component, behavioral interventions with two coping styles and to assess their efficacy in minimizing fear and pain in pediatric cancer patients as they experienced a series of invasive medical procedures. A greater reduction was predicted for those children using the intervention more consistent with their coping style (repression-distraction, sensitization-information) compared to those using an inconsistent intervention (repression-information, sensitization-distraction).

**METHOD**

**Participants**

The initial sample included 42 cancer patients, 6 to 18 years of age, whose medical treatment required a series of at least four bone marrow aspirations (BMAs) and/or lumbar punctures (LPs), and who consented to participate. Four additional patients refused consent, two did not feel the need for the interventions offered, and two were uncomfortable having an observer in the room or using the heart rate monitor. Of the 42 patients who initially agreed to participate, 14 did not complete the study because of inconsistent appointment keeping (n = 1), change in medical treatment delaying further procedures (n = 1), deterioration in physical status and/or death (n = 6), and discomfort with an observer in the room (n = 6). Therefore a total of 28 patients completed the study, 67% of the initial sample. The study sample has a mean age of 10.75 years (SD = 3.32), with 57% male and 43% female. The majority (82%) were Caucasian; 61% were in the lower socioeconomic (SES) range (Green, 1970). Twenty-six had a diagnosis of acute lymphocytic leukemia (ALL); two had a diagnosis of Burkitt's lymphoma. Time since diagnosis ranged from 1 to 96 months, with a mean of 16.11 months (SD = 26.59). All participants were receiving chemotherapy as part of their medical treatment.

**Measures**

**Demographic Data**

The child's age, gender, type and date of diagnosis, maternal educational level, primary provider's occupation and family income were ob-
tained from a parent. The number of prior procedures was obtained from the medical chart.

Assessment of Coping Style

A modified version of the Coping Strategy Interview (Siegel, 1980, 1983) was used to assess coping style. The following two open-ended questions were asked to elicit coping strategies used by the child during prior procedures: "I want you to think about the last time you had a LP or BMA. To help you remember what you were thinking or doing at the time, I would like you to close your eyes and imagine everything that happened just like you are running a movie through your head. Now, what kinds of things did you think or do, or maybe the nurses do, during the LP or BMA that helped make it hurt less or make you less afraid?" "Pretend that your best friend has to go to the doctor to have a LP or BMA like you have had. What advice would you tell your friend to help him/her so that it would not hurt as much or so they are not so afraid?" Responses were categorized into one of the 19 behavioral categories developed in conjunction with the interview.

Prior to data collection, four experienced child clinical psychologists independently classified 18 of the coping strategy categories into one of two global coping styles: (a) Repressor or (b) Sensitizer. One of the behavioral coping strategies, Physical Activity, was deleted since the nature of the medical procedures required patients to hold their bodies in a particular position. A coping strategy was categorized as consistent with either repression or sensitization if at least a 75% agreement rate was found. Those categories not meeting this criterion were considered Mixed.

The criteria for agreement were met for 14 of the 18 categories. Nine of the strategies were rated as consistent with a repressive coping style (Distraction-External, Distraction-Internal, Distraction-Imagery, Reinterprets Sensations, Fantasy, Information Seeking-Irrelevant, Relaxation, Passive Acceptance, No strategy reported), and five with sensitization (Mental Rehearsal Information Seeking-Relevant, Positive Self-statements, Negative Self-statements, and Catastrophizing Thoughts). The four coping strategies considered Mixed were similar in that each involved an emotional focus (Affective Expression, Affective Inhibition, Seeks Active Termination, Emotional Support). A complete description of these strategies has been presented by Siegel (1980).

Observation Scale of Behavioral Distress (OSBD)

The OSBD (Jay, Ozolins, Elliott, & Caldwell, 1983) was used to assess the behavior of the child before, during, and just after the medical procedures. Trained observers recorded behaviors in 11 categories (e.g., crying,
nervous behavior, verbal resistance) in continuous 15-second intervals to obtain a total distress score. The scale has good reliability and validity and has been described at length previously (Jay et al., 1983). Interrater reliability to the total OSBD score was assessed for 16% of the study procedures randomly chosen. As observations were made by four research assistants, one was used as a comparison for the others. Point-by-point agreement ratios were calculated based on the number of agreements between two observers as to whether a behavior occurred or not during each of the 15-second intervals divided by the total number of agreements and disagreements (Kazdin, 1982). Reliability across all procedures ranged from .88 to .99 with an average of .95. Agreement for the three pairs of raters averaged .94 to .96.

**Self-Report Measures of Fear and Pain**

Three visual analog thermometers, each graduated on a 0 (e.g., no fear) to 100 (e.g., as afraid as can be) scale, were used to assess the child's perception of fear and expectancy of pain prior to the procedure and actual pain experienced afterwards. The reliability for these thermometers has been documented for children 8 years of age and older (Katz, Kellerman, & Siegel, 1982).

**Physiological Measure of Anxiety**

Anticipatory heart-rate levels (HR) were obtained with an Exersentry (Respironics, Inc.) device attached to the participants' chest via electrodes or a Photoplethysmograph device (Pulseminder Heart Speedometer, Model 7719H, Computer Instrument Corp.) attached to the child's earlobe. In both devices, a HR value (averaged over five consecutive heartbeats) appeared as a digital beats-per-minute display. HR data were unavailable during one of the four sessions for three participants.

**Intervention Implementation Ratings**

Ratings of how much attention the child was paying to the procedure were made by the research assistant and parent. A 5-point scale ranging from 1 = completely focused on the procedure to 5 = completely distracted, not paying attention to the procedure was used.

**Procedure**

Potential participants were contacted during a scheduled clinic visit and the study explained to both patient and parent. Parent(s) of partici-
pants signed an informed consent form, assent was obtained from the child, and demographic information obtained from a parent. Data were collected in the same manner during four scheduled medical procedures, with all observers blind to the child's preferred coping style. The first procedure was used to familiarize the child with the measures used and having an observer in the room and the second to collect baseline data. The intervention was provided during the last two procedures. Parents accompanied the child during the procedure in all but three participants.

After the child was placed in a treatment room and examined by a doctor, the research assistant entered the room, attached the heart rate monitor, and had the child rate his or her fear and expected pain. Behavioral observation began after completing the thermometers and the anticipatory HR measure was recorded 3 minutes later. Observation resumed when the nurse entered the room with the procedure instruments, continued during the procedure, and ended 1 ½ minutes after the procedure was completed. The intervention was begun as the nurse entered the room with the instruments to perform the procedure. For the distraction groups, the nurse began with "What are we going to talk about today?" as she prepared the instruments. For the sensory information groups, the nurse began with "I will be telling you everything that I am doing." Two to 5 minutes after the procedure ended, the child rated his or her actual pain experienced. The research assistant rated the child's level of focus on the procedure and then had the parent rate this independently.

If children were scheduled for both BMA and LP, the child was asked to rate his or her anticipatory fear and pain as well as experienced pain separately for each procedure. The research assistant asked the child to point to the place on each of the thermometers that represented how he or she felt for one procedure and then the other. Behavioral observations continued during both procedures with actual procedure-related behavior noted separately.

**Group Assignment**

The Coping Strategy Interview was administered during a clinic visit not requiring a procedure after the baseline procedure and the child was assigned to a coping style group as outlined above. Seventeen children were assessed as having a Repressive coping style. Strategies reported by the children included keeping their mind off the procedure through conversation unrelated to the procedure (n = 8), diverting attention by counting numbers or objects in the room (n = 2), or by relaxing (n = 1). Several indicated that nothing would help, passive acceptance (SD = 3), or they could not remember using any strategy (n = 3). The 11 children assessed as Sensitizers re-
ported either wanting the nurse to tell them exactly what was happening during the procedure \((n = 8)\), or used positive self-statements (e.g., telling themselves that the procedure did not hurt so bad and was needed to make them well) \((n = 3)\). None of the participants' responses were indicative of a Mixed style. Participants within each coping style group were then randomly assigned to one of the two interventions, resulting in four groups: (a) repressors provided distraction \((n = 8)\), (b) repressors provided sensory information \((n = 9)\), (c) sensitizers provided distraction \((n = 5)\), and (d) sensitizers provided sensory information \((n = 6)\).

**Interventions**

In order to keep the number of persons in the treatment room to a minimum, the nurses who performed the procedures were trained to provide the interventions. Though five nurses were involved, the majority of procedures \((84\%)\) were performed by two nurses. All were blind to participants' coping styles. During baseline procedures the nurses used a combination of information and conversation in no systematic manner.

Participants provided verbal distraction were told that one way of learning to cope with the procedures was to focus on something other than the procedure and the pain. It was explained that during the next two medical procedures the nurse would help them do this by talking to them about things other than the procedure. The nurse would still give them basic information such as telling them when the needle was to be inserted but would then go back to talking about other things. The children were encouraged to think of something they would like to talk about such as discussing an upcoming or recent vacation or something that happened at school. Therefore, the content differed in these groups depending upon the child. If the children asked procedure-related questions, the nurse was instructed to answer with minimal information and return to non-procedure-related conversation.

Participants provided sensory information were told that one way of learning to cope with the procedures was to know exactly what to expect, including what they may think and feel. It was explained that during the next two medical procedures the nurse would provide this detailed information, telling them step-by-step what she was doing. The detailed information in these two groups was essentially the same.

The following excerpts of information provided to each group at one step in the procedure exemplify the two interventions. Just prior to giving the lidocaine, the sensory information groups were told “I am about to put in the numbing medicine in the place where I washed. I'll count to three and then put it in so that way you won't feel the bigger needle. You may feel a
pinprick as I put the numbing medicine in and sometimes the medicine stings as it is starting to work. OK, one, two, three. Those in the distraction groups were told “Here is the numbing medicine” and the nurse returned to talking about the child’s upcoming vacation to Disney World. Again the topic of the distracting conversation varied from child to child.

RESULTS

Statistical Analyses

Multivariate analyses were not used because the dependent variables did not have a multivariate normal distribution with equal variance-covariance matrices in each group (Tatsuoka, 1971). The data were analyzed using separate analysis of covariance tests (ANCOVA) with data obtained during the baseline procedure entered as the covariate and data collected during the fourth procedure used to assess the intervention’s effectiveness. Data from the self-report of fear did not meet assumption of homogeneity of slopes and was therefore analyzed using the three-factor analysis of variance (ANOVA) with time as a repeated measure. The data for all dependent measures were found to have a skewed distribution, so all data were transformed using a base 10 logarithm transformation (Afifi & Clark, 1984).

Types of Procedures

Since both BMAs and LPs are frequently experienced throughout the medical treatment, both were included in the study. A participant may or may not have received the same type of procedure at all four study clinic visits and some of the children experienced both procedures during the same visit. If two procedures were given, then data related to only one procedure were entered into the analyses. As considerable differences on self-report measures and behavior were noted between the two types of procedures even when administered during the same clinic visit, an attempt was made to ensure that data entered in the analyses were for the same type of procedure when possible. All four study procedures were the same (e.g., all BMAs or LPs) for 17 of the 28 participants. An additional 5 had the same type of procedure at Time 2 (baseline) and Time 4 (intervention). Hence for the majority of the sample, 22, the same type of procedure was compared in the analyses.

Based on chi-squared analyses with Yates correction for continuity, no significant differences were found between the coping style groups or the intervention groups in the number of children who received only one proce-
Reducing Distress During Invasive Medical Procedures

Procedure during each of the four study visits versus those who had both procedures during the same visit at least once. Though sample size precluded direct comparison of all four groups, these results suggest that the proportion of children who received both procedures at the same time was randomly distributed between the two factors.

Comparison of Characteristics Between Groups

No significant differences in age, SES or gender were found between the groups. While the groups were comparable on demographic variables, differences were found on disease-related variables. Participants provided with sensory information had had their disease a significantly longer period of time, $F(1, 24) = 6.32, p < .05$, and had experienced more procedures, $F(1, 24) = 5.74, p < .05$, than those provided with verbal distraction. As one might expect, these variables were interrelated, for the children had less time to experience procedures during the earlier phases of their diagnosis ($r = .98$). Therefore, random assignment did not result in equivalent groups with respect to two of the three variables related to disease chronicity.

Trends for differences between repressors and sensitizers were also found for chronicity variables. Repressors compared to sensitizers tended to have had their disease a shorter period of time, $F(1, 24) = 3.17, p < .09$, and to have experienced fewer procedures, $F(1, 24) = 3.21, p < .09$. In fact, 14 of the 17 repressors had been diagnosed for less than 6 months compared to 1 of 11 sensitizers. Repressors were also found to have averaged significantly fewer days between procedures compared to sensitizers, $F(1, 24) = 17.77, p < .01$. Group means for the demographic and disease-related variables are summarized in Table I.

Focus on Procedure

In order to determine how effective the interventions were in either distracting the child away from or focusing his or her attention on the procedure, Pearson correlation coefficients were first obtained across all subjects for both procedures when an intervention was implemented to assess the reliability of the ratings. Significant correlations were found at both times, $r(25) = .64, p < .01$, and $r(26) = .79, p < .01$, therefore further analyses were based on ratings made by the research assistant. As it was predicted that coping style would interact with the participants' ability to utilize the intervention provided, repressors using distraction were predicted to be most distracted and therefore have the highest mean rating. Sensitizers provided information were predicted to have the greatest focus on the procedure and the lowest mean rating. Sensitizers using distraction and repressors
Table I. Comparison of Groups on Disease-Related Variables

<table>
<thead>
<tr>
<th></th>
<th>Months since diagnosis</th>
<th>No. of prior procedures</th>
<th>Average days between procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Repressors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distraction</td>
<td>8</td>
<td>18.9</td>
<td>29.8</td>
</tr>
<tr>
<td>Information</td>
<td>9</td>
<td>1.8</td>
<td>3.4</td>
</tr>
<tr>
<td>Sensitizers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distraction</td>
<td>5</td>
<td>42.8</td>
<td>41.9</td>
</tr>
<tr>
<td>Information</td>
<td>6</td>
<td>11.7</td>
<td>7.2</td>
</tr>
<tr>
<td>Coping style</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repressor</td>
<td>17</td>
<td>9.8</td>
<td>21.6*</td>
</tr>
<tr>
<td>Sensitizer</td>
<td>11</td>
<td>25.8</td>
<td>31.5</td>
</tr>
<tr>
<td>Intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distraction</td>
<td>13</td>
<td>28.1</td>
<td>35.4b</td>
</tr>
<tr>
<td>Information</td>
<td>15</td>
<td>5.7</td>
<td>6.7</td>
</tr>
<tr>
<td>Total sample</td>
<td>28</td>
<td>16.1</td>
<td>26.6</td>
</tr>
</tbody>
</table>

*a p < .09.
*b p < .05.
*c p < .01.

provided sensory information were expected to be about equal in their level of focus on the procedure with values between the other two groups. A three-factor ANOVA, with time as a repeated measure, and coping style and intervention as between group variables, was used to compare group differences in focus on the procedure. The predicted interaction was not found though there was a significant between-group intervention effect, $F(1, 23) = 19.16, p < .001$. Those groups using distraction had mean ratings of 3.42 ($SD = 0.90$) and 3.08 ($SD = 1.31$) for the two intervention procedures, whereas those provided sensory information had mean ratings of 2.00 ($SD = 0.84$) and 1.93 ($SD = 1.03$).

Analyses of Self-Report Data

No significant differences between groups were found on self-reports of fear or anticipated pain. A significant coping style by intervention interaction was found for the self-report of pain experienced during the procedure, $F(1, 23) = 4.98, p < .05$. Repressors using distraction had the highest experienced pain ratings after controlling for baseline differences. Pain ratings were significantly higher for this group than for repressors provided information, $t(16) = 2.43, p < .05$, and sensitizers using distraction, $t(12) = 2.35, p < .05$, the two groups with the lowest ratings. Sensitizers provided
Table II. Comparison of Groups on Dependent Measures

<table>
<thead>
<tr>
<th></th>
<th>Anticipatory Fear</th>
<th>Pain</th>
<th>Experienced pain</th>
<th>Anticipatory heart rate</th>
<th>Observed behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Repressors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distraction</td>
<td>0.05 (.32)</td>
<td>1.45 (.15)</td>
<td>1.56 (.19)</td>
<td>1.94 (.03)</td>
<td>0.53 (.09)</td>
</tr>
<tr>
<td>Information</td>
<td>0.14 (.19)</td>
<td>1.16 (.14)</td>
<td>0.96 (.18)</td>
<td>2.01 (.02)</td>
<td>0.50 (.08)</td>
</tr>
<tr>
<td><strong>Sensitizers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distraction</td>
<td>0.09 (.83)</td>
<td>1.39 (.19)</td>
<td>0.91 (.24)</td>
<td>1.98 (.04)</td>
<td>0.54 (.11)</td>
</tr>
<tr>
<td>Information</td>
<td>0.12 (.58)</td>
<td>1.53 (.18)</td>
<td>1.23 (.22)</td>
<td>2.04 (.03)</td>
<td>0.54 (.10)</td>
</tr>
<tr>
<td><strong>Coping style</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repressor</td>
<td>0.10 (.26)</td>
<td>1.31 (.10)</td>
<td>1.26 (.13)</td>
<td>1.98 (.02)</td>
<td>0.53 (.06)</td>
</tr>
<tr>
<td>Sensitizer</td>
<td>0.11 (.67)</td>
<td>1.46 (.13)</td>
<td>1.07 (.16)</td>
<td>2.01 (.02)</td>
<td>0.54 (.08)</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distraction</td>
<td>0.06 (.54)</td>
<td>1.42 (.12)</td>
<td>1.24 (.15)</td>
<td>1.96 (.02)</td>
<td>0.53 (.07)</td>
</tr>
<tr>
<td>Information</td>
<td>0.13 (.38)</td>
<td>1.34 (.11)</td>
<td>1.09 (.14)</td>
<td>2.02 (.02)</td>
<td>0.52 (.07)</td>
</tr>
</tbody>
</table>

*Data presented are log transformed; Fear measure is mean (SD); all others are least square means (SE).

*Significant coping style by intervention interaction, p < .05.

*Significant intervention main effect, p < .05.

Analyses of Physiological and Observation Data

Differences between the intervention groups were found for anticipatory heart-rate data. Those children provided information had higher anticipatory heart rates than those using distraction, irrespective of coping style, \( F(1, 22) = 4.31, p < .05 \). No significant differences between groups were found in observed behavior after controlling for baseline differences. This may have been due to relatively low mean scores during baseline (\( M = 3.27, SD = 2.79 \)). The means and standard errors for all of the dependent measures are summarized in Table II.

DISCUSSION

Partial support was found for the hypothesis that preferred coping style would influence the effectiveness of the intervention provided during invasive medical procedures, but these effects were observed only for subjective ratings of pain experienced during the procedure. Furthermore, the interaction occurred in the direction opposite from that predicted: those
children using the intervention chosen as most "consistent" with their coping style (i.e., Repressors using distraction and sensitizers provided information) actually reported more pain compared to those with an "inconsistent" intervention (i.e., Repressors provided information and Sensitizers using distraction) after controlling for baseline differences.

The other significant effect found was for heart-rate levels; children that were provided information had higher anticipatory heart rates compared to those who were distracted. Heart-rate levels have been interpreted as an indication of anxiety (Melamed, 1983). Our results suggest that knowing that detailed information would be provided during the procedure has a sensitizing effect, resulting in higher levels of anticipatory arousal. However, children who received information also had had their disease a shorter period of time and had less experience with procedures than those provided distraction and, therefore, may have been more physiologically aroused because of their inexperience. Preliminary data reported by Jay et al. (1984) suggested that children may show less physiological arousal with experience despite continued self-report of pain at the same level. It is difficult to say whether one or both of these factors contributed to our results.

No significant changes were found for the other dependent variables: fear, anticipatory pain, and observed behavior. In retrospect, it makes sense that few changes were observed on anticipatory measures as the interventions focused on the time period immediately prior to and including the actual procedure. Though not included in the present study, a practice component at home may be needed to target anticipatory fears. As a group these children exhibited low levels of observable indices of pain and distress as measured by the OSBD. Other studies have found that by age 6 or 7, disruptive behaviors tend to decrease, though the subjective experience of anxiety of pain may still be present (Jay et al., 1983; Katz, Kellerman, & Siegel, 1980). The results of this study are consistent with these previous findings as all but two of the children were 7 years of age or older and total behavior scores at baseline were quite low. Other studies which include the OSBD have reported baseline levels ranging from 8 to 20 for individual patients (Jay et al., 1984; Jay, Elliott, Ozolins, Olson, & Pruitt, 1985). The lack of behavioral change may have been due to a floor effect.

The tendency for preferred coping style to be related to variables indicative of the chronic nature of the illness (duration of illness, number or prior procedures, and time between procedures), though unanticipated, may help to explain the unexpected direction of the interaction found for experienced pain. Those children in the initial stages of their diagnosis and medical treatment perceived that avoiding focus on the procedure or on information related to the procedure was more helpful during the BMAs and LPs. Those children who had had more time to adapt to the diagnosis and become familiar with the procedures, as a group, perceived that more infor-
mation and/or using positive self-statements that focused on the procedure itself was more helpful. Therefore, preferred coping style, in this setting, seems more related to stage of adjustment or adaptation to this serious, life-threatening illness.

These different styles of dealing with the invasive medical procedures in recently diagnosed versus more chronic patients are consistent with other investigations of adaptation to a life-threatening event, where initial coping strategies may include denial or avoidance (Levenson, Pfefferbaum, Copeland, & Silberberg, 1982; Spinetta & Maloney, 1978; Zeltzer, 1980). Healthy adaptation to such events usually involves gradually gaining a more informed and realistic understanding of the illness though some continued use of denial may be adaptive (Koocher & O'Malley, 1981; Lazarus, 1983).

Yet our results indicate that for those children who preferred to avoid information, receiving information resulted in lower subjective ratings of pain. The information may have been more salient and useful to the Repressors, who had less experience with the procedure despite the perception that avoiding information would be more helpful. Providing information may have helped restore a sense of control by knowing exactly what was happening (e.g., Gil, 1984). For the Sensitizers who had more experience, on the other hand, information may have been less useful and may even have had a sensitizing effect due to repeated experience with the procedures. Though not statistically different, Sensitizers provided information, as a groups, had the second highest pain ratings.

Despite limitations, the present study suggests that different types of pain management strategies used during invasive medical procedures may be needed for children at different stages in the diagnosis of cancer. Coping style may have an impact on an intervention's effectiveness but these results suggest that the greatest influence may be on children's choice of a strategy they might use on their own. Yet, the perception that a particular strategy works best may prevent children from trying other strategies that actually may be more helpful.

The present results are limited in that the number of children within each group was small and there was considerable variability within the data. Limiting the sample to ages where self-report data could be obtained excluded many patients with ALL as the peak age for diagnosis has been reported to be between 2 and 5 years (Klopovich & Cohen, 1984). The sample was further decreased by 14 children who did not complete the study; a subset of 6 of these children requested to stop participation because they did not want an observer in the room or use the equipment. Baseline assessments were available to assess whether these children differed from those in the other four groups on the dependent measures but no significant differences were found. Disease-related differences which may have helped clarify the results and multivariate analyses which would control for multiple
comparisons could not be statistically addressed because of the small sample.

A second limitation may be raised regarding the distraction intervention. The ratings of attentional focus suggest that it was more difficult to distract children than to provide the sensory information. It may have been too difficult for the nurse to perform the procedure and successfully distract the children. In this study, one of the medical staff’s concerns was to minimize the number of persons in the treatment room. Other investigations where distraction has been successful (e.g., Zeltzer & LeBaron, 1982) have used a separate therapist and this may be a necessary component for using distraction effectively. A direct comparison between nurse-initiated versus other-initiated distraction would be needed to address this question.

Further research is certainly needed to replicate these results with a larger sample and ensuring that the distraction technique used is as attention-sustaining as possible. Investigations should continue to include measures from various response modalities (e.g., covert, overt, and physiological measures) as interventions may have a different impact on each. The relationship between preferred coping style and chronicity factors warrants further exploration by using a longitudinal design to ascertain whether coping style does change with experience versus being a more enduring personality trait.

REFERENCES


Reducing Distress During Invasive Medical Procedures


