A Comparison of Distraction Strategies for Venipuncture Distress in Children

Jill E. MacLaren,1 MA, and Lindsey L. Cohen,2 PhD
1West Virginia University and 2Georgia State University

Objective  To compare the effects of two pediatric venipuncture distress-management distraction strategies that differed in the degree to which they required children’s interaction.  Methods  Eighty-eight 1- to 7-year-old children receiving venipuncture were randomly assigned to one of three treatment conditions: interactive toy distraction, passive movie distraction, or standard care. Distress was examined via parent, nurse, self-report (children over 4 years), and observational coding. Engagement in distraction was assessed via observational coding.  Results  Children in the passive condition were more distracted and less distressed than children in the interactive condition. Although children in the interactive condition were more distracted than standard care children, there were no differences in distress between these groups.  Conclusions  Despite literature that suggests that interactive distraction should lower distress more than passive distraction, results indicate that a passive strategy might be most effective for children’s venipuncture. It is possible that children’s distress interfered with their ability to interact with the distractor.

Key words  distraction; pain; distress; venipuncture; intervention.

Given that children exhibit and report high levels of distress during painful medical procedures, the development and evaluation of interventions in this area is an important endeavor (Jacobsen et al., 2001). This is particularly true for younger children, who tend to display higher distress than older children (Carlson, Broome, & Vessey, 2000). The distress resulting from medical procedures, if untreated, can lead to negative experiences and, in turn, to more anxiety and distress during subsequent procedures (Bijttebier & Vertommen, 1998). Further, early painful procedures have been associated with increased sensitivity to later medical insults (Taddio, Goldbach, Ipp, Stevens, & Koren, 1995). Recognizing the importance of interventions in this area, researchers and clinicians have developed several effective nonpharmacological treatment protocols for reducing procedure-related distress. Most are cognitive-behavioral in nature (Powers, 1999), and the vast majority include distraction. In fact, distraction has been identified as the critical active ingredient in distress-management interventions for children of preschool age and younger (Blount, Piira, & Cohen, 2003).

There is an abundance of literature supporting the efficacy of distraction; however, there is vast diversity in the distraction strategies used by researchers. For example, researchers have used nonprocedural talk (e.g., Gonzalez, Routh, & Armstrong, 1993), cartoon movies (e.g., Cohen, Blount, Cohen, Schaen, & Zaff, 1999; Cohen, Blount, & Panopoulos, 1997), and interactive toys (e.g., Dahlquist, Pendley, Landthrip, Jones, & Steuber, 2002). These strategies differ on several dimensions, one of which is the amount of interaction required of the child.

The theoretical underpinnings of distraction suggest that its efficacy lies in its ability to use up cognitive capacity, leaving fewer resources to devote to pain (McCaul & Mallot, 1984). It has been posited in studies using interactive toys with children (e.g., Dahlquist et al., 2002) that distraction requiring an overt response from the child should be more distracting, and therefore
more effectively decrease pain than distraction not involving this interactive component. This hypothesis has been partially supported in research with adults (e.g., Williams & Kinney, 1991). However, only one study to date with children—the only study comparing distraction techniques at all in this population—has provided support for the claim (Mason, Johnson, & Woolley, 1999).

Mason et al. (1999) compared two distractors (a brief cartoon film and a short story requiring button pressing at specified points in the story) and a Standard Care Control condition during painful procedures in seven 2- to 4-year-old children with cancer. Results indicated that children displayed the least distress and received lower nurse and caregiver ratings of distress in the interactive story condition, but no differences between the Cartoon Distraction and the Standard Care condition. However, the results of this study were limited by the inclusion of a small sample size and problems in the administration of distraction protocols (e.g., lack of parent or nurse coaching).

The current study was designed to replicate and extend the experiment by Mason et al. (1999). To make the current study relevant to existing literature, two distinct, empirically supported distraction strategies were examined. Although these strategies differ on several dimensions, they were selected from the current literature because they differed maximally on the dimension of interactivity. In the Interactive Toy Distraction condition, children played with a toy that required the child to press buttons to respond to questions and to produce sounds. A similar intervention was proven effective by Pringle et al. (2001) and Dahlquist et al. (2002). The Movie Distraction condition consisted of children viewing a cartoon movie; this intervention has also received support in the literature (e.g., Cohen et al., 1997, 1999). In the latter condition, no response was demanded of the child. In both conditions, caregivers and nurses administering the procedure were trained to actively encourage the child to attend to the distraction procedure. As a comparison, children received standard care.

Children ranging in age from 1 to 7 years participated to explore age as a continuous variable. Inclusion of infants allowed examination of the appropriateness of a behavioral intervention for this age group. Furthermore, it allowed an examination of the extent to which developmental changes affect children’s engagement in distraction, and also how age relates to distress. This clinically-important and heuristic question has yet to be addressed in the literature.

Methods

Participants

Appropriate institutional approval was obtained for this study. Participants were 88 children, ranging in age from 1 to 7 years (M = 4.29, SD = 1.80), undergoing venipunctures as part of a pre-surgery admission procedure at a university-affiliated hospital. Participants were recruited over an 18-month period. Fifty-two children were male (59.1%) and 81 were Caucasian (92.0%). Four children were African American (4.5%) and the race of the remaining three was not reported.

Most children were accompanied by a female caregiver (83 children, 94.3%). Five of the female caregivers were grandmothers and the rest were mothers. The remaining five children (5.7%) were accompanied by fathers. To simplify language, the researchers will refer to all mothers, fathers, and grandmothers as “caregivers” for the remainder of this paper. Caregivers ranged in age from 23 to 62 years (M = 33.2, SD = 8.28) and 84 (95.5%) were Caucasian. Three of the remaining caregivers were African American and one did not report his or her race.

Nine caregivers were approached to participate and declined participation. One was too busy and another did not want to be videotaped. Caregivers of two children did not speak adequate English to complete the measures. Two more cited caregiver factors (feeling too tired, too nervous) as their reason for not participating and two more cited child factors (too “emotional”, not cooperative). The final caregiver did not provide a reason for declining participation.

Measures

Demographic Form. Caregivers who accompanied participants to the clinic completed a consent form and demographic information questionnaire that included questions about the family and the child. Family questions included caregiver demographics (e.g., age, gender, race) and family income. Questions about the child included child demographics (age, gender, and race), how many previous venipunctures the child had received, and how anxious the child had been during prior venipunctures.

Observational Measures. Child distress behaviors were coded using videotapes of the venipuncture procedure. A modified version of the Observation Scale of Behavioral Distress (OSBD; Elliot, Jay, & Woody, 1987; Jay, Ozolins, Elliot, & Caldwell, 1983) was used to code child distress behaviors. The OSBD was originally designed to assess children’s distress behaviors during
bone marrow aspirations, and it has been widely used for other painful medical procedures such as immunizations (e.g., Blount et al., 1992; Dahlquist et al., 2002; Pringle et al., 2001). The scale contains 11 behavioral subcodes indicative of procedural distress (information seeking, crying, screaming, physical restraint, verbal resistance, seeking emotional support, verbal pain, flail, verbal fear, muscular rigidity, and nervous behavior). This measure has been primarily used with verbal children, but it contains behaviors (e.g., cry, scream, flail) that are included on popular infant observational pain scales such as the Infant Behavior Rating Scale (Craig, McMahon, Morison, & Zaskow, 1984) and the Modified Behavioral Pain Scale (Taddio, Nulman, Goldbach, & Ipp, 1994; Taddio, Nulman, Koren, Stevens, & Koren, 1995). The original OSBD assigns intensity weights for each subcode, but research suggests these weights may not have incremental validity beyond simply coding the occurrence of the behavior (Jay & Elliot, 1984). Therefore, for the purposes of this study, only the presence of behaviors was examined.

To evaluate caregiver and nurse distraction behavior, the following behaviors were coded: Adult makes comments about movie or toy, Adult asks questions about the movie or toy, Adult physically guides the child to engage with the toy, Adult physically guides the child to watch the movie, and Adult engages in other non-procedural talk. To assess the child's engagement in distraction, the subcodes of Child physically manipulate the DVD player or toy, Child watches the movie or toy, Child makes comments about the movie or toy, Child answers nurse's and caregiver's questions about the movie or toy, and Child engages in other nonprocedural talk was coded.

To better account for distress across the age range, and to obtain consistent metrics across codes, a dichotomous coding procedure was used. Specifically, Child Distress, Child Engage in Distraction, Caregiver Distact, and Nurse Distract codes were treated as dichotomous; if a participant displayed one or more of the subcodes in a given 5-s interval, it was counted as only one occurrence of the larger code. If more than one caregiver was in the room during the procedure, both caregivers were coded as a unit. Caregiver Distact was coded as present if either mother or father engaged in distraction and was not double counted if both distracted in the same interval. Occurrences of each code were summed and then divided by the total number of 5-s intervals to form the following variables, which were used in analyses: Caregiver Distact, Nurse Distract, Child Engage in Distraction, and Child Distress. These variables reflect the percentage of 5-s intervals during the procedure when the target (nurse, caregiver and child) was engaged in the specified behavior.

All observational codes were operationally defined. Coding spanned from 3 min prior to the injection until 3 min after withdrawal of the needle. As part of training, the research assistants practiced by coding previously collected data. When the research assistants demonstrated “good” interrater reliability (i.e., Kappa coefficients greater than .59; Fleiss, 1981) on the practice tapes, they began coding the study data. To evaluate their reliability with the study data, the coders overlapped on a randomly selected 20% of the participants (i.e., 18 participants). Reliability analyses were conducted on the four dependent variables (Child Distress, Child Engage in Distraction, Caregiver Distract, and Nurse Distract). Mean Kappa statistics for the overlapped participants for Child Distress, Child Engage in Distraction, Caregiver Distract, and Nurse Distract were 0.81 (SD = 0.20), 0.87 (SD = 0.11), 0.75 (SD = 0.23), and 0.76 (SD = 0.15), respectively. All Kappas fell within the “excellent” range (Fleiss).

**Child Report.** Children 4 years and older completed ratings prior to and following the procedure. Research indicates that children as young as 4 years can report pain using simple self-report instruments (Champion, Goodenough, von Baeyer, & Thomas, 1998). Reports were made using five computer-generated faces showing progressive expressions from a smile to a frown, which has been used in several prior studies (e.g., Cohen, Bernard, Greco, & McClellan, 2002; Cohen et al., 1997). A research assistant trained a child in the use of this measure and presented questions orally to the child. Prior to the procedure, the child answered the questions “How upset are you right now?” and “How upset will you be during the venipuncture?” using the five faces. The word venipuncture was replaced with shot or blood draw if the child appeared not to understand the term venipuncture. After the procedure, children answered similar questions “How upset are you right now?” and “How upset were you during the venipuncture?” also by using the five faces.

**Nurse-Report.** Nurses completed three visual analog scale (VAS) ratings prior to and following the procedure. Prior to the procedure, nurses completed VASs (Child Report, Child Distress, Child Engage in Distraction, Caregiver Distract, and Nurse Distract) in the same interval. Occurrences of each code were summed and then divided by the total number of 5-s intervals to form the following variables, which were used in analyses: Caregiver Distact, Nurse Distract, Child Engage in Distraction, and Child Distress. These variables reflect the percentage of 5-s intervals during the procedure when the target (nurse, caregiver and child) was engaged in the specified behavior.
(with the addition of during the venipuncture) were administered following the procedure. VASs are common methods of assessment in pain studies and they have been shown to be both valid and reliable (McGrath, 1990). In addition, they do not result in clustering of scores that often occurs with categorical scales (Varni, Walco, & Wilcox, 1990).

**Caregiver-Report.** Prior to the venipuncture, caregivers answered the following questions using VASs: “How distressed are you now?” and “How distressed is your child about the upcoming venipuncture?” (anchored with “Not Distressed” and “Very Distressed”). Following the procedure, caregivers responded to the same questions (the word “will” was replaced with “did”).

**Procedure**

Potential participants were approached by a research assistant in the waiting room of the clinic. All preprocedure measures were completed before the caregivers and participants had contact with the medical staff, and before they were assigned to condition. After completing the demographics questionnaire, participants were grouped by age (1–3 and 4–7) and then assigned to condition (Control, Toy, Movie) on an alternating basis within each group. This procedure ensured that groups were roughly matched on age. Twenty-nine participants each were assigned to the Control and Movie conditions, and 30 participants were assigned to the Interactive Toy condition.

**Standard Care (Control).** In the Control condition, the nurse was instructed to interact with the child according to her own routine with the additional instruction to minimize distracting behaviors when possible. Although nurses may still have used distraction in addition to other behaviors, neither the toy nor the movie was provided to the child.

**Interactive Toy Distraction (Toy).** Children in the Toy condition were provided with one of two age-appropriate interactive toys approximately 5–7 min before the beginning of the procedure. Provision of the toy before the procedure ensured that the child had time to learn how to use and become engaged with the toy. Children 3 years and under were provided with a toy robot with multicolored buttons. Pressing buttons activates the robot to make sounds, play music, and spin a colorful wheel. Children 4 years and older were provided with a toy laptop computer. The child had the choice of six games (tic-tac-toe, comparison, matching, counting, find the object, and rock-paper-scissors), all of which require the child to press buttons in response to commands made, or questions asked by the toy. The toy replies to correct responses with “Good job” and to incorrect responses with “Sorry, try again.” Children received instructions from the researcher on how to use the toy and were encouraged to play with it throughout the procedure. The nurse and caregiver were trained to encourage the child’s adherence to the distraction procedure. They were instructed to encourage the child to press buttons using comments such as “What does this button do?” “Push that button” and “Can you make it do that again?” and physical gestures such as pointing to the toy and moving the child’s hand onto the toy.

**Movie Distraction (Movie).** Children in the Movie condition were provided with a hand held DVD player with a 7-inch screen and an age-appropriate DVD movie. Children 3 years and under watched “Teletubbies”, and children 4 years and older were given the choice to watch either “Toy Story 2” or “The Little Mermaid.” The movie was started for the child approximately 5–7 min before the start of the procedure. As with the toy robot and laptop, provision of the movie before the procedure allowed the child to become involved in the distraction.

As in the Toy condition, the nurse and the caregiver were trained in ways to encourage the child’s adherence to the distraction procedure. They were instructed to encourage the child to watch the movie using comments such as “Watch the movie” and asking questions such as “Who is the good guy?” and “Have you seen this before?” Caregivers were also trained to use physical gestures such as pointing to the DVD player and watching the movie themselves to encourage engagement in the distraction.

Once the child was assigned to a condition and the pre-venipuncture measures were completed, a nurse called the family into a treatment room. The research assistant accompanied the family to the treatment room, set up an 8-mm video camera, and began recording. The research assistant also placed a condition sheet at the nurse’s workstation that informed the nurse of the condition to which the child had been assigned and provided reminders of prescribed behavior. The research assistant then left the room. Prior to administering the venipuncture, the nurse completed the pre-venipuncture VASs.

Following the completion of the procedure, the research assistant returned to the treatment room, turned off the camera, and provided the caregiver and the child (if applicable) with the postvenipuncture questionnaires. The nurse also completed the postvenipuncture measures at this time.
Comparison of Distractors

Results

Data Analysis Overview

Analyses were conducted in a series of steps. First, descriptive statistics were performed to provide a summary of demographic characteristics of the sample within each treatment group (Toy, Movie, and Control). Second, preliminary analyses were conducted to ensure that groups were roughly similar on demographic variables. Third, treatment integrity analyses were conducted to examine if the nurses and caregivers provided distraction as trained in the Toy and Movie conditions. Fourth, one-way analyses of variance (ANOVA) with follow-up t tests were conducted to examine the between-groups differences on dependent variables. Fifth, to assist in the interpretation of between-groups differences, correlational analyses were conducted to determine whether a relation existed between children’s engagement in distraction and their procedure-related distress.

Attributable to technical difficulties with video equipment and participants not completing all measures, some data were missing. In reports of children’s distress, two (2.2%) caregivers failed to report their children’s post procedure distress, and one (1.1%) nurse also omitted this item. Eight (12.9%) children within the self-report age range did not report their postprocedure distress. Finally, six (6.8%) participants did not have video data (because of equipment failure or human error) and therefore could not be coded for Child Observational Distress, Child Engage in Distraction, Nurse Distraction, or Caregiver Distraction. These data were left as missing data points in analyses and other compensatory actions were not taken (e.g., inserting a mean value).

Preliminary Analyses

Preliminary analyses were conducted to determine whether there were any significant between-groups differences on demographic variables. Chi-square analyses indicated no differences between groups on child and caregiver race, and child and caregiver gender. ANOVAs were used to compare the three conditions on child age, family income, previous number of venipunctures, caregiver-report of prior distress during venipunctures, and caregiver-report and child report (if applicable) of the amount of distress the child experienced preprocedure (see Table I). Conditions differed significantly only on family income. Families in the Movie condition had significantly higher incomes than families in the Control condition. This does not appear to be problematic, however, as family income was not related to any of the distress variables. There were no differences between the Toy and Movie groups or between the Control and Toy groups on family income.

Treatment Integrity

To examine the degree to which caregivers and nurses adhered to training in each of the conditions, treatment integrity analyses were conducted. Two ANOVAs were performed to compare Nurse Distraction and Caregiver Distraction across treatment groups (see Table II). No significant differences were found between groups on either variable. Although these analyses indicate that groups did not differ on caregiver and nurse behavior, the nature of the distraction stimuli differed between groups, therefore justifying further between-groups analyses.

Treatment Effects

Descriptive statistics for Child Engagement in Distraction by treatment group are shown in Table II. An ANOVA examining Child Engagement in Distraction, indicated that there were significant between-groups differences on this variable, $F (2, 79) = 41.62, p < .001$. Follow-up t tests with a Bonferroni corrected alpha level

<table>
<thead>
<tr>
<th>Table I. Demographic Variables by Condition</th>
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<tbody>
<tr>
<td>Treatment Condition</td>
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<td>M</td>
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<tr>
<td>Child age (years)</td>
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<tr>
<td>Caregiver age (years)</td>
</tr>
<tr>
<td>Family income ($)</td>
</tr>
<tr>
<td>Number of previous venipunctures</td>
</tr>
<tr>
<td>Previous child distress (caregiver-report)</td>
</tr>
<tr>
<td>Preprocedure child distress (caregiver-report)</td>
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<tr>
<td>Preprocedure child distress (self-report)</td>
</tr>
</tbody>
</table>

Means in a row with different superscripts (e.g., a, b) indicates significant differences at $p < .05$. Caregiver-report were 100-mm visual analog scales ranging from 0 to 100 with higher scores indicating higher levels of distress. Self-report was with a facial expression scale from 1 to 5 with higher scores indicating higher levels of distress.
MacLaren and Cohen

of 0.012 revealed significant differences between all group pairs. Children in the Control condition engaged in significantly less distraction than children in the Toy condition, \( t(52) = 6.84, p < .01 \), and children in the Movie condition, \( t(55) = 9.56, p < .01 \). Additionally, children in the Toy condition engaged in significantly less distraction than children in the Movie condition, \( t(51) = 2.74, p < .01 \).

Descriptive statistics for Child Distress by treatment group are shown in Table II. ANOVAs were conducted to examine treatment effects on measures of child distress (Caregiver-report, Nurse-report, Self-report, and Observed). Results indicated that treatment groups differed significantly on Caregiver-report, \( F(2, 83) = 3.37, p < .05 \), and on Self-report \( F(2, 84) = 3.67, n.s. \), or Observed distress, \( F(2, 79) = 1.98, n.s. \). Significant findings were followed-up by \( t \)-tests with a Bonferroni corrected alpha level of .012. In Caregiver-report of distress, children in the Movie condition were significantly less distressed than children in the control condition, \( t(55) = 2.58, p < .01 \), but did not significantly differ from children in the Toy condition. Children in the Toy and Control conditions did not significantly differ on Caregiver-report of child distress. With respect to Self-report of distress, children in the Movie condition rated themselves as significantly less distressed than children in the Toy, \( t(37) = 3.01, p < .01 \), and Control, \( t(44) = 3.22, p < .01 \), conditions. Children in the Control and Toy conditions did not significantly differ on Self-report distress.

Relations between Child Distress and Engagement in Distraction

Correlations were conducted to examine the relations between Child Engagement in Distraction and measures of child distress. Significant negative correlations were evidenced between Engagement and Self-reported, \( r(59) = -.49, p < .001 \), Nurse-reported, \( r(82) = -.29, p < .001 \), Caregiver-reported, \( r(80) = -.50, p < .001 \), and Observed Distress, \( r(82) = -.40, p < .001 \). In all cases, children who engaged in more distraction behaviors were rated as less distressed.

Relation between Child Age and Engagement in Distraction

Inclusion of the entire sample (collapsed across treatment condition) resulted in a non-significant correlation between Child Age and Child Engagement in Distraction, \( R(82) = .218, p > .05 \). This result is consistent with non-significant correlations between Age and Child Engagement in the Control group, \( R(29) = .208, p > .05 \), and the Movie group, \( R(28) = .223, p > .05 \). However, a significant positive relation between Age and Child Engagement in Distraction, \( R(25) = .493, p < .05 \), was evidenced in the Toy group; older age in the Toy condition was associated with more engagement in distraction.

Relation between Child Distress and Engagement in Distraction within Age Group

To examine whether the relations between distress and distraction differed depending on age groups, correlational analyses were conducted within age group (1–3 years old and 4–7 years old; Table III). The pattern of these correlations was similar across age groups. In both groups, significant negative correlations were found between Child Engagement in Distraction and Caregiver-report, Child Self-report, and Observed child distress. Correlations between Child Engagement in Distraction and Nurse-reported Distress were non-significant in both groups.
In the treatment groups to promote distraction, an intuitive to interpret this result as a failure of the conditions than in the control condition. Although it is significantly more distracting behaviors in the distraction condition revealed that neither party performed significantly different between the control and toy conditions did not differ on child distress measures.

These results stand in contrast to those of Mason et al. (1999), who found that an interactive distraction was more effective than viewing a distracting cartoon. There are several possible explanations for the discrepancy between the two studies. First, differences in distraction stimuli should be considered. It is possible that the toy robot and laptop in the current study were not as engaging as the interactive storybook used by Mason et al. However the laptop and robot were similar to those stimuli found to be effective in other studies (e.g., Pringle et al., 2001), and therefore were expected to have been effective here. Similarly, the movies in the current study might have been more distracting than the cartoons used by Mason et al. Other differences between the studies, such as the samples, measures, and design might also explain differences in results.

It is pertinent to note how the children used each of the distraction stimuli (interactive toy and movie). First, it is possible that differences in children's interest in the distractors lead to the observed results. It is possible that children in the Interactive Toy condition quickly became bored with the stimulus and therefore stopped interacting with it, and children in the movie condition did not. Although the amount of time that the toy was made available to the child was limited in this study, it is possible that it was still too much. Further studies should evaluate the optimal amount of time for distractors to be made available to children. An additional explanation of these results is also possible.

Anecdotally, many children in the current study appeared to show significant anticipatory distress upon first exposure to the nurse and medical instruments. In an already stressful situation, children might become overwhelmed when they were required to perform an action to receive feedback from the distractor. In many cases, children appeared to simply stop interacting with the toy and instead focused their attention on the procedure. Alternatively, children in the movie condition continued to receive distraction regardless of their ability (or willingness) to interact with the stimulus.

The possibility that children were less overwhelmed and therefore more distracted by a movie than interactive toy highlights an important difference between previous studies and the current one. Current participants were generally healthy children who did not have extensive experience with painful procedures, or previous exposure to the venipuncture clinic. Alternatively, participants

### Table III. Correlations between Child Distress and Child Engagement in Distraction by Age Group

<table>
<thead>
<tr>
<th>Age Group</th>
<th>1- to 3-year-olds (n)</th>
<th>4- to 7-year-olds (n)</th>
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<tbody>
<tr>
<td></td>
<td>Engagement in Distraction</td>
<td>Engagement in Distraction</td>
</tr>
<tr>
<td>Caregiver-report distress</td>
<td>−.470* (28)</td>
<td>−.468** (52)</td>
</tr>
<tr>
<td>Nurse-report distress</td>
<td>−.151 (28)</td>
<td>−.256 (54)</td>
</tr>
<tr>
<td>Self-report distress</td>
<td>−.780* (8)</td>
<td>−.458** (51)</td>
</tr>
<tr>
<td>Observational distress</td>
<td>−.444* (28)</td>
<td>−.325** (54)</td>
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*p < .05.

**p < .01.

### Discussion

This study compared the efficacy of two empirically-supported distraction strategies—a movie (e.g., Cohen et al., 1997) and an interactive toy (e.g., Pringle et al., 2001)—in promoting engagement in distraction and decreasing distress during pre-surgery venipuncture in young children. In addition, relations between children's distress measures and children's engagement in distraction were examined. Analyses of nurses' and caregivers' behavior revealed that individuals in all conditions spent approximately 25% of their time engaging in distraction, a relatively large amount. Therefore, the lack of a statistically significant difference between the control and intervention groups may have been because of a relatively high amount of caregiver and nurse distracting behavior in the control condition, rather than a low amount in intervention conditions.

It is also possible that caregivers and nurses were engaging in enough distracting behavior to ensure that children in the treatment groups were attending to the stimuli, therefore eliminating the need for adults to engage in further distracting behaviors. Regardless of the explanation, it is essential that pediatric pain researchers monitor nurses' and caregivers' adherence to treatment protocol; unfortunately, this is a rare occurrence in the literature.

Results of the current investigation revealed significant effects of distraction when compared to control, but in a direction that was not expected. The movie distraction—which required less behavioral interaction than the toy distraction—was more effective than the toy distraction in engaging the child, and resulted in less child distress.

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The possibility that children were less overwhelmed and therefore more distracted by a movie than interactive toy highlights an important difference between previous studies and the current one. Current participants were generally healthy children who did not have extensive experience with painful procedures, or previous exposure to the venipuncture clinic. Alternatively, participants
included by both Mason et al. (1999) and Pringle et al. (2001) were children currently receiving cancer treatment including repeated painful procedures (e.g., bone marrow aspiration and lumbar puncture) and had prior exposure to the clinic setting. It is possible that these children, although experiencing pain from their procedure, do not experience the additional distress of a new environment and a novel procedure. Thus, the participants examined by Mason et al. and Pringle et al. may be less overwhelmed by their environment and more able to participate in an interactive distraction strategy. Therefore, it might be important to consider children’s past experience and current level of distress when selecting an appropriate pain management intervention, and future studies should continue to examine this interaction.

The failure to find differences between groups in nurse-report of child distress was not completely unexpected given prior research (e.g., Blount et al., 1992, Manne et al., 1990). Competing demands placed on nurses (e.g., preparing medical equipment) may make it difficult for them to provide adequate attention to, and therefore valid ratings of, children’s distress. The failure to find differences in observed distress was surprising, especially given previous research documenting effects using this measure (e.g., Dahlquist et al., 2002). It is possible that this measure was not sensitive enough to detect subtle differences between groups. In fact, to date, this scale has not been used to evaluate distress in infants. Although the OSBD includes behaviors that are typically included on infant scales (e.g., MBPS; Taddio et al., 1994), it might not be sensitive enough to detect changes in this population.

Inclusion of a wide age range of children in the current study allowed for analyses examining the relations between this variable and children’s engagement in distraction and distress. Results of these analyses revealed that older children were more engaged by the interactive distractor than were younger children. This relation was not evident in the movie condition, however, as older and younger children engaged in distraction at similar rates. This result highlights the importance of considering individual factors when selecting a distraction strategy. Despite the relations between age and engagement in the interactive condition, it is important to note that engagement in distraction appears to be the key element in this strategy’s effectiveness. In both older and younger groups of children, those individuals who engaged the most with the distractor were also the least distressed. One caveat is that the distraction stimuli (e.g., “Teletubbies” movie versus “Toy Story 2”) were confounded with age, and, thus, these results might be related to nuances of the distraction stimuli.

Limitations of this study should be noted. The lack of treatment integrity limits the interpretations of the treatment effects. Although it highlights an interesting possibility that caregivers and nurses may not need to coach children in the presence of a salient distractor, the fact remains that neither condition in this study was conducted in the manner that ensured maximal efficacy (e.g., the training provided to nurses and parents might have not been adequate to ensure behavior change). Additionally, the observational measure included, the OSBD (Jay & Elliot, 1984), has not been widely used, or validated in children below preschool age. Although it contains behaviors that are included on many infant scales (e.g., cry, scream, and flail), the psychometrics of this measure in an infant population are not well established. Finally, the design of the current study limits the ability to reach conclusions on the mechanisms responsible for the differences between treatment groups. Although it is possible that requiring children to interact with a distractor is indeed too demanding in a pre-surgery venipuncture setting, it is also possible that other factors (e.g., physical differences between distractors) may have been responsible for the results. Future research might compare distractors that differ only in the amount of interaction required which are needed to truly determine if the addition of such a requirement decreases distress.

In sum, results of this study indicate that a movie appears to be more distracting and more effective in decreasing distress than an interactive toy for pediatric pre-surgery venipuncture. These results stand in contrast to previous studies with adults and in children; however, many of those studies involved participants who were experiencing repeated procedures. It is important to note that the positive effects of distraction were evidenced despite the lack of differences in caregiver and nurse coaching behavior between the intervention and control groups. This provocative finding suggests that simply providing children with a sufficiently engaging and easy-to-use distraction might be a cost-effective and time-efficient pediatric distress management technique.

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