The Impact of Maternal Behavior on Children's Pain Experiences: An Experimental Analysis

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Objective: To provide an experimental investigation of the impact of maternal behavior on children's pain experiences.
Method: Participants were 120 healthy children (60 boys, 60 girls) between the ages of 8 and 12 years and their mothers. Mothers were randomly assigned and trained to interact with their children in one of three ways while the children were exposed to lab-induced cold pressor pain: (1) a pain-promoting interaction, (2) a pain-reducing interaction, and (3) a no training control group. Training was based on behaviors presumed to have the expected impact, as based on correlational studies reported in the literature. Children's pain experiences during the cold pressor were assessed using self-reports of intensity and affect, coding of facial activity, tolerance, and heart rate responsiveness.
Results: Girls whose mothers interacted with them in the pain-promoting manner reported more pain than daughters of mothers in the control group, who in turn reported more pain than girls whose mothers interacted with them in the pain-reducing manner. This effect was not significant for boys. Maternal interaction type had no effect on children's pain affect, facial activity, tolerance, or heart rate.
Conclusions: Results indicate that maternal behavior can have a direct impact on their daughters' subjective reports of pain. These data support the importance of social learning factors in influencing children's pain experiences.

Key words: children; pain; maternal influences; family factors; social learning.

The experience of chronic pain conditions and associated disability are serious problems for many children (Goodman & McGrath, 1991). Although it is generally recognized that complex factors interact to influence children's pain (Merskey & Bogduk, 1994), clinical lore and psychological theory point to the critical role parents play in determining their children's pain experiences. Studies of the aggregation of pain complaints in families have high-

lighted the important context of the family in childhood pain (Goodman, McGrath, & Forward, 1997); however, little research has directly explored the mechanisms through which parents transmit information about pain to their children. Social learning theory is frequently used to conceptualize the relationship between familial factors and childhood pain (Bandura, 1977; Craig, 1986) and applies two primary learning mechanisms, parental modeling and parental reinforcement of pain responses, to the etiology and maintenance of children's adaptive and maladaptive pain behaviors.

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Considerable research has focused on the impact of observational learning of pain within families (e.g., Osborne, Hatcher, & Richtsmeier, 1989; Routh & Ernst, 1984). Substantial experimental evidence supports the position that parents can exert a direct impact on children's pain experiences and pattern of expression through modeling reactions to painful stimuli (Goodman & McGrath, 1999). Empirical support for the impact of parental responses on children's reports of pain arises from two separate research areas: descriptions of parent-child interactions during episodes of acute pain and research examining the relationship between parental behaviors and chronic pain conditions in their children.

The results of research in acute pain settings (e.g., lumbar punctures) has indicated that some parent behaviors (i.e., reassurance, empathy, apologies, giving control, criticism) are associated with increases in children's distress during painful medical procedures, whereas other parent behaviors (i.e., nonprocedural talk, commands to use coping strategies, humor) are associated with decreases in child distress (Blount et al., 1989, 1997; Blount, Sturges, & Powers, 1990). These relationships are particularly strong, with one study finding that parent behavior accounted for 55% of the variance in child distress behavior (Frank, Blount, Smith, Manimala, & Martin, 1995). These studies largely examine the immediate distress of the child. But it also appears that certain parental behaviors (e.g., discouraging children's coping efforts, providing special attention) are associated with long-term distress, difficulties coping with pain, and the likelihood of developing chronic pain (e.g., Walker & Zeman, 1992; Walker, Garber, & Greene, 1993).

The important research outlined above describes correlations among certain types of parental behaviors and child pain and distress; however, prospective, experimental research is needed to elucidate the direct impact of parental behaviors within parent-child dyads on children's pain experiences. To date, only two studies have attempted to directly manipulate maternal behavior to systematically produce increases or decreases in children's distress behaviors. Gonzalez, Routh, and Armstrong (1993) randomly assigned mothers of 47 3- to 7-year-old children undergoing an injection procedure to a reassurance or distraction condition or a no training control group. Mothers received training in how they should interact through oral instruction, listening to an audiocassette demonstration, brief practice, and the posting of reminders. Results indicated that children in the distraction condition cried less during the procedure than children in the reassurance or no training groups. Although this experimental study confirmed some previous correlational findings, the children of mothers in the reassurance group did not manifest greater levels of behavioral distress than the control condition. A limitation of this study was that parents were trained to reassure their children on an artificial, time-driven schedule and the small sample size may have precluded significant findings.

More recently, Manimala, Blount, and Cohen (2000) randomly assigned 82 parents of children between the ages of 3 and 6 years undergoing immunization injections to either a reassurance, distraction, or control condition. They found that children in the distraction group evidenced the least amount of distress on several measures, whereas children in the reassurance group were restrained a greater number of times and were more fearful than other children. This study provides evidence of direct maternal effects on children's distress behaviors during a medical procedure, but it did not examine the impact of parental behavior on children's pain. The distinction between children's more general distress and pain is important as it has implications for etiological theories of pediatric pain and interventions are different for anxiety/distress and pain (Merskey & Bogduk, 1994; Powers, 1999).

This study provided a lab-based experimental investigation of the impact of maternal behavior on healthy school-age children's pain experiences. Mothers were the focus of this investigation as they have been reported to be more likely to reinforce child pain behaviors than fathers (Walker & Zeman, 1992). Unbeknownst to children, mothers were randomly assigned and trained to interact with their children in one of three ways during a cold pressor pain experience: (1) pain-promoting interaction, (2) pain-reducing interaction, and (3) no training control group. The labeling of the different maternal interaction types was based on the hypothesized direction of effects. Content of the training procedures was based on Blount et al.'s (1989) correlational data indicating links between parent behaviors and child distress. Children's pain experiences were measured by obtaining self-reports of intensity and affect, pain tolerance, coding of facial activity, and heart rate responsiveness. Given knowledge of gender differences in pain experi-

ences (Unruh, 1996), the relationship between children's gender and pain was also examined. Further, given reports that girls perceive their mothers as engaging in more illness behavior encouragement than do boys (Walker & Zeman, 1992), the possibility that girls would be more sensitive to parental behavior during pain was explored. Consequently, this study was a 2 (Child Gender: Boy versus Girl) × 3 (Maternal Interaction Type: Pain-Promoting versus Pain-Reducing versus Natural Reaction) between-subjects design.

We hypothesized that both boys and girls of mothers in the pain-promoting group would score higher on pain measures than children of mothers in the control group, who in turn would score higher than children of mothers in the pain-reducing group. Girls were expected to score higher than boys on the pain measures, regardless of maternal interaction type. Finally, an interaction between child gender and maternal interaction type was hypothesized; girls were expected to be more heavily influenced by the experimental manipulation than boys.

Method

Participants

The sample consisted of 120 (60 boys, 60 girls) healthy 8- to 12-year-old children ($M = 9.74$ years, $SD = 1.41$ years), and their mothers. Mother-identified ethnic breakdown of children was (1) Caucasian ($n = 83$); (2) Asian ($n = 13$); (3) Indo-Canadian ($n = 4$); (4) First Nations ($n = 1$); and (5) other (e.g., Asian/Caucasian) ($n = 18$). Mothers reported a mean age of 41.48 years (range = 27 to 55 years, $SD = 5.48$ years) and 70% reported being married. Families were middle to upper social class (Class II, Hollingshead Index; Miller, 1983). Children were randomly assigned to one of three groups with an equal number of boys and girls in each group: (1) a pain-promoting group ($n = 40$); (2) a pain-reducing group ($n = 40$); or (3) a control group ($n = 40$). This study was approved by the University of British Columbia Behavioral Research Ethics Board.

Apparatus

The cold pressor device consisted of a commercially manufactured cooler measuring 23.5 cm wide, 43.5 cm long, and 28.0 cm deep. There was a square opening in the lid (11 cm by 11 cm) through which children lowered their hand into ice-cooled water. A plastic porous screen separated the ice cube region from the compartment where the child's hand was immersed. The water was maintained at a temperature of 10 degrees Celsius ($+/- 1$ degree) and was circulated continuously by a pump to prevent local warming.

Measures

Pain Intensity. The Faces Pain Scale (Bieri, Reeve, Champion, Addicoat, & Ziegler, 1990) provides seven faces depicting increasing gradations of pain severity. Children were asked to choose a face to indicate their level of worst pain intensity during the cold pressor. The scale is scored from 0 to 6, where 0 = "no pain" and 6 = "most pain possible." This scale has shown good evidence of reliability, validity, and preliminary ratio scaling properties (Bieri et al., 1990).

Pain Affect. The Facial Affective Scale (McGrath, de Veber, & Hearn, 1985) provides nine faces ranging from "happiest feeling possible" to "saddest feeling possible." Children were asked to select the face that best represented how "unpleasant or yucky" they felt when they had their hand in the water. The scale is scored using affective magnitude ratings assigned to each face ranging from 0.04 to 0.97. This scale has good reliability and validity data (McGrath et al., 1985).

Pain Tolerance. The length of time (in seconds) the child voluntarily kept his or her hand immersed in the water was recorded.

Facial Expression. The Child Facial Coding System (CFCS) codes 13 discrete facial actions, 5 of which have been found to be indicative of pain in previous research (i.e., brow lower, eye squeeze, cheek raiser, nose wrinkler, upper lip raise) (Goodman & McGrath, 1999; Prkachin, 1992). The CFCS has shown good reliability and validity in the coding of children's responses to pain (Gilbert et al., 1999). Up to eight 10-second segments were coded for each child, depending on the length of time they left their hand in the water. A mean summary score for each of the five facial actions known to be indicative of pain was calculated across segments, with these summed together to yield a total CFCS ranging between 0 and 10. Twenty percent of segments were coded by a second trained coder and interrater reliability was .86.

Heart Rate. Heart rate (beats per minute) was measured using a Polar brand heart rate chest band and watch. Measurements were taken every 5 seconds and a mean heart rate score representing the entire time the child had his or her hand immersed in the water was calculated.

Procedure

Participants were recruited through community advertising. Interested families were asked to contact the research lab to learn more about the study and to schedule an appointment to participate. On the day of testing, the study was described as examining factors related to children's pain. Mothers and children then were separated, and mothers assigned to a training group were advised that the main purpose of the study was to examine the impact of maternal behavior on children's pain. Written informed consent was obtained and mothers were asked to provide basic demographic information. Children independently provided their assent to participate. Based on findings by Blount and colleagues, the *pain-promoting interaction* consisted of verbalizations designed to be reassuring; provide empathy, apologies, or mild criticism; and give control to the child. The *pain-reducing interaction* consisted of verbalizations designed to distract the child with nonprocedural talk, humor directed to the child, and commands to engage in coping strategies. Mothers in the *no training control group* were simply asked to interact with their children as they normally would.

Mothers were not aware of the hypothesized impact of their training. Training followed a four-step process: (1) verbal instruction and discussion, (2) a sheet of written reminders, (3) video demonstration, and (4) role modeled practice. Mothers were asked to use at least three of the verbalizations before the child submerged his or her hand in the water, and then at least six verbalizations while the child had his or her hand in the water (equivalent to the rate of 1.5 verbalizations per minute). Mothers in the control condition were shown a video generally describing current research projects in the lab and were given verbal and written instructions describing the procedure, but not specifying how they should interact.

After children and mothers were reunited, they were asked to wait for 2 minutes. When they heard an audible "beep," children were to lower their left hand into the water, just past the wrist-fold. Children were asked to leave their hand in the water as long as they possibly could, but were advised that they could remove their hand from the water at any time if they felt they could not tolerate it anymore. Otherwise, another "beep" after 4 minutes would signal that it was time to remove their hand from the water. The research assistant waited in another room. Children's facial expressions were videotaped through a one-way mirror and mothers' verbalizations were audiorecorded.

Following the 6-minute period, or the child's removal of his or her hand from the water, whichever occurred first, the research assistant returned to the room to obtain the child's self-reports of intensity and affect, the order of which was randomized for each child. The mother and child were then again separated to be asked additional questions. Children were asked to rate on a 5-point scale ranging from "not at all" to "a lot" the degree with which they had noticed anything "different or weird" about how their mom was acting with them. Mothers in the two training groups provided ratings on a 5-point scale ranging from "not at all" to "a lot" indicating how difficult it had been to interact with their child in the assigned manner. After being reunited again, mothers in the control group were debriefed as to the true purposes of the study. A thorough debriefing was conducted with each child.

The tapes of mother-child interactions during the 2-minute waiting period and up to 4-minute pain period were reviewed. A research assistant transcribed parent verbalizations. An additional research assistant reviewed all transcriptions and any disagreements were resolved through discussion. The verbalizations were then coded into the pain-promoting, pain-reducing, or a neutral category using the Child-Adult Medical Procedure Interaction Scale–Revised (CAMPIS-R) system, which has shown excellent reliability and validity data across a number of studies (Blount et al., 1997). The number of verbalizations provided by mothers in each of the categories was calculated as a rate per minute score for both the waiting and pain periods. Twenty percent of verbalizations were coded by a second coder. Percent agreement was calculated to be 92.2%.

Results

Manipulation Check

A series of 3 (Maternal Interaction Type) × 2 (Child Gender) analyses of variance (ANOVAs) was used to examine group differences on the continuous mea-
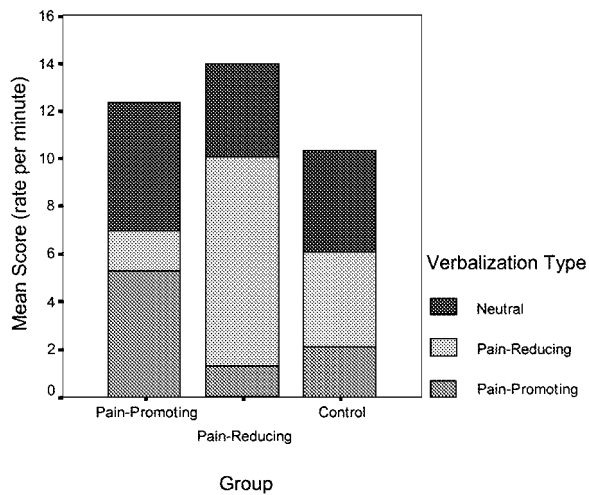
Figure 1. Maternal verbalization use (rate per minute) as a function of maternal interaction type during the pain period.

sures (e.g., child's age). Chi-square analyses were used to examine group differences on the categorical measures (e.g., child's ethnicity). Results revealed no significant group differences for maternal interaction type or child gender on any of the demographic measures.

Maternal verbalization use as a function of maternal interaction type during the pain period is depicted graphically in Figure 1. A series of 3 (Maternal Interaction Type) × 2 (Child Gender) ANOVAs examined group differences in verbalization use as a function of maternal interaction type and child gender. Mothers in the pain-promoting group provided significantly more pain-promoting verbalizations than mothers in the pain-reducing group and mothers in the control group, both during the waiting period and the pain period. There were no differences in the number of pain-promoting verbalizations provided by mothers in the pain-reducing group and the control group. In addition, mothers in the pain-reducing group provided more pain-reducing verbalizations than mothers in the control group, who in turn provided more pain-reducing verbalizations than mothers in the pain-promoting group, both during the waiting period and pain period. There were no group differences in maternal verbalizations as a function of child gender during either the waiting or pain period. Pain-promoting verbalizations were primarily conveyed through parental use of reassurance, followed by apologies, empathy, and giving control. There were very low rates of criticism. Pain-reducing verbalizations were fairly evenly divided among nonproce-

dural talk, humor, and commands to use coping strategies. Children's ratings of whether they had noticed anything "weird or different" about their mom (where 0 = "not at all" and 4 = "a lot") and mother ratings of how difficult it had been for them to behave in the desired manner (where 0 = "not at all" and 4 = "a lot") were low, 0.69 (SD = 1.19) and 0.55 (SD = 0.87), respectively, and did not differ as a function of maternal interaction group and child gender.

In summary, the training successfully varied in the desired manner the types of maternal verbalizations offered during the waiting and pain periods of the cold pressor task. Child-rated suspiciousness was low and mothers reported adhering to training with relative ease. As shown in Figure 1, mothers in both of the training groups, on average, considerably exceeded the proposed 1.5 verbalizations per minute.

Relationships Among Measures

To assess the degree of convergence among the various dependent measures, we conducted correlational analyses. Intensity and affect measures were moderately correlated (r = .45, p< .01); children reporting higher levels of pain intensity also reported higher levels of negative affect. Tolerance was negatively correlated with the intensity and affect measures (rs = −.34 and −.29, ps < .01). Scores on the heart rate and facial activity measures were not significantly correlated with each other or the self-report or tolerance measures (rs = −.17 to .03). Child age was significantly correlated with the two self-report measures (rs = .19 and .18, ps < .05); younger children reported lower levels of intensity and negative affect than older children.

Effects of Maternal Interaction Type

The means and standard deviations of children's scores on each of the dependent measures, as a function of maternal interaction type and child gender, appear in Table I. Given the significant correlations, the two self-report measures and pain tolerance were entered together into a 3 (Maternal Interaction Type) × 2 (Child Gender) multivariate analysis of covariance (MANCOVA), with Child Age entered as a covariate. Using Wilks's lambda as the multivariate test, the MANCOVA yielded a significant multivariate main effect for Maternal Interaction Type, F(6, 222) = 2.84, p = .01, and a significant multivariate interaction effect between

Table I. Means (and Standard Deviations) of Scores on the Dependent Measures as a Function of Maternal Interaction Type and Child Gender

	Pain-promoting group		Pain-reducing group		Control group	
	Boys	Girls	Boys	Girls	Boys	Girls
Pain intensity	3.55 (1.82)	4.40 (1.27)	3.65 (1.73)	2.60 (1.47)	3.10 (1.71)	3.45 (0.94)
Pain affect	0.55 (0.27)	0.68 (0.22)	0.67 (0.22)	0.70 (0.13)	0.60 (0.28)	0.61 (0.19)
Pain tolerance	128.60 (95.61)	163.70 (98.02)	113.35 (96.66)	143.15 (91.82)	146.30 (96.89)	156.55 (94.01)
Heart rate	94.32 (9.08)	89.24 (12.18)	94.67 (9.31)	93.81 (11.98)	92.37 (11.62)	94.00 (8.18)
CFCS	2.06 (1.24)	1.08 (0.50)	1.98 (1.04)	1.53 (0.72)	1.41 (0.80)	1.22 (0.83)

CFCS = Child Facial Coding System.

Maternal Interaction Type and Child Gender, $F(6, 222) = 2.18$, $p < .05$. Child Age as a covariate was also significant, $F(3, 111) = 4.04$, $p < .01$. The multivariate main effect of Child Gender was not significant, $F(3, 111) = 1.47$, $p > .05$.

A series of follow-up 3×2 univariate analyses of covariance (ANCOVAs), with Child Age as a covariate was conducted to probe the significant multivariate effects. There were no significant main effects or interactions when tolerance or affect were used as the dependent variables. When intensity was used as the dependent variable there was a significant main effect for Maternal Interaction Type, $F(2, 113) = 3.97$, $p < .05$. However, this main effect was superseded by a significant interaction effect between Maternal Interaction Type and Child Gender $F(1, 113) = 3.94$, $p < .05$). This interaction effect is depicted in Figure 2. The main effect for Child Gender was not significant, $F(1, 113) = 0.39$, $p > .05$. Child Age was a significant covariate when self-reported pain intensity and affect were used as dependent measures, $F(1, 113) = 5.77$, $p < .05$, and $F(1, 113) = 4.31$, $p < .05$, respectively. Given that the Maternal Interaction Type × Child Gender interaction was significant when using intensity as the dependent measure, two separate one-way ANCOVAs examined differences as a function of maternal interaction type separately for boys and for girls. For boys, there were no significant differences in intensity as a function of Maternal Interaction Type, $F(2, 56) = 0.48$, $p > .05$. Age was not a significant covariate, $F(1, 56) = 2.24$, $p > .05$. However, for girls there was a highly significant effect of Maternal Interaction Group, $F(2, 56) = 10.98$, $p < .001$. Age was a significant covariate, $F(1, 56) = 4.15$, $p < .05$. As illustrated in Figure 2, follow-up Student-Newman-Keuls post-hoc testing (with alpha set at $p < .05$) revealed that girls of mothers in the pain-promoting group reported higher levels of pain intensity than girls of mothers in the control group,

who in turn reported higher levels of pain intensity than girls of mothers in the pain-reducing group.

An additional 3 × 2 ANOVA was used to examine differences in children's CFCS scores (the facial expression measure). Results indicated a significant main effect of Child Gender, $F(1, 114) = 11.25$, $p < .01$; boys had significantly higher CFCS scores than girls, with higher scores indicating more frequent facial expressions suggestive of pain. The main effect of Maternal Interaction Type, and the interaction between Maternal Interaction Type and Child Gender, were not significant, $F(2, 114) = 2.42$, $p > .05$, and $F(2, 114) = 2.07$, $p > .05$, respectively. A final 3 × 2 ANOVA was used to examine differences in children's heart rate scores. Results indicated no significant main effects for Maternal Interaction Type, $F(2, 114) = 0.55$, $p > .05$, Child Gender $F(1, 114) = 0.56$, $p > .05$, or interaction between Maternal Interaction Type and Child Gender, $F(2, 114) = 1.04$, $p > .05$.

Discussion

This study provides experimental support for the position that maternal behavior can play a causal role in determining children's pain experiences. As hypothesized, when controlling for the effects of age, girls whose mothers interacted with them in a manner expected to be pain-promoting reported higher levels of pain intensity during the cold pressor than girls in the control group, whose mothers reacted spontaneously. In turn, the daughters of the control group mothers reported higher levels of pain intensity than did girls whose mothers had interacted with them in a pain-reducing manner. This finding is consistent with prior correlational research examining the relationship between certain pain-moderating parental behaviors and child distress (Blount et al., 1989; Walker & Zeman, 1992).
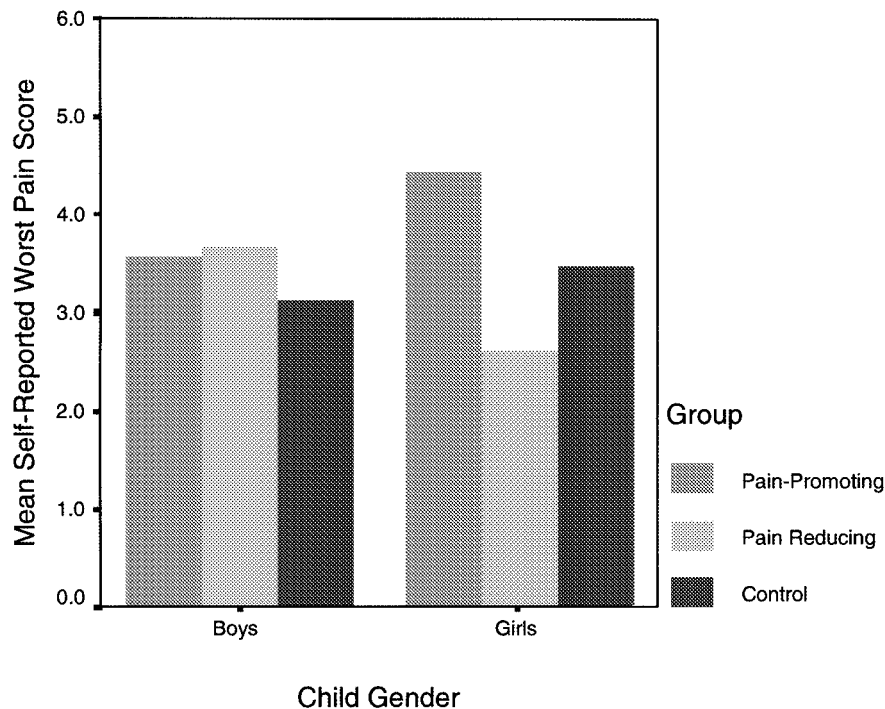
Figure 2. Children's self-reported pain intensity scores as a function of child gender and maternal interaction type.

The outcome of this experimental study also builds on the previous correlational findings by demonstrating a direct impact on daughters' subjective reports of pain, rather than the more general construct of distress.

It is interesting to consider why maternal interaction type had an effect only on the self-reports of pain intensity for girls, not boys. Prior research has indicated that girls may be more sensitive to their parents' behavior regarding pain symptoms (Walker & Zeman, 1992). Therefore, it is possible that girls in this study were more aware of and reactive to their mothers' behavior during the cold pressor than boys. Another possible explanation would be that the pain responses of the 8- to 12-year-old boys who participated in this study had already been well socialized and were not as susceptible to maternal influence as the responses of the girls. These potential explanations deserve further study.

Despite the counterintuitive yet consistent finding of parental behaviors such as reassurance being linked to increases in child distress (Blount et al., 1989), there has been relatively little critical consideration of the mechanisms whereby this happens. Consistent with a social learning perspective (Bandura, 1977; Craig, 1986), parental verbalizations and nonverbal behavior may function primarily as signals for parental anxiety or concern and precipitate children's behavioral distress. In addition, these particular parental behaviors may serve to reinforce children's pain and distress behaviors as the interaction progresses. A quotation from a recent award-winning children's novel illustrates this phenomenon: "If an adult tells you not to worry, and you weren't worried before, you better hurry up and start because you're already running late" (Curtis, 1999, p. 42). Further study of the complexities of parent-child interactions during pain is clearly warranted.

In contrast to our hypotheses, there was no impact of maternal interaction type on children's pain affect, tolerance, facial activity, or physiological reactiveness. One possible explanation for an absence of maternal influence on these measures would be findings indicating that nonverbal behavioral, physiological, and emotional reactions to pain are more deeply entrenched and less amenable to external influences than self-reports of pain intensity (Craig, 1998). Indeed, if the long-term impact of socialization and parental influences were as powerful as has been hypothesized, it is impressive that a time-limited (6 minute or less) experimental session could override a lifetime of learned parent-child interactions surrounding pain symptoms and take effect on at least one component of the children's pain experience. In addition, significant findings on

the nonverbal and physiological measures, as a function of maternal interaction type, may have been masked by variability introduced by individual difference variables such as children's coping skills or pain-sensitive temperament (Chen, Craske, Katz, Schwartz, & Zeltzer, 2000).

There was a lack of congruence among the various pain measures included in the study. This was not unexpected, given previous accounts of discordance among multiple measures of pediatric pain (Beyer, McGrath, & Berde, 1990). This finding is consistent with a multidimensional view of other emotional and psychological states and likely reflects the complex nature of the pain experience (Merskey & Bogduk, 1994).

In contrast to previous findings (Unruh, 1996), boys in this study evidenced higher scores on the facial activity measure than girls, and younger children reported lower levels of pain intensity and affect than older children. Previous research examining age and gender differences in children's pain has been conducted with the children's knowledge that they were being watched and their behavior recorded. It is possible that a different pattern of pain reactivity occurs when children are unaware that their behavior is being watched except by their mothers. Research confirms that children do report varying their emotional expression in the presence of different audiences (Zeman & Garber, 1996). The unique nature of the pain stimulus and the restricted range of scores for age might also have contributed to these findings. Further, although not examined in this study, pubertal status may play a role in influencing age-related differences in pain expression.

Several limitations of this study should be noted. No direct attempt was made to control or monitor mothers' nonverbal behaviors in this study. Future studies should attempt to explore the relative influences of verbal and nonverbal behaviors within the context of parent-child interactions during pain. An examination of the impact of paternal behavior on boys' and girls' pain responses is also warranted. In addition, this study was a lab-based experimental study using an atypical pain stimulus. While these restrictions increased experimental control and improved maternal adherence to training, the generalizability of findings to other types of pain, groups of children, and types of families is not known.

Parents have long been hypothesized to be influential forces in shaping how their children respond to pain. The results of this study build on previous correlational research and provide evidence that mothers can play a direct role in influencing their daughters' subjective reports of pain. Although future research is needed to extend these findings beyond the laboratory and to different samples of children, this research provides important information regarding how mothers verbally transmit information to their children about pain.

Acknowledgments

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