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# Preschoolers' Emotion Regulation Strategy Understanding: Relations with Emotion Socialization and Child Self-regulation

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## Abstract

*Preschool-age children's ability to verbally generate strategies for regulating anger and sadness, and to recognize purported effective strategies for these emotions, were examined in relation to child factors (child age, temperament, and language ability) and maternal emotion socialization (supportiveness and structuring in response to child distress). The relation between strategy understanding and actual self-regulation was also examined. In a sample of 116 boys and girls, 4-year-olds recognized and generated strategies for anger more than 3-year-olds but 3- and 4-year-olds recognized and generated strategies similarly for sadness. Age effects for strategy generation were explained by expressive language skill. Maternal support in response to child distress was related to strategy recognition and generation but in different ways. Maternal structuring was related only to strategy generation for anger. Child strategy understanding of anger and sadness predicted different child behaviors when children had to deal with frustration alone. The findings suggest that emotion regulation strategy understanding can be assessed in young children and that such understanding has implications for self-regulatory behavior.*

*Keywords:* emotion understanding; emotion socialization; self-regulation; preschool-age children

## Introduction

Understanding one's emotional life is believed to be a central component of children's socio-emotional competence and adjustment (Crick & Dodge, 1994; Halberstadt, Denham, & Dunsmore, 2001; Saarni, 1999). Emotional understanding develops throughout the life span but the years between a child's third birthday and entry into kindergarten are particularly noteworthy for substantial gains in emotional

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understanding. During these years, children increasingly show that they understand that certain types of situations evoke particular emotions, facial expressions signal particular emotions, and emotions influence behavior and can be used to influence others' emotions (Bartsch & Wellman, 1995; Bretherton, Fritz, Zahn-Waxler, & Ridgeway, 1986; Brown & Dunn, 1991; Dunn, 1991; Dunn & Brown, 1991; Harris, 1994; Lagattuta, Wellman, & Flavell, 1997; Masters, Ford, & Arend, 1983; Stein & Levine, 1989; Stipek & DeCotis, 1988).

Emotion understanding in early childhood has been associated with a child's general socio-emotional competence (see Denham, 1998; Saarni, 1999 for integrative summaries). Less is known, however, about (1) the development of understanding how emotions can be regulated and (2) whether such understanding has implications for a child's actual self-regulation (Lemerise & Arsenio, 2000). Spontaneous self-regulation of emotion begins as early as the first year of life (e.g., Rothbart, Ziaie, & O'Boyle, 1992) but these efforts are not conscious, planned strategies, which may be one reason they are of limited effectiveness (Buss & Goldsmith, 1998). The ability to access a number of strategies that may modify emotion should enhance a child's ability to self-regulate in times of distress.

Explicit awareness of emotion regulation strategies likely emerges between ages 3 and 5 years (Denham, 1998; Denham & Kochanoff, 2002a, 2002b; Denham et al., 2002; Lemerise & Arsenio, 2000), a period during which children come to understand the nature of the mind and of the relation between internal states and external behavior (e.g., Baird & Moses, 2001; Gopnik, Slaughter, & Meltzoff, 1994; Gopnik & Wellman, 1994; Leslie, 1994; Wellman, Cross, & Watson, 2001). In the present study, 3- and 4-year-old children's understanding of how to 'stop' feeling intensely angry or sad was assessed using puppets that prompted children to (1) spontaneously verbalize strategies in response to the puppets' pleas for help, and (2) choose, from pairs of strategies suggested by the puppets, the 'best' strategy (defined as strategies that are effective and appropriate in studies of early childhood emotional self-regulation).

Three assumptions concerning the importance of strategy understanding for the development of emotion regulation were examined: (1) explicit understanding of emotion regulation strategies develops between the child's third birthday and the end of the fourth year, (2) its emergence is promoted by parental responses to child emotion that are both supportive and instructive, that is, affirming of a child's experience and structuring the ability to self-regulate, and (3) understanding appropriate, effective regulatory strategies enhances actual behavioral self-regulation in an emotionally challenging situation. In addition, the present study examined whether there are early gender differences in emotion understanding (Denham et al., 2002; Maccoby, 1998).

### *The Development of Emotion Understanding*

By the age of five, most typically developing children can identify emotions that are elicited by challenging circumstances, describe steps that parents take to alleviate child distress, and conceive of strategies they might use to deal with everyday stress (Band & Weisz, 1988; Denham, 1997; Denham & Zoller, 1991; Fabes, Eisenberg, McCormick, & Wilson, 1988; Harris, Olthof, & Terwogt, 1981; McCoy & Masters, 1985, 1990; Meerum Terwogt & Olthof, 1989; Rossman, 1992; Stein & Levine, 1989). In the preschool years, children's ideas about coping strategies typically aim to alter the situation rather than modify internal states (Banerjee, 1997; Brown, Covell, & Abramovitch, 1991; Flavell, Flavell, & Green, 2001; Kalish, 1997). Preschoolers,

however, tend to identify both appropriate *and* inappropriate strategies (e.g., aggression) for regulating negative emotion states (Denham, 1998; Eisenberg & Fabes, 1992; McCoy & Masters, 1985; Saarni, 1997). Thus, their knowledge is limited and may not be particularly helpful in actual situations when they need to regulate their own reactions. On the other hand, between the ages of 3 and 4 years, children acquire a myriad of new skills, including developing a theory of mind (Gopnik & Wellman, 1994; Gopnik et al., 1994; Wellman et al., 2001), beginning to delay dominant responses in rule-governed ways (Carlson, 2005), and spontaneously attempting to regulate the display of emotion without adult support (Cole, 1986). Arguably, 3- and 4-year-olds who have acquired an understanding of appropriate, effective strategies should select and deploy strategies that help them deal well with a frustrating situation. In the present study, we included strategies that are thought to be effective and that children use, specifically problem-solving (support-seeking and self-directed instrumental efforts to fix a problem), switching to a more pleasing activity, and cognitive self-distraction (e.g., Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001)

#### *Parental Contributions and Child Emotion Regulation Understanding*

The development of strategy understanding is likely to require input and guidance from caregivers. A host of studies suggest that children whose parents guide them sensitively through life are socially and emotionally competent. In terms of the development of emotion understanding, if a parent is emotionally supportive when a child is unhappy *and* uses the experience to teach the child to cope, the child is presumed to acquire emotional awareness and understanding which in turn promote effective self-regulation (Denham, 1989, 1993, 1997; Denham & Grout, 1993; Eisenberg, Cumberland & Spinrad, 1998; Gottman, Katz, & Hooven, 1997; Parke, 1994).

Parental emotional support and teaching of child self-regulation are complementary aspects of optimal parental responses to children's emotions. A parent can rely primarily on one or the other but the literature implies that optimal parenting involves both a warm acceptance of a child's emotions and guidance in how to manage emotions. A parent who is an emotional 'coach,' for example, communicates empathic tolerance of the child's distress but also uses the experience as a learning opportunity (Gottman et al., 1997; Parke, 1994). A parent who is primarily supportive (e.g., sympathetic and soothing) but takes care of situations for the child may be less likely to provide an interpersonal structure for the child's attempts to self-regulate; the parent teaches the child that negative emotions are manageable but does not cultivate practice in deploying specific strategies. Alternatively, a parent can prompt and guide the child to self-regulate without communicating warmth and tolerance of emotion. This child may feel pushed to cope independently but is not sure that emotions are acceptable; the child may prefer not to think about emotions and strategies or may understand strategies but be less able to use them effectively.

Given the importance of early childhood emotion regulation strategies such as self-distraction and verbalizing about problems (rather than crying or behaving disruptively), we assume that both structuring and supportiveness are important aspects of parental responses. Parents who encourage a child to divert attention and to use language to deal with distress, structure the *self*-regulation of emotion. A child who has these learning opportunities then may learn about self-regulatory strategies in a way that promotes the child's verbal access to these ideas and therefore, more ability to spontaneously verbalize strategies. Emotional support in the form of soothing, positive

emotional expression, affection, and instrumental assistance takes care of distress *for the child* (Denham & Kochanoff, 2002a, 2002b; Denham, 1997). Children who are accustomed to being supported learn, implicitly, that emotions can be managed and this may help them recognize effective, appropriate strategies, but structuring may be essential to being able to readily access and verbalize strategies. In sum, caregiving that is both emotionally supportive and that structures self-regulation may have its effect on child social emotional competence through the child's acquisition of understanding of emotion regulation strategies (Denham, 1997; Denham, Mitchell-Copeland, Strandberg, Auerbach, & Blair, 1997; Raikes & Thompson, 2006). These two dimensions of parental responses can occur during the same child emotional episode but they need not and thus there is potential that they may differentially influence specific forms of emotion understanding.

The present study examines the specific relations between parental support and structuring in response to child negative emotion and two aspects of children's emotion understanding—the ability to spontaneously verbalize effective and appropriate emotion regulation strategies and the ability to recognize effective, appropriate strategies. We test the prediction that parental structuring of self-regulation promotes child strategy understanding and particularly so in the context of emotionally supportive parenting.

### *Child Contributions to Emotion Regulation Understanding*

Conceiving of and recognizing effective, appropriate strategies may require that a child has good verbal skills. Verbal ability is associated with other forms of understanding about internal states (e.g., Cutting & Dunn, 1999). The method developed for the present study accommodated the limitations of 3- and 4-year-olds' verbal abilities by including procedures, that is, a recognition task, which did not require a child to speak, as well as a component that allowed children to spontaneously verbalize strategies. Although the former approach reduces the demand on the child to perform verbally, it is nonetheless the case that understanding of emotion regulation strategies may depend upon the child's language development. Therefore, the child's mean length of utterance (MLU) was calculated on the basis of natural speech during a free play period and used as an index of linguistic skill in predicting emotion regulation strategy understanding.

A child's understanding of regulatory strategies may also be influenced by child temperament. The more emotionally reactive a child is, the more potential opportunities the child has to learn about regulating emotion. On the other hand, highly reactive children might have difficulty understanding their experiences because they become too upset and miss learning opportunities. Virtually nothing is known about these relations. To account for the possible influence of child temperament on strategy generation and recognition, the analyses include the mean score for negative emotionality from a maternal report of child temperament.

Finally, child gender may play a role in emotion regulation understanding. Evidence suggests that girls may be more emotionally aware and have more accurate or elaborate emotion understanding than boys (Bajgar, Ciarrochi, Lane, & Deane, 2005; Casey, 1993; Hughes & Dunn, 2002), perhaps due to differential socialization (e.g., Fivush, Brotman, Buckner, & Goodman, 2000). On the other hand, in terms of emotion socialization, the quality of maternal emotion talk predicts emotion understanding in boys and not girls (Martin & Green, 2005). None of these studies address

understanding of strategies. The findings are also mixed in regard to gender differences in children's strategy use, which emerge mainly in high risk samples (e.g., Cole, Zahn-Waxler, & Smith, 1994; Silk, Shaw, Skuban, Oland, & Kovacs, 2006). We examine the possibility that gender is a factor in children's strategy understanding.

### *Methods of Assessing Young Children's Emotion Understanding*

Important breakthroughs in revealing young children's social and emotional understanding have used techniques that engage the child's interest and lower demands on expressive language and memory. Previous studies suggest that preschoolers respond well to methods that provide a realistic context and capitalize on the child's ability to express understanding through play (e.g., Denham & Couchoud, 1990; Denham, 1997). Pictures and dolls are commonly used (e.g., the MacArthur story stems). Puppets also appear to be useful in eliciting preschool-age children's self-perceptions and emotion knowledge (Denham & Couchoud, 1990; Eder, 1990; Measelle, Ablow, Cowan, & Cowan, 1998). In addition to the materials, wording is critical; young children appear to understand questions about emotion regulation when they are asked to consider 'stopping' a negative emotion (Denham, 1997). In the present study, we devised a puppet technique to assess preschoolers' generation and recognition of appropriate, effective strategies for how to 'stop' feeling strong anger or sadness.

### *The Present Study*

In sum, the present study involved three predictions. Firstly, it was expected that 4-year-olds would be more likely than 3-year-olds to generate and recognize effective and appropriate strategies. We examined whether these age differences may involve expressive language skills, using independent assessment of children's natural speech during a free play. Secondly, we expected that maternal emotional supportiveness, without structuring of self-regulation, might predict recognition of effective, appropriate strategies, and maternal structuring—particularly if the mother is also emotionally supportive—predicts the child's verbal generation of effective, appropriate strategies. Thirdly, because emotion understanding is related to general social emotional competence in children, it was predicted that understanding of emotion regulation strategies should be associated with an important self-regulation skill, the ability to persist despite frustration. We expected that children who understand strategies for emotion regulation should be able to work on a task that was difficult to solve, without becoming disruptive or seeking support. We controlled for child temperament, which can influence children's reactivity to challenging tasks (Posner & Rothbart, 2000) and tested for potential interactive effects of emotion understanding and parenting on child emotion regulation (Denham, 1997).

## **Method**

### *Participants*

Preschool-age children and their mothers were recruited through area preschools, newspaper advertisements, and birth announcements in a small city in semi-rural Pennsylvania. Interested parents contacted a special phone number, received details of the study and then scheduled a visit. Through these efforts, 116 children (59 boys, 57

girls) between the ages of 3 years, 0 months and 4 years, 11 months enrolled in the project. The participants were predominantly White American. Family income, based on 96 mothers who were willing to provide this information, ranged from \$20 000 to \$200 000, with a mean income of \$60 187 ( $SD = \$30\ 355$ ), which is representative of the community from which they were recruited. The assistants who administered the procedures were female graduate or undergraduate students, including the second and fourth authors.

### *Procedures*

To participate, each child and mother spent approximately one hour at a child study center on a single occasion. After being greeted and escorted to a small observation room, a fixed sequence of procedures was administered. This session included a warm-up period, administration of the strategy understanding task, and a series of fun and challenging tasks, several of which were used in the present study (see below). Mothers completed a child temperament questionnaire prior to the laboratory session.

*Child Strategy Understanding.* To assess preschool-age children's awareness of emotion regulatory strategies, a puppet procedure was designed. As shown (see Appendix for full script), the procedure began with a warm-up period during which the children were encouraged to interact with the puppets. Three cloth puppets (Brownie, Red, and Mom) were used to enact three vignettes. The first vignette involved the puppets being happy and was used as a training item. The other two focused on sadness and anger. To encourage engagement in the stories, children were invited to interact with the puppets during the vignettes (e.g., waking up a napping puppet).

In each story, the reasons for the puppets' emotions and for needing to 'stop' feeling so angry or sad were enacted for the child. Again, this choice of words was based on Denham's (1997) finding that the word 'stop' seemed to facilitate understanding of emotion regulation in young children. One research assistant was the puppeteer; she sat on the floor across from the child, resting her wrists on the edge of a child size table. A second assistant sat next to the child, helping the child understand the story line of each vignette and the instructions. A third assistant videotaped the procedure from behind a two-way mirror.

Each vignette ended with the puppets turning to the child and directly asking, '[Child's name], what can we do to stop feeling so [target emotion]?' The child then had the opportunity to make suggestions to the puppets; from these spontaneous suggestions, we coded strategy generation. If a child did not initially make any suggestion after 30 seconds, the assistant prompted the child by repeating the dilemma and the question. For all children, regardless of whether they spontaneously spoke to the puppets, the procedure continued to the strategy recognition portion. In this section, the child had three opportunities to recognize a purportedly effective, appropriate strategy. Each puppet verbalized a strategy, one effective and appropriate strategy derived from the literature on emotion regulation and one parallel strategy that is regarded, under ordinary circumstances, as socially undesirable (e.g., hitting) or less effective (e.g., dwelling on a problem when one cannot do anything about it). Pictorial representations were used to illustrate mental strategies and the puppets enacted behavioral strategies.

The order of the pairs of strategies began with an effective strategy for half the children and ineffective one for the other half. Subsequent analyses indicated that this

variation in order did not produce an effect. For each pair of strategies, the child was asked to tell the puppets which strategy was the ‘best’ (also in Appendix). The child could respond by speaking or pointing to a puppet or picture. The child’s selection of the better strategy was scored as recognition of an effective, appropriate strategy. The puppet who suggested a purported effective strategy was also alternated.

*Mother–Child Interaction during a Challenging Wait.* To assess the degree to which mothers supported and/or structured their children’s negative emotions, mother and child were observed during a challenging wait (Carmichael-Olson, Greenberg, & Slough, 1985). After a free play between mother and child, the research assistant returned to the observation room and the free play toys were collected. The assistant left with those toys and immediately returned with the wait task materials (a brightly wrapped surprise, a boring toy, and a clipboard with questionnaires).

Prior to this task, when she was not in the same room as the child, the mother was coached in the procedure. She was shown the task materials and given instructions about how to administer the task, both orally and in written form. She kept the written instructions with her during the procedure to facilitate uniformity and compliance with the wait instructions to the child. In previous work we found this coaching increased mother’s ease and compliance with the task and eliminated a potential problem of mothers’ finding the situation funny. Thus, child emotional reactions were to the circumstances of the wait and not a reaction to mother tension or humor.

Subsequently, when the wait task was to begin, the assistant handed the clipboard to the mother, saying ‘Here is the work I told you about.’ The assistant then gave the child a broken toy (‘Here is a toy for you to play with’), and placed a brightly wrapped surprise on the table across from the child. The mother, as previously instructed, told the child, ‘This surprise is for you but you have to wait until I finish my work to open it.’ The mother had been told that she was free to interact with her child as she normally would when she needed to work and the child needed to wait. After 8 minutes, the assistant returned and the mother let the child open the surprise (a set of magnetic marbles). The child played with the marbles for a brief time. The marbles were then placed in a clear plastic bag for the child to take home and remove from the room.

*Child Behavior in a Frustrating Situation.* To assess whether preschoolers’ understanding that emotions can be regulated is related to how they behave in a challenging task, we used the transparent box procedure from the laboratory temperament assessment battery (LabTab; Goldsmith, Reilly, Lemery, Longley, & Prescott, 1995). This task is designed to elicit anger-related emotions in young children. The box was a large, clear, acrylic box, with a metal lock. The child is shown two figurines and allowed to select one. This figurine was then placed in the box and the box was locked. The child is then shown how to open the lock with a set of two keys. The child is allowed to practice opening the lock and the box. The assistant then tells the child that she needs to do something in another room and will be back shortly. The child is told, ‘I’m going to find your mom. I will let you work on that for a while. When you open the box, you can play with the toy inside.’ To elicit frustration, the task then requires the assistant hand the *wrong* set of keys to the child, without the child realizing a switch was made.

The child is left to try to open the locked box for 3 minutes. Upon her return, the assistant asked the child whether the box was opened, asked why the child could not open the box (to check whether the child realized that the wrong keys were given),

acknowledged that she must have given the child the wrong keys, and helped the child open the box and get the figurine. The child was given the figurine as a gift to take home.

*Child Language Ability.* To assess potential effects of child language ability on strategy understanding, particularly the spontaneous verbal generation of strategies, speech samples were transcribed from the first 4 minutes of the free play with mother. From these transcriptions, MLU was calculated.

*Child Temperament.* To assess potential influences of child emotional reactivity and regulation on children's strategy understanding and to control for their influence on frustration and self-regulation during the transparent box task, the child behavior questionnaire (CBQ; Rothbart, Ahadi, & Hershey, 1994; Rothbart, Ahadi, Hershey, & Fisher, 2001) was administered to mothers. The CBQ is a commonly used, well-established parental report of child temperament measure, which has been factor analyzed and consistently finds negative affectivity ( $\alpha = .55$ ) and effortful control ( $\alpha = .70$ ) to be two robust factors. Scores for each factor were sums of the average rating for each item that loads on the subscales that comprise these factors.

### *Measures*

*Strategy Generation.* Children's spontaneous verbalizations in response to the queries about what the puppets can do to stop feeling angry (or sad) were transcribed from videotapes of the puppet procedure. All statements were transcribed. A team of trained coders then read the transcriptions to locate emotion regulation strategies. To ensure the reliability of transcription, 20 percent of the videotapes were transcribed independently by two individuals. The first and third authors reviewed the transcripts and found they were virtually identical.

An emotion regulation strategy was defined by behavior or ideation that is described in the literature as an effective and context-appropriate way to manage negative emotion or act upon the problematic situation. Children's strategies were classified as one of three types by a team of undergraduate coders who were trained by the third author. The strategy types were: (1) self-focused internal, that is, use of ideation to change internal state (e.g., just think about something else), (2) self-focused external, that is, use of action to change internal state (e.g., when I'm cranky I take a nap), and (3) problem-focused, that is, behavior directed at changing the situation (e.g., you can put up signs that say your puppy is lost). Kappa was used to assess reliability based on 20 percent of cases (all  $\kappa$  were  $\geq .69$ ). The total number of spontaneously verbalized strategies, regardless of type, was summed for each vignette. These two sums were the variables used in data analyses.

*Strategy Recognition.* Children's choices for the 'best' thing to do of the pairs generated by the puppets were recorded by the assistant present during administration. The number of 'effective' strategies chosen was summed for each vignette. These two sums were the variables used in data analyses.

*Observed Behavior during the Transparent Box Task.* A team of trained coders classified child behavior during this task designed to engender frustration. Undergraduate coders were trained to identify whether any of a finite set of behaviors occurred

during each 5-second epoch of the 3-minute task. The target behaviors and their operational definitions were: (1) persistence, that is, trying to open the box with the key in an appropriate and not overly forceful manner; (2) alternative problem-solving, that is, trying a different, appropriate strategy, for example, trying a different key, checking to see if the lid could be opened another way; (3) support-seeking, that is, trying to find help (e.g., calling out for help, looking out the door for someone); (4) distraction, that is, shifting attention to a different activity instead of focusing on opening the box; and (5) disruptive behavior, that is, engaging in socially unacceptable behavior (e.g., cursing, trying to break or damage the box). Inter-rater reliability was estimated based on approximately 20 percent of the cases. Reliability estimates were acceptable, with an average kappa of .83 (range was .70–.96). The total number of epochs for each of the five strategies was summed and these variables were used for data analyses.

*Maternal Response to Child Negative Emotion.* Maternal responses to her child's negative emotions were assessed during the 8-minute challenging wait. *Maternal structuring* was counted each time the mother provided structure for the child to self-regulate when the child expressed negative emotion. Maternal structuring was defined by suggesting the child redirect attention from the sources of frustration (e.g., thinking about the poster on the wall), helping the child plan how long the wait would take (e.g., if you play for 5 minutes, then I'll be finished and we can open the surprise), or labeling the situation or the child's feeling with emotion terms (e.g., I know it's frustrating but I will be finished soon, OK?). *Maternal support* was counted each time the mother was emotionally present and comforting in response to child negative emotion. Support was defined by expressions of sympathy, being attentive and positive with the child (excluding laughing at the child), or being physically affectionate.

Maternal support and structuring were treated as mutually exclusive to the degree that only one could be coded at a single point in time. If they both occurred at one time, structuring was selected for the code. The task, however, was 8 minutes long and these two aspects of parenting could occur at different times. In addition, the two aspects could and did occur in sequence during the unfolding of a child emotional episode. Indeed, they are significantly correlated,  $r(116) = .66, p < .0001$ , indicating that most mothers who were supportive also engaged in structuring.

Percent agreement was based on 18 percent of the coded observations: 73.3 percent agreement for discerning that the child had an emotional episode, 94.8 percent agreement on the emotional valence (positive or negative) of the child's emotion, and 98.3 percent agreement on classifying the mother's behavior as supportive, structuring, or both. As children varied in the number of observed negative emotions, percentages were calculated for maternal support and structuring and these two percentage scores were used in analyses.

## Results

### *Descriptive Statistics*

The grand means and standard deviations for all variables used in data analyses are presented in Table 1 and the zero-order correlations for all variables are presented in Table 2. Of note are the following results. For strategy generation, the majority of

**Table 1. Means and Standard Deviations for Main Variables**

	<i>M</i>	<i>SD</i>
Child age (in months)	47.84	6.19
Child mean length of utterance	3.40	.77
Child temperament		
Negative affectivity	12.09	2.76
Effortful control	25.77	2.27
Child strategy generation		
Anger (range 0–10)	1.16	1.36
Sadness (range 0–6)	1.10	1.22
Child strategy recognition		
Anger (range 0–3)	2.41	.76
Sadness (range 0–3)	2.34	.72
Child behavior during transparent box task		
Persistence (number of epochs)	22.41	8.53
Alternative problem-solving	3.63	3.59
Self-distraction	10.15	8.24
Support seeking	1.91	2.90
Misbehavior	.17	.74
Maternal response to child negative emotion		
Percent supportiveness	81.47	27.46
Percent structuring	67.73	32.45

children ( $N = 91$ ; 78.4 percent) generated at least one plausible strategy for each story (total  $M = 2.3$  strategies,  $SD = 2.3$ ) and anger and sadness strategy generation were correlated,  $r(116) = .55$ ,  $p < .0005$ .

For strategy recognition, 100 percent of the children recognized at least one purported emotion regulation strategy (total  $M = 4.8$ ;  $SD = 1.2$ ). This number includes the 16.4 percent of children whose responses could have been correct by chance (50 percent correct is chance level). As seen in Table 1, on average, children recognized the purported effective strategy in at least two of the three pairs for both the angry and the sad vignettes. Anger and sadness strategy recognition were correlated,  $r(116) = .30$ ,  $p < .001$ . Table 3 presents the percentage of children in each age group who selected an appropriate strategy for each of the choices.

We assumed that it is easier to recognize than verbally produce a strategy. Therefore, we predicted that the two measures would be related to each other because children who could generate strategies would be also able to recognize them. As seen in Table 1, the correlation between strategy recognition and generation was modestly related for the angry,  $r(116) = .24$ ,  $p < .005$ , but not the sad vignette,  $r(116) = .01$ ,  $p = .46$ . (We excluded data from the happy vignette because it served as a training trial and performance could not be attributed solely to strategy awareness.) Therefore, at this early stage of the research, as well as the theoretical importance of distinguishing among negative emotions, it seemed prudent not to assume that understanding how to regulate anger equates with understanding how to regulate sadness. Data analyses were conducted separately for each vignette and for each form of understanding.

**Table 2. Zero-order Correlations among Main Variables**

	1	2	3	4	5	6	7	8	9	10	11	12
1. Strategy generation—anger	—											
2. Strategy generation—sadness	<b>.55</b>	—										
3. Strategy recognition—anger	<b>.24</b>	.13	—									
4. Strategy recognition—sadness	.10	.01	<b>.30</b>	—								
5. Maternal supportiveness	<b>-.15</b>	<b>-.15</b>	<b>.23</b>	.14	—							
6. Maternal structuring	.03	.00	.13	.03	<b>.66</b>	—						
7. Persistence	.04	<b>.18</b>	<b>.26</b>	-.02	.07	.00	—					
8. Alternative problem solving	.01	-.04	<b>.24</b>	<b>.18</b>	.09	.10	.13	—				
9. Distraction	-.07	<b>-.16</b>	-.14	.04	.09	.01	<b>-.65</b>	<b>-.29</b>	—			
10. Support-seeking	<b>.18</b>	-.07	<b>-.24</b>	<b>-.21</b>	<b>-.21</b>	-.10	<b>-.37</b>	-.08	-.08	—		
11. Misbehavior	.09	-.07	<b>-.15</b>	<b>-.19</b>	<b>-.28</b>	<b>-.18</b>	-.08	.02	.04	.11	—	
12. Age in months	<b>.22</b>	.08	<b>.31</b>	.10	.06	-.01	.04	-.15	.14	-.04	.14	—
13. Mean length of utterance	<b>.16</b>	.09	<b>.26</b>	.13	-.14	<b>-.16</b>	-.01	-.04	-.08	.09	.09	<b>.20</b>

Note: Values in bold font are significant at  $p < .05$  or less.

**Table 3. Percentage of 3- and 4-year-olds Selecting Effective Strategy for Each Strategy Pair**

	Age in years	
	3-year-olds	4-year-olds
N	58	58
Sad vignette (lost puppy)		
Think about something nice	55.2	63.8
Play with my toys	84.5	94.8
Look for puppy	86.2	82.8
Angry vignette (fighting over toys)		
Think about something else	79.3	87.9
Find another toy	69.0	82.8
Share the toy	72.4	91.4

### *Preliminary Analyses*

Before testing predictions, we considered the possibilities that child gender or family economic status might influence strategy understanding although we did not predict effects. As discussed, there are inconsistent gender differences in emotion understanding in the literature but, when differences emerge, they suggest that girls may have an advantage. In addition, it is well established that girls have an expressive language advantage in early childhood. No significant gender differences or gender by age interactions reached or approached significance. We therefore combined data for boys and girls for all subsequent analyses. Family income is related to child language ability and to the degree to which parents talk to their children (Hart & Risley, 1995) and could, therefore, be related to child strategy understanding. Preliminary analyses revealed that family income was not related to any study variables and did not interact with any factor, perhaps because most families were relatively advantaged.

As seen in Table 1, the strategy generation data are skewed (eight children generated six or more strategies). The generation data were logarithmically transformed, resulting in improved distributions. This transformation was also applied to the disruptive behavior variable that was skewed due to low frequency. All other variables were normally distributed. For ease of interpretation, untransformed means and their standard deviations are presented in tables.

The main analyses addressed two sets of questions: (1) whether child factors (language ability, over and above age, and temperament) and parenting factors (being supportive and structuring child self-regulation when the child expressed negative emotion in the wait) accounted for significant variance in children's strategy recognition or generation and (2) whether children's strategy recognition or generation was systematically related to their self-regulatory efforts when challenged by the challenge of trying to get a desired object from a box that would not open.

### *Predicting Child Strategy Understanding*

Hierarchical linear regressions were used to examine the degree to which strategy generation and recognition for each emotion were predicted by the following order

**Table 4. Regression Coefficients for Models Predicting Strategy Understanding for Anger**

	B	SE	$\beta$	<i>t</i>	<i>p</i> <
Strategy generation					
MLU	.07	.03	.22	2.43	.02
Age	.01	.00	.15	1.69	.10
Structuring	.16	.08	.22	1.86	.07
Supportiveness	-.22	.10	-.26	-2.23	.03
Strategy recognition					
MLU	.13	.09	.14	1.52	.13
Age	.04	.01	.29	3.33	.001
Structuring	-.15	.27	-.06	-.55	.59
Supportiveness	.83	.32	.30	2.61	.01

*Note:* The models predicting strategy understanding for sadness were not significant. MLU = mean length of utterance.

of variables. Firstly, because language ability might influence a child's ability to understand and communicate in the procedures, we entered child MLU as an index of the child's expressive language skill. In the same step, we included negative affectivity and effortful control, dimensions of child functioning that influence how often a child may have opportunities to experience emotion that is difficult to self-regulate and therefore opportunities to learn strategies. In the second step, we entered child age in months to consider the general effects of age over and above language ability and effortful control. Thirdly, we entered the two dimensions of maternal responses to child negative emotion—supportiveness and structuring. The fourth step included the interactions of each pair of variables. The first set of analyses clearly indicated that there were no effects for child temperament or for interactions between any pair of variables (all  $\beta$ s ranged from .00 to .05). Notably, this indicates that the prediction that structuring and supportiveness would interact to predict strategy understanding was not supported. Consequently, these variables were removed to reduce the number of predictors and we present the results of regressions using this more parsimonious model.

### *Strategy Generation*

In this section, the regressions predicting the number of strategies children generated are presented first for the angry vignette and then for the sad vignette.

*Anger.* The model for anger strategy generation was significant,  $R = .37$ ,  $\text{Adj } R^2 = .11$ ,  $F(4, 111) = 4.40$ ,  $p < .005$ . The results indicate that, when both age and MLU are entered, MLU is a significant predictor and age is represented by a modest relation that only approaches significance (see Table 4). Thus, the fact that 4-year-olds generated nearly twice as many anger strategies as 3-year-olds (see Table 5) is better explained by expressive language skills than age alone.

**Table 5. Number of Strategies Generated and Recognized for Anger and Sadness for Each Age Group**

		3-year-olds	4-year-olds
N		58	58
Strategies generated			
Anger	<i>M</i>	.84	1.48
	<i>SD</i>	.88	1.66
Sadness	<i>M</i>	1.02	1.19
	<i>SD</i>	1.25	1.19
Total	<i>M</i>	1.86	2.67
	<i>SD</i>	1.91	2.26
Strategies recognized			
Anger	<i>M</i>	2.26	2.62
	<i>SD</i>	.83	.62
Sadness	<i>M</i>	2.26	2.41
	<i>SD</i>	.69	.75
Total	<i>M</i>	4.47	5.03
	<i>SD</i>	1.23	1.09

*Note:* Age was entered as age in months in the regression analyses.

Maternal responses to child distress appeared to approach but not reach significance in predicting children's anger strategy generation,  $F_{\text{change}}(2, 111) = 2.63, p < .10$ . Notably, the two emotion socialization dimensions predicted child anger strategy generation differently. Specifically, the *less* supportively the mother responded to the child's distress during the wait, the more strategies the child generated for the angry puppets. In contrast, the more a mother structured her child's self-regulation when distressed, the more strategies the child generated; although this latter effect was only a trend that did not achieve significance (see Table 4). As noted in the preliminary analyses section, no interactions were significant including the expected interaction between structuring and supportiveness ( $F < 1$ ). Thus, the unexpected finding is that each parenting dimension predicted children's verbal generation of anger strategies in opposite directions, despite the fact that the two dimensions were correlated (.66). Nonetheless, there did not appear to be a problem with multicollinearity as indicated by the recommended indices (Tabachnik & Fidell, 2007).

*Sadness.* The model for predicting the child's verbal generation of strategies for the sad puppets was not significant,  $F(4, 111) = 1.42, \text{NS}$ . Moreover, no individual variable accounted for significant variance in strategy generation for sadness.

### *Strategy Recognition*

In this section, the regressions predicting the number of effective strategies children recognized are presented first for the angry vignette and then for the sad vignette.

*Anger.* The model predicting the number of effective strategies for anger that children endorsed was significant,  $R = .42$ ,  $\text{Adj } R^2 = .15$ ,  $F(4, 111) = 5.88$ ,  $p < .0005$ . As seen in Table 4, two of the four predictors accounted for significant variance in anger strategy recognition. Specifically, the older the child was, the more strategies for regulating anger that the child recognized (see Tables 4 and 5); MLU was not a significant predictor for this index of strategy understanding.

In addition, maternal responses to child distress contributed significant unique variance in children's anger strategy recognition,  $F_{\text{change}}(2, 111) = 4.52$ ,  $p < .01$ . This effect was accounted for by maternal supportiveness when a child is distressed. The more supportive the mother, the more effective strategies for regulating anger the child endorsed. Maternal structuring was unrelated and, as noted above, there was no interaction of the two parenting dimensions.

*Sadness.* The model for predicting strategy recognition for sadness was not significant,  $F(4, 111) = 1.49$ , NS.

#### *Child Strategy Understanding as a Predictor of Child Self-regulation*

The next set of analyses used hierarchical linear regression to assess whether child strategy awareness predicted the child's behavior in a challenging situation, that is, trying unsuccessfully to open a box to get a desired toy. On step 1, child age and MLU were entered to control for the effects of developmental gains including language ability on self-regulation in the challenging situation. On step 2, child temperament dimensions that affect child self-regulation were entered, negative affectivity and effortful control. On step 3, the total number of verbally generated strategies for each emotion and the total number of recognized strategies for each emotion were entered. The interactions of factors were entered on the fourth and final step. In each and every case, only strategy understanding variables predicted child behavior. Streamlined models were therefore created in which only the four strategy understanding variables were entered on a single step.

*Predicting Persistence.* A child's ability to keep trying, appropriately, to open a locked box was predicted by strategy understanding,  $R = .33$ ,  $\text{Adj } R^2 = .08$ ,  $F(4, 111) = 3.49$ ,  $p < .01$ . As shown in Table 6, the more strategies for regulating anger a child recognized, and the more strategies for regulating sadness the child verbally generated, the more persistence the child showed.

*Predicting Alternative Problem-solving.* A child's ability to engage in appropriate alternative ways to open the box was also predicted by strategy understanding,  $R = .30$ ,  $\text{Adj } R^2 = .07$ ,  $F(4, 111) = 3.06$ ,  $p < .05$ , although the specific predictors were somewhat different. Again, the more anger strategies, and also the more sadness strategies the child recognized, the more alternative solutions the child attempted.

*Predicting Self-distraction.* The model was not significant for self-distraction,  $R = .22$ ,  $\text{Adj } R^2 = .01$ ,  $F(4, 111) = 1.42$ , NS. It should be noted, however, that there was a trend for an inverse relation between strategy generation for sadness and self-distraction. As shown in Table 6, the more strategies the child generated for sadness, the less the child self-distracted during the challenge of opening the box.

**Table 6. Regression Coefficients for Child Strategy Understanding Predicting Child Self-regulation**

	B	SE	$\beta$	<i>t</i>	<i>p</i> <
Persistence					
Anger					
Generation	-5.22	4.02	-.14	1.30	NS
<b>Recognition</b>	<b>3.31</b>	<b>1.08</b>	<b>.29</b>	<b>3.06</b>	<b>.005</b>
Sadness					
<b>Generation</b>	<b>8.08</b>	<b>3.97</b>	<b>.22</b>	<b>2.04</b>	<b>.05</b>
Recognition	-1.19	1.11	-.10	-1.07	NS
Alternative Solutions					
Anger					
Generation	-.34	1.73	-.02	<1	NS
<b>Recognition</b>	<b>1.02</b>	<b>.46</b>	<b>.22</b>	<b>2.20</b>	<b>.05</b>
Sadness					
Generation	-.85	1.70	-.05	<1	NS
<b>Recognition</b>	<b>.98</b>	<b>.48</b>	<b>.18</b>	<b>2.00</b>	<b>.05</b>
Self-distraction					
Anger					
Generation	1.97	4.02	.06	<1	NS
Recognition	-1.65	1.08	-.15	-1.52	NS
Sadness					
Generation	-6.30	3.97	-.19	-1.91	.10
Recognition	.88	1.11	.08	<1	NS
Support seeking					
Anger					
<b>Generation</b>	<b>5.28</b>	<b>1.43</b>	<b>.39</b>	<b>3.69</b>	<b>.001</b>
<b>Recognition</b>	<b>-1.01</b>	<b>.39</b>	<b>-.24</b>	<b>-2.62</b>	<b>.01</b>
Sadness					
<b>Generation</b>	<b>-3.45</b>	<b>1.41</b>	<b>-.25</b>	<b>-2.45</b>	<b>.05</b>
<b>Recognition</b>	<b>-.76</b>	<b>.40</b>	<b>-.18</b>	<b>-2.01</b>	<b>.05</b>
Disruptive Behavior					
Anger					
Generation	.63	.35	.20	1.79	.10
Recognition	.07	.09	-.07	<1	NS
Sadness					
<b>Generation</b>	<b>-.80</b>	<b>.35</b>	<b>-.25</b>	<b>-2.31</b>	<b>.05</b>
<b>Recognition</b>	<b>-.19</b>	<b>.10</b>	<b>-.19</b>	<b>-2.01</b>	<b>.05</b>

Note: Significant relations are in bold font.

*Predicting Support-seeking.* The model for support seeking was significant,  $R = .42$ ,  $\text{Adj } R^2 = .15$ ,  $F(4, 111) = 6.10$ ,  $p < .001$ . All four understanding variables predicted significant variance in support-seeking. The more strategies recognized, both for anger and sadness, and the more strategies generated for sadness, the less the child sought adult support. However, for anger strategy generation, the effect was in the opposite

direction; the more strategies the child generated, the more support-seeking the child attempted.

*Predicting Disruptive Behavior.* Finally, disruptive behavior during the transparent box task was also predicted by strategy understanding,  $R = .29$ ,  $\text{Adj } R^2 = .05$ ,  $F(4, 111) = 2.59$ ,  $p < .05$ . As shown in Table 6 this effect was associated with poorer understanding of sadness recognition and generation strategies.

#### *Did Emotion Regulation Strategy Understanding Mediate Relations between Emotion Socialization and Child Self-regulation?*

The pattern of results led to the question of whether a child's strategy understanding mediates the relation between maternal supportiveness and child self-regulation in a task that engenders frustration. We tested this mediation hypothesis for two child behaviors—support-seeking and disruptive behavior—for which there were significant zero order correlations between maternal supportiveness (in the wait) and child behavior (during the locked box task); maternal supportiveness and child strategy understanding; and child understanding and child behavior during the locked box task. We constructed the standard sequence of steps for testing mediation using regression (Baron & Kenny, 1986) and, because the sample size was less than 400, we used the bootstrapping method (Preacher & Hayes, 2004) to determine whether mediation could be inferred (Dearing & Hamilton, 2006). For both indices of child self-regulation, mediation was not supported in that the total effect (c path) and the indirect effect (c') were both significant; the total path should not be significant if mediation is present (Preacher & Hayes, 2004).

## **Discussion**

Meaningful individual differences in 3- and 4-year-olds' understanding that a person can act strategically to modify negative emotions are revealed in the present study. Based on the use of a new procedure, the results indicate that child and parenting factors predict children's emotion regulation strategy understanding. In addition, children's strategy understanding predicts their actual behavior during a challenging task designed to engender frustration.

#### *Child Factors that Predict Emotion Regulation Strategy Understanding*

The findings add further to evidence that children's emotion understanding is developing between the third and fourth years, a time when there are developmental changes in other pertinent domains of social and emotional understanding, such as theory of mind and executive functioning (e.g., Carlson, Moses, & Claxton, 2004; Wellman & Gelman, 1992). In particular, 4-year-olds showed a better grasp of strategies for regulating anger than 3-year-olds, although both age groups appeared to understand strategies for regulating sadness equally well.

Age differences presumably reflect individual differences in skills and experiences that promote strategy understanding, such as a child's language skills and emotion socialization history. We examined the complexity of a child's spontaneous speech as an index of expressive language skill, finding that it predicted strategy generation but not strategy recognition. Expressive language may simply be related to the strategy

generation task demands, given that recognition of effective strategies could be demonstrated without speaking and age differences in this ability were not related to expressive language skill. Possibly, receptive language skills are important to the recognition component, aiding the child's understanding of verbally presented vignettes, instructions, and pairs of choices. It would be useful, then, in future studies to examine both receptive and expressive domains of linguistic skill. More generally, the study of strategy understanding and other facets of emotion knowledge, will be enriched by studies that include assessment of abilities that are thought to account for age effects. For instance, it may also be the case that expressive language enhances explicit understanding (accessing and generating a strategy) but is less essential for implicit understanding (recognizing a good strategy when you see one). It is noteworthy that the two strategy indices were only modestly correlated and only for anger, suggesting important differences between the skills tapped and the emotions assessed.

Age and language status predicted strategy understanding, but only for anger, not sadness. The evidence suggests that children may understand strategies for sadness regulation prior to understanding strategies for anger regulation. One important difference between anger and sadness is that anger is defined in part by readiness to act forcefully to regain well-being, whereas sadness involves readiness to cease effort and relinquish goals (Barrett & Campos, 1987). In the anger-eliciting tasks we used in this study, and in others we have used elsewhere, we often observe that some children communicate sadness as the situation unfolds. Little is known about the *multiple* emotions involved in children's dealing with challenges to their goals, although research suggests this is a direction for future research. Evidence that young children's temper tantrums involve two emotional components (anger and distress; Potegal & Davidson, 2003; Potegal, Kosorok, & Davidson, 2003) and that infant sadness in a blocked goal task is associated with more physiological distress than infant anger (Lewis, Ramsay, & Sullivan, 2006) suggests that it is important to understand the functions and consequences of different emotions in a given situation. The fact that children can have multiple, different emotions in response to a challenge, and that age and language relate to strategy understanding for anger but not sadness, is therefore worthy of further pursuit.

We also considered two dimensions of child temperament that contribute to the degree to which a child tends to get upset and to be able to self-regulate when distressed (Rothbart & Bates, 1998). Negative affectivity and effortful control could influence strategy understanding because the degree to which a child gets upset influences the opportunities the child has for getting adult assistance with distress and therefore opportunities to learn strategies. Few studies examine temperament and emotion understanding and, as in the present study, none finds a significant relation (Cutting & Dunn, 1999; Garner & Power, 1996; Warren, 2005).

### *Emotion Socialization and Children's Emotion Regulation Strategy Understanding*

We also examined mothers' immediate responses to children's expression of negative emotion as an index of emotion socialization rather than focus on more global parenting qualities such as maternal sensitivity. The degree to which mothers respond supportively and attempt to scaffold the child's ability to self-regulate when the child is distressed are immediate aspects of the child's experience. We expected these two aspects of parental responses to work in concert to predict children's understanding of regulatory strategies because one creates an open, tolerant, emotional climate and the

other gives the child guidance and experience in self-regulation. The predicted interaction, however, was not found. Perhaps the skillful parenting that combines support and structuring may be more important at earlier ages, a question that is better tested in a longitudinal design.

These two parenting dimensions were highly related, raising a question of whether there was sufficient variability to test the predicted interaction, which we addressed with diagnostic statistics that indicated multicollinearity was not present. Despite the fact that maternal supportiveness and structuring were highly related, each contributed to child strategy understanding. Firstly, maternal supportiveness when a child was bothered by a long wait to open a gift predicted child strategy understanding but the direction of the effect differed depending on the way in which strategy understanding was assessed. The more emotional support the mother communicated to her frustrated child, the more anger strategies the child recognized but the fewer anger strategies the child generated.

Supportiveness is a form of interpersonal regulation of emotion, providing solace and reassurance, but not explicit guidance regarding how to regulate emotion autonomously. The data indicate that the child who receives a higher level of emotional support when distressed recognizes more strategies for regulating anger. The mechanisms explaining this relation may include a history of experience with supportiveness such that a young child has an implicit sense that emotions are manageable and can access implicit strategies that children may not readily verbalize. In contrast, children who experience *less* support generate more strategies for anger, perhaps because mothers give them more opportunity to generate their own ideas. In addition, maternal structuring, which contrary to prediction did not contribute overall to strategy understanding, predicted only child anger strategy generation. Because the study design was cross-sectional, it is not possible to disentangle the degree to which certain children elicit different parenting behavior and the degree to which different styles of parenting relate to different ways of learning about strategies. Certain child characteristics may cause mothers to realize their children either have the ability or prefer to handle situations on their own and therefore less of a need of immediate solace but perhaps some structuring of their self-regulatory efforts. Longitudinal research would shed more light on these interesting pathways.

Unexpectedly, maternal structuring was not highly related to strategy understanding. Like others (Dunn & Brown, 1991; Gottman et al., 1997; Parke, 1994), we expected to find that using children's emotional episodes as learning opportunities to teach *self*-regulation was essential to a child's ability to understand emotion regulation strategies. The data, however, indicate that structuring is only related to the number of plausible strategies a child generates for anger, not for sadness, and not in terms of recognizing strategies for anger or sadness. One possibility is that structuring enhances children's ability to verbalize their understanding, at least for anger, but again, it may also reflect a parental style associated with a child's tendency to be verbally assertive. It may also be that structuring has its effect in a different developmental window, perhaps earlier in a child's life than the period we assessed.

### *Emotion Regulation Strategy Understanding Predicts Child Self-regulation*

The emotion-specific effects in the present study underscore the multifaceted nature of children's emotional responses to challenges. Awareness of distinct emotions may be associated with unique patterns of emotion regulation. The findings require additional

study but indicate the value of observing parental contingent responses to specific child emotions (Chaplin, Cole, & Zahn-Waxler, 2005; Cole, Teti, & Zahn-Waxler, 2003) and in relation to promoting autonomy or reliance on others (Dennis, Cole, Zahn-Waxler, & Mizuta, 2002). In the present study, parental emotion socialization was observed in a context designed to engender frustration and parenting predicted strategy recognition and generation only for anger, not sadness. This suggests that it might be important in future work to examine a range of emotions and tie parental responses to different specific emotions.

The emotion-specific nature of the findings is also important in understanding the relations between child-strategy understanding and child self-regulatory behavior. Firstly, it is noteworthy that strategy understanding, particularly strategy recognition, predicts a young child's behavior in a challenging situation when help is not present. The more strategies for regulating anger a child recognized, the more the child persisted both in trying to open the box, including attempting alternative methods, and the less the child left the task to seek help. But understanding strategies for sadness also played a role. The more strategies the child recognized for sadness, the more alternative solutions the child tried and the less the child sought support or became disruptive. The capacity to recognize a variety of strategies for regulating different emotions may aid a child's efforts to cope. When well-regulated anger and persistence fail to achieve a desired goal, having strategies for regulating sadness may become important. Sadness represents the giving up of goals; thus it is quite interesting that children who have less access to strategies for dealing with sadness, not anger, are more likely to seek help or become disruptive. As noted earlier, there is insufficient work addressing multiple emotions in tasks designed to elicit a particular emotion but there are studies that indicate that anger and sadness co-occur but have different functions and consequences (Lewis et al., 2006; Potegal & Davidson, 2003; Potegal et al., 2003). Taken together with the present study, the evidence begins to suggest that children can reach a point of frustration at which the anger that was fueling their efforts to overcome a problem begins to shift into realization that a desired goal cannot be attained, which is linked to more physiological and behavioral distress. The findings underscore the fact that multiple emotions can arise, even in a context designed to elicit one category of emotion. Future work must examine the child's *range* and *sequence* of emotions and regulatory strategies (Cole & Hall, 2008).

The possibility that parental emotional socialization leads to strategy understanding that in turns leads to effective self-regulation was not supported by this study. Of the five behaviors we examined, two—support-seeking and disruptive behavior—met criteria for testing mediation. In both cases, mediation was not supported. Because these pathways are likely to be complex, and measurement of strategy understanding is likely to involve some measurement error, it may require larger sample sizes, preferably studied over time, to adequately infer mediation.

### *Differences in Strategy Generation and Recognition*

Strategy recognition and generation were related, modestly, for anger and not at all for sadness. The ability to verbalize strategies in the 'as-if' context of talking to puppets is surely more difficult than recognizing a strategy; a difference in difficulty that is well known in the literature on memory. Strategy generation may be a less potent predictor of child behavior, given that the ability to verbally mediate action is beginning to

develop for most 3- and 4-year-olds (e.g., Bem, 1967; Winsler, De León, Wallace, Carlton, & Willson-Quayle, 2003).

We assumed that children who generate strategies would easily recognize them. This may be true at older ages than we studied but does not appear to hold in this sample of preschool-age children. In fact, the relation between strategy recognition and generation (.24) diminishes when we restrict the relation to children who verbalized at least one strategy (.12). It may be that strategy recognition taps accessible strategy knowledge more readily than verbal strategy generation, which requires the co-ordination of multiple skills including language production and interpersonal comfort speaking about one's ideas to an unfamiliar adult in a novel laboratory setting. If strategies are more readily recognized, they may also be more readily accessed in an actual problematic situation. Research examining the relation between the specific strategies a child recognizes and uses would be useful in explaining the current findings.

In conclusion, this study contributes to our knowledge about children's understanding of emotion regulation strategies in several ways. Firstly, we demonstrated that a novel, developmentally appropriate method elicits meaningful differences in young children's capacity to understand they can modify emotions in order to meet goals and cope with emotional challenges. The individual differences are predicted by a child's language ability and maternal emotion socialization practices and also by age—an index perhaps of the accumulating experience even young children have in learning about emotion regulation. These differences predict children's behavior when they try to cope with frustration on their own. Moreover, this study is one of the few that documents links between emotional understanding and observed emotional self-regulation (see also Garner & Power, 1996). Finally, the study clearly indicates the importance of examining specific emotions rather than aggregating negative emotions. The findings lay the groundwork for future longitudinal assessments of understanding as one of the mechanisms in the development of emotion regulation.

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### Appendix. Puppet Procedure Script

Two research assistants (RA-1 and RA-2) administer the procedure to each child. RA-1 sits across from the child and enacts the vignettes using two 'child' puppets (Red & Brownie) and RA-2 sits next to the child, aiding the child's understanding and enacting the 'mom' puppet. RA-1 must not obscure the videotaping of the child. To convey emotion, each RA uses standard facial and vocal signals of the target emotions. Each speaks slowly and clearly so a young child can follow the dialogue. Each listens carefully to the child's utterances, trying to ensure that the child understands. RA-2 may cue RA-1 to repeat a part of the script (e.g., 'Hmm. Do you understand? Maybe s/he will say that again so we can understand it.'). RA-2 aids and encourages the child to respond (e.g., 'Brownie needs your help. Let's tell him/her something to help her stop feeling so . . .').

### Introduction to Puppets

Before the first vignette, the child is introduced to each puppet character. The child puppets are described as the same gender as the child:

RA-1 (introduces puppet with long red ears): This is Red. Red is a little boy/girl like you! Can you say his/her name, Red?

RA-1 (introduces puppet with short brown ears): This is Brownie. Brownie is Red's sister/brother. Can you say his/her name, Brownie?

RA-2 (introduces pink puppet): This is Red and Brownie's mother. What do you call your mother? Oh, you call your mother [child's word]. Well, Red and Brownie call their mother 'Mom.'

RA-1: OK, so this is Red, and this is Brownie . . .

RA-2: . . . and this is Mom.

RA-1: Good. You understand everything. Now first Red and Brownie are going to tell us a story. Let's listen!

## Happy Vignette

*Introduction (Props: Little Blanket, Present)*

Red (excited): *Brownie is sleeping. WAKE UP, Brownie!*

Brownie rouses a little but is drowsy and falls back to sleep.

Red (louder, more excited): *Wake up, wake up, Brownie! Today is our birthday!*

(Red runs back to look offstage at Mom): *Look! Mom has a birthday present for us!*

Red (looks to child): *[Child's name], help me wake up Brownie!* (RA-2 helps child).

Brownie (drowsily waking up, speaks sleepily): *Why are you yelling, Red?*

Red (excited): *Brownie, it's our birthday! And Mom got us a PRESENT!*

(Brownie gets up excitedly and both puppets look at child): *It's our birthday!! [Child's name] Can you say Happy Birthday to us?* (RA-2 helps child say Happy Birthday).

Red & Brownie (jumping, squealing, moving all around): *YIPPEE!!!*

Mom (enters): *Here are your birthday presents! Happy Birthday!* (Mom puts down 2 presents).

*Happy Vignette Continued*

Brownie: *Red! Red! Our presents!!* (Brownie runs to help Red get back on table).

Red & Brownie (jumping & screaming): *Yippee!! Our presents!!*

Mom (returns sternly): *Red, Brownie! You are **too** happy! Stop being so happy or I will take away that present!*

Red & Brownie: *STOP being so happy? How? How can we STOP feeling so happy? Please [child's name], what can we do to STOP feeling so happy?*

*Happy Vignette Queries*

OPEN-ENDED QUERY:

RA-2: Let's see, Red & Brownie need your help, [child's name]. They must STOP feeling so happy or Mom will take away the present. [Child's name] what's the best way to STOP feeling so happy?

Pause to give child time to reply. If the child gives a reply, then say:

RA-2: Oh, they could [repeat child's idea regardless of whether it is good or not], then say to the child, Do you have any other ideas?

Repeat this until the child is finished with ideas. If the child has no ideas, or when the child is finished with ideas, continue.

FORCED CHOICE QUERY:

RA-2: Well, Brownie and Red do you have any ideas?

(RA-2: Remember for all pairs have puppet place a bubble card showing that mental component to the child).

Red: *I should think about something else.*

Brownie: *I should think about our birthday present.*

RA-2: Now [child's name], which is the best way for Red & Brownie to STOP feeling so happy, (point to bubble cards and repeat choices and say), remember they want to STOP feeling so happy.

RA-2 repeats child's answer, writes down the child's response and then says: OK, that's good. Red & Brownie, do you have any other ideas?

Brownie (moving to look outside): *I should go see what's going on outside.*

Red (jumping up and down): *I should jump up & down & laugh.*

RA-2: Now [child's name], which is the best way for Red & Brownie to STOP feeling so happy, (point to bubble cards and repeat choices and say), remember they want to STOP feeling so happy.

RA-2 repeats child's answer, writes down the child's response and then says: OK, that's good. Red & Brownie, do you have any other ideas?

Red (moving the present away and turning back on present): *I should hide the present so I can't see it any more.*

Brownie (staring at the present): *I should look at the present.*

RA-2: Now [child's name], which is the best way for Red & Brownie to STOP feeling so happy, (point to bubble cards and repeat choices and say), remember they want to STOP feeling so happy.

RA-2 repeats child's answer, writes down the child's response and then says: OK, that's good.

RA-2: OK, [child's name], that was great. Red & Brownie, can you tell us another story?

## Angry Vignette

*Introduction (Props: Small Toys)*

Red & Brownie are happy & content, playing with some toys. Each is playing by him/herself but sitting next to the other. They both reach for the same toy.

Red (looks over at Brownie, speaks with emphatic irritation): *I need that toy, Brownie.* (Brownie pulls the toy.)

Brownie (angrily protesting): *HEY, no-oo! I need that toy!*

Red (very angry, yells): *I NEED IT!* (To child subject): *[Child's name], Brownie won't give it to me!*

Brownie (also very angry, loud, jumping up): *NOOO!! I NEED IT!* (They struggle with the toy, then Brownie says to child subject in a sullen voice): *[Child's name], Red won't give it to me!!!!*

Red & Brownie (both very angry, loud, jumping up, approaches as if to hit Red): *It's mine!!!!!!*

Brownie (To child): *I'm telling Mom. MOOOOM!!*

Mom (enters, very angry): *You two STOP being so angry! If you do not STOP being angry, I'm taking all the toys away!* (Mom marches off.)

Red & Brownie (so angry, both turning to child subject): *We are SO angry. Please [child's name], what can we do to STOP feeling so angry?*

*Angry Vignette Queries*

## OPEN-ENDED QUERY:

RA-2: Let's see, Red & Brownie need your help, [child's name]. They must STOP feeling so angry or Mom will take away the toys. [Child's name] what's the best way to STOP feeling so angry?

Pause to give child time to reply. If the child gives a reply, then say:

RA-2: Oh, they could [repeat child's idea regardless of whether it is good or not], then say to the child, Do you have any other ideas?

Repeat this until the child is finished with ideas. If the child has no ideas, or when the child is finished with ideas, continue.

## FORCED CHOICE QUERY:

RA-2: Well, Brownie and Red do you have any ideas?

(RA-2: Remember for all the pairs, have the puppet place a bubble card showing that mental component to the child.)

Red: *I should think about what a bad boy/girl Brownie is.*

Brownie: *I should think about something else, like playing with my friend.*

RA-2: Now [child's name], which is the best way for Red & Brownie to STOP feeling so angry, (point to bubble cards and repeat choices and say), remember they want to STOP feeling so angry.

*Angry Vignette Queries Continued*

RA-2 Repeats child's answer, writes down the child's response and then says: OK, that's good. Red & Brownie, do you have any other ideas?

Brownie (threatening to hit Red): *I should hit Red.*

Red (looking for another toy): *I should find another toy.*

RA-2: Now [child's name], which is the best way for Red & Brownie to STOP feeling so angry, (point to bubble cards and repeat choices and say), remember they want to STOP feeling so angry.

RA-2 Repeats child's answer, writes down the child's response and then says: OK, that's good. Red & Brownie, do you have any other ideas?

Red (moving the toy away and turning back on toy): *I should grab Brownie's toy.*

Brownie (staring at the toy): *I should share the toy with Red.*

RA-2: Now [child's name], which is the best way for Red & Brownie to STOP feeling so angry, (point to bubble cards and repeat choices and say), remember they want to STOP feeling so angry.

RA-2 repeats child's answer, writes down the child's response and then says: OK, [child's name], that was great. Red & Brownie, can you tell us another story?

**Sad Vignette**

Red & Brownie are sitting right next to each other, heads down.

Red (sniffing, very sad voice): *Oh, Brownie, our puppy ran away. I am so sad.*

Brownie (voice is small and low and sad, head way down): *I love our puppy. (Softly crying) Maybe puppy will never come back.*

Red & Brownie (more sniffing, crying voice, calling off to the side): *Puppy, puppy, please come back!* (Sadly, to child): *Puppy won't ever come back, [child's name].*

Mom (sees children crying): *Now, now children. Stop crying. It's time to go outside. I won't take you outside until you stop feeling so sad. (Mom exits).*

Red sits up but still sad and slumping.

Brownie (whimpering and sniffing, turns to child subject): *What can we do? Please [child's name], how can we STOP feeling so sad?*

### *Sad Vignette Queries*

#### OPEN-ENDED QUERY:

RA-2: Let's see, Red & Brownie need your help, [child's name]. They must STOP feeling so sad about their puppy or they can't go outside. [Child's name] what's the best way to STOP feeling so sad?

Pause to give child time to reply. If the child gives a reply, then say:

RA-2: Oh, they could [repeat child's idea regardless of whether it is good or not], then say to the child, Do you have any other ideas?

Repeat this until the child is finished with ideas. If the child has no ideas, or when the child is finished with ideas, then say:

### *Sad Vignette Queries Continued*

#### FORCED CHOICE QUERY

RA-2: Well, Brownie and Red do you have any ideas?

(RA-2: Remember for all the pairs, have the puppet place a bubble card showing that mental component to the child.)

Red: *I should think about our lost puppy all day.*

Brownie: *I should think about something nice I can do tomorrow.*

RA-2: Now [child's name], which is the best way for Red & Brownie to STOP feeling so sad, (point to bubble cards and repeat choices and say), remember they want to STOP feeling so sad.

RA-2 repeats child's answer, writes down the child's response and then says: OK, that's good. Red & Brownie, do you have any other ideas?

Brownie (sitting down): *I should sit down and cry.*

Red (going to toys): *I should go play with my toys.*

RA-2: Now [child's name], which is the best way for Red & Brownie to STOP feeling so sad, (point to bubble cards and repeat choices and say), remember they want to STOP feeling so sad.

RA-2 repeats child's answer, writes down the child's response and then says: OK, that's good. Red & Brownie, do you have any other ideas?

Red (putting head down so puppet can't see): *I should not try looking for puppy.*

Brownie (looking off the table): *I should try looking for puppy.*

RA-2: Now [child's name], which is the best way for Red & Brownie to STOP feeling so sad (point to bubble cards and repeat choices and say), remember they want to STOP feeling so sad.

RA-2 repeats child's answer, writes down the child's response and then says: Well, [child's name], that was great. Red & Brownie, are you finished now?

RA-1: Red & Brownie: Yes, thank you for your help, [child's name]. Bye-bye (waving, take puppets off table and hands).