

## Preschoolers' Understanding of the Link between Thinking and Feeling: Cognitive Cuing and Emotional Change

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In 3 studies we investigated 3- through 6-year-olds' knowledge of thinking and feeling by examining their understanding of how emotions can change when memories of past sad events are cued by objects in the current environment. In Study 1, 48 4-, 5-, and 6-year-olds were presented with 4 illustrated stories in which focal characters experience minor sad events. Later, each story character encounters a visual cue that is related to one of his or her previous sad experiences. Children were told that the character felt sad, and they were asked to explain why. Study 1 suggested considerable competence as well as substantial development in the years between 4 and 6 in the understanding of the influence of mental activity on emotions. Studies 2 and 3 more systematically explored preschoolers' understanding of cognitive cuing and emotional change with different types of situations and cues. Across these 2 studies, 108 3-, 4-, and 5-year-olds listened to illustrated stories that featured story characters who each experienced a sad event and who were later exposed to a related cue. Children were not only asked to explain why the characters suddenly felt sad, but in some stories, they were also asked to predict and explain how another character, who was never at the past sad event, would feel. Results of Studies 2 and 3 showed an initial understanding of cognitive cuing and emotion in some children as young as 3, replicated and extended the evidence for significant developmental changes in that understanding during the preschool years, and revealed that the strength and consistency of preschoolers' knowledge of cognitive cuing and emotion was affected by whether cues were the same, or only similar to, parts of the earlier events.

### INTRODUCTION

Thoughts and emotions go hand in hand. For example, thinking of something pleasant or unpleasant can help one to feel happy or sad; experiencing an emotion is often accompanied by related thoughts as to the cause, nature, and ramifications of the emotion; thinking itself can be easy and pleasant, difficult but thrilling, or boring and dissatisfying. When do children know about the links between thinking and feeling? This is a complex question rarely addressed in current research in spite of extensive investigations of children's understanding of emotion (e.g., Harris, 1989) and children's understanding of thinking (e.g., Flavell, Green, & Flavell, 1995).

Consider children's developing understanding of the causes of emotions. Young children readily assert that emotions are caused by objective situations and events. When given familiar situations, preschoolers can accurately identify the commonly associated emotion, and, when given an emotion, they can easily describe an appropriate eliciting situation (Barden, Zelko, Duncan, & Masters, 1980; Borke, 1971; Harris, 1985; Harris, Olthof, Terwogt, & Hardman, 1987; Russell, 1990; Trabasso, Stein, & Johnson, 1981). But what of children's understanding of mental rather than situational causes of feelings? Past research has largely addressed this topic by examining the emo-

tion regulation strategies proposed by young children, with findings suggesting that it is not until 8 or 9 years of age that children begin to suggest mental strategies (e.g., changing thoughts) in addition to situational strategies (e.g., changing the situation) to alter the way they feel (see Fox, 1994, for a review). We pursued a different line of investigation: examining children's understanding of the emotional consequences of being reminded of, or of being "cognitively cued" about, past experiences. For example, if your rabbit is chased away by a spotted dog, then seeing a spotted dog on a later occasion can make you think about your lost rabbit and thereby make you sad.

Although unexamined in prior research, we reasoned that such experiences are common, everyday ones, likely prevalent even in the lives of very young children. If so, children's understanding of this sort of emotional change could provide a revealing window into their larger ideas about mind and emotion. Specifically, we believe that an understanding of emotional change as a result of cognitive cuing requires and manifests four related concepts: (1) an understanding that emotions can be independent of objective events—people's prior experiences, desires,



beliefs, and thoughts can affect their emotional reactions to situations; (2) an awareness of and the ability to infer mental activity (e.g., thinking or remembering) in people; (3) an understanding of how mental activity can influence emotional arousal; and (4) knowledge about sources of thoughts, specifically, cognitive cuing.

Past research provides various clues as to children's possible knowledge about the influence of thoughts on emotions. To start, investigations of young children's understanding of individuated nature of emotions have revealed age-related increases in young children's knowledge about how the same objective situation can lead to different emotional reactions in different people. For example, Gove and Keating (1979) found that 5-year-olds, but not 3-year-olds, could suggest psychological or "mental content" explanations to justify how two characters could experience opposite reactions to the same objective situation (e.g., a picture of a dog). Being unable to offer psychological explanations, many 3-year-olds reconstructed the external situation to make it objectively different for each character. Using similar procedures, other researchers have found that although 3-, 4-, and 5-year-olds are often able to explain emotional reactions based on characters' current desires (Gnepp, Klayman, & Trabasso, 1982; Stein & Levine, 1987) and even their beliefs (Harris, Johnson, Hutton, Andrews, & Cooke, 1989; Wellman & Banerjee, 1991), young children have much more difficulty understanding how a person's prior experiences can affect their emotional reactions to a related situation (Gnepp, 1983, 1989a, 1989b; Gnepp & Gould, 1985). Not only do preschoolers in these prior studies disregard personal information in favor of objective, consensual information in explaining people's emotional reactions when confronted with hypothetical story vignettes, but they also do so when faced with "real life" naturalistic events in the playground (Fabes, Eisenberg, Nyman, & Michaelieu, 1991).

To understand that thinking about a prior event can change someone's feelings requires some understanding of thinking as a mental activity. Following current advances in our understanding of children's knowledge about mental states (see Flavell, 1988; Perner, 1991; Wellman, 1988, 1990), researchers have recently begun to carefully investigate children's knowledge about ongoing mental activity. In a series of 14 studies, Flavell et al. (1995) found that although preschoolers understand that thinking is an internal, mental activity that is distinct from seeing, looking, talking, touching, and knowing, they have extremely

little knowledge about when to infer that a person (including themselves) is thinking and what a person is thinking about. Typically this research employed tasks involving "cognitive" situations (e.g., reading, looking, listening, and talking). In one study, however, young children's understanding of thinking in the context of emotional experiences was included (e.g., waiting to go to the doctor's to get a shot). In contrast to the other tasks, preschoolers seemed more willing to attribute thinking in these emotionally charged situations. Thus, whereas preschoolers are often poor at recognizing and attributing thinking in people engaged in activities such as problem solving, it is possible that they are more knowledgeable about thinking as it relates to emotional experiences.

Research on cognitive cuing suggests that young children have limited insight into the source of thoughts. Gordon and Flavell (1977) investigated 3- and 5-year-olds' intuitive knowledge about cognitive cuing—how one mental event can trigger another related mental event. They reported that although preschoolers could use associated cues to find a target object (e.g., a Band-Aid helped them find a doctor doll), they displayed only a rudimentary understanding as to why the cue was helpful. Schneider and Sodian (1988) and Sodian and Schneider (1990) also examined 4- to 6-year-olds' understanding of cognitive cuing as reflected in their ability to place cues either to help a partner or to deceive a competitor. A minority of 4-year-olds, but nearly all 6-year-olds, were able to manipulate cues to help or to deceive a confederate (see also Whittaker, McShane, & Dunn, 1985). Surprisingly, although this research tackles young children's implicit knowledge about how cues are related to objects (i.e., A goes with B), none of the studies we are aware of tested children's explicit understanding about the causal mechanism of cognitive cuing (i.e., A makes one *think* of B).

Young children also often demonstrate little understanding that thinking can affect one's emotions. Although 4- to 6-year-old children understand that emotional reactions to events gradually wane over time, it is not until 6 years or later that children describe waning of emotions as dependent not just on changing situations but also on whether or not a person remembers or forgets about the initial emotional event (Harris, Guz, Lipian, & Man-Shu, 1985). As noted earlier, research on children's coping strategies typically finds that although young children can suggest several situational strategies to make oneself feel better, it is not until grade school that they begin to understand cognitive strategies such as mental dis-

traction (Altshuler & Ruble, 1989; Band & Weisz, 1988; Harris & Guz, 1986; Harris & Lipian, 1989; Harris & Olthof, 1982; Lipian, 1985). However, two recent studies claim that children as young as first graders (Guskin, 1991), or even 4- and 5-year-olds (Banerjee, 1993), evidence appropriate understanding of such cognitive strategies in some tasks.

In summary, past research points in two directions. On the one hand, the research suggests that children's understanding of how emotions can be influenced by thoughts and reminders of prior events should be late developing; preschoolers seem to have a consistent bias in attributing emotions to factors in the environment, rather than the mind; they are more likely to infer a character's emotions based on consensual reactions to the objective situation rather than on an individual's prior experiences; they have a limited ability to infer when people are actively thinking and what they are thinking about; and they have a fragile understanding of cognitive cuing. On the other hand, few of these studies have been specifically designed to test preschoolers' knowledge—many included these young children only to show dramatic development from the preschool to school-age years. Moreover, some studies point to intriguing early understandings. Indeed, as suggested above, it is possible that linking children's understanding of thinking with their understanding of emotion may reveal some unexpected early conceptions of both emotion and thoughts.

## STUDY 1

The three studies reported here share the goal of tying together young children's understanding of emotions and thinking by examining their understanding of cognitive cuing and emotional change. Study 1 represents an initial attempt to assess preschoolers' knowledge using a variety of formats. Primarily we focused on characters who experience sad events and who later encounter *semantic* or *personal* cues related to those past situations. By *personal cue*, we mean that the cue is associated with an event only in the personal history of the character (e.g., spotted dogs are not commonly associated with pet rabbits but are personally connected for the character whose rabbit was chased by a spotted dog). A *semantic cue* depends instead on a common semantic association, for example, fishbowl and fish. Children were presented scenarios about characters whose emotions changed (in the presence of a cue connected to a prior event), and they were asked to explain the cause of these characters' feelings. By analyzing the explanations pre-

schoolers gave, we aimed to probe their ideas about the sources of emotion and, especially, their knowledge about the relation between cognitive cuing, thinking, and emotion.

## Method

### Participants

Forty-eight children participated; 16 4-year-olds ( $M = 4.6$ ;  $range = 4.0-4.11$ ; nine girls and seven boys), 16 5-year-olds ( $M = 5.5$ ;  $range = 5.0-5.11$ ; seven girls and nine boys), and 16 6-year-olds ( $M = 6.7$ ;  $range = 6.0-7.6$ ; nine girls and seven boys). They were recruited from three nursery schools and child-care centers near Stanford University that serve predominantly Caucasian, middle- to upper-middle-class families (88% European American, 8% Asian, 2% African American, 2% other).

### Material and Procedure

Four stories were created that consisted of simple colorful pictures on  $5 \times 6$  inch laminated cards. The first two stories tested children's understanding of cognitive cuing with *personal cues*. These stories (*Mary* and *Brian* stories) featured a child who experienced two negative events, each event paired with a specific visual cue. Many days later, the target character sees something that looks *similar* to an object that was at one of the past sad events and starts to feel sad. For example, Figure 1 shows the illustrations used in *Mary's* story, a vignette about a girl (*a*) whose rabbit gets chased away by a black-spotted dog and (*b*) whose best friend gets angry when she breaks her new red ball. Many days later, *Mary* feels sad when a friend wants her to play with his spotted puppy (or big red ball). At this point, the child was asked to explain why *Mary* feels sad. The *Mary* and *Brian* stories each contained 12 standardized picture cards that were attached by velcro (one at a time with the unraveling of the story) onto an upright board. The order of the *Mary* and *Brian* stories, the within-story orders of sad events (*a* or *b*), and the final cue were counterbalanced, resulting in 16 test versions.

To ensure that the children remembered each of the sad events in the *Mary* and *Brian* stories, two procedures were followed. First, after each of the initial sad events (*a* and *b* above), a control question was included that asked the child to explain why the character felt sad. Second, after reciting the two sad events in the story, the adult reviewed both events



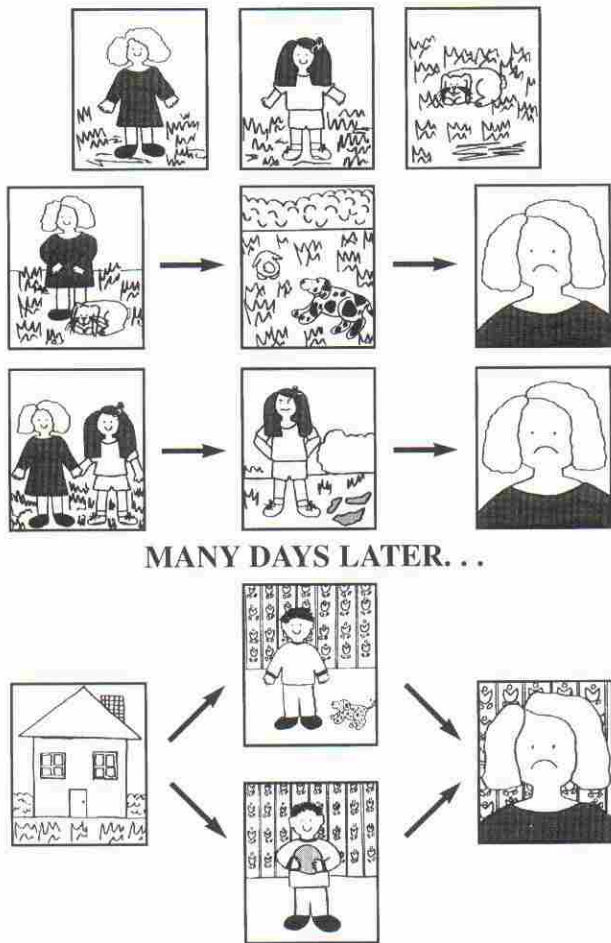


Figure 1 Illustrations for a personal cue story used in Study 1 shown uncolored in reduced form.

briefly in a standardized format. Only after this review did the experimenter present the final scene where the cue appears. The child was then asked the explanation question: "Why did Mary start to feel sad right now?" To help elicit children's explanations about the causes of the emotion in the target event, the experimenter encouraged children to take guesses and paraphrased children's answers to help them clarify and extend their responses. If children stated that a character was "thinking about" a past event, but they did not simultaneously mention the cue, the experimenter asked the follow-up question, "What made Mary think about the [past event] right now?"

The final two stories used a different format with three picture cards each. Each of these stories had two sections, a first *thinking and feeling* section designed to elicit children's knowledge of the links between thinking and feeling, and a second *semantic*

*cues* section designed to further probe children's understanding of cognitive cuing and emotional change. The *Cat* story was about two sisters whose cat runs away and they are sure it will never come back. The girls were pictured with blank faces, and children were told their task was "to figure out how the girls are feeling." First, Beth was described as both knowing that her cat ran away and presently thinking<sup>1</sup> about the cat never coming back. Children were asked to predict and explain whether Beth feels "sad" or "OK" right now. Next, they were questioned whether Beth would feel "sad" versus "a little better" (or "OK" versus "sad") if she started to think about what is on television. Children were asked to justify their answers. Then, her sister Megan was described as knowing that the cat ran away but presently thinking about what she is going to draw. Later, Megan starts to think about the cat never coming back. Again, children were asked to predict and justify how Megan was feeling initially, and whether or not her emotions changed when she started to think about the cat. Finally, in the last section (the *semantic cue* section of the story), the two sisters were playing outside and one, but not the other of them, sees the cat's favorite toy mouse lying on the ground. Children were told that this sister started to feel sad, and they were asked to explain why. The *Fish* story was structurally equivalent to the *Cat* story except it was about two brothers whose pet fish dies. The semantic cue in this story was the empty fishbowl.

The order of the two stories, the character who was first thinking about the past sad event (versus not thinking about it), and the character who encountered the cue were counterbalanced in the *Cat* and *Fish* stories. The order of "sad/OK," "sad/a little better," and "sad/even more sad" were also arranged so that children having a response bias to pick the first or the second choice would perform at chance. The 16 versions yielded by these permutations were then randomly assigned to one of the 16 versions of the *Mary* and *Brian* stories. In the testing procedure, the *Cat* and *Fish* stories were always given after the *Mary* and *Brian* stories so that children would not be primed to consider the character's thoughts in *Mary* and *Brian* stories.

Every participant was interviewed individually by the same experimenter (a white female) in a private room after a period of building rapport in the classroom for at least 4 days. Children's responses were

1. After pilot testing, we found that the best way to convey to young children that the characters were concentrating on particular thoughts was to use the phrase "thinking most about."



tape-recorded, and their responses transcribed verbatim. The testing procedure lasted approximately 15 min.

## Results

### Personal Cue Stories

#### Coding

Children's responses about why the character felt sad (after seeing the *personal cue*) were coded into four categories.

1. *Situational responses.* Children either asserted that a present event caused the character's sadness (e.g., "The dog licked her too hard," "If he squashes a ladybug") or gave uninformative responses (e.g., "I don't know why she's sad"). This category also included children's responses referring to the character's present desires (e.g., "Because he wanted to go home").

2. *Cue responses.* Children explained that the character feels sad because he or she sees the cue; however, they made no reference to thinking about the past event (e.g., "She's sad because she sees the dog," "Because he sees the same speeding car that broke his bike").

3. *Thinking responses.* Children stated that the character feels sad because he or she is thinking about the past sad event; however, they made no reference to the cue as the elicitor of these thoughts. Instead, the characters are thinking about the event due to alternative causes (e.g., "Because she likes her rabbit") or for no apparent reason (e.g., "Because she just thinks about it").

4. *Cognitive cuing responses.* Children explained that the characters feel sad because seeing the cue reminds them, or makes them think about, the past sad event: "She thinks about her rabbit when she sees that puppy." Note that *cognitive cuing responses* require mention of three connected parts: (1) the cue ("That puppy") elicits (2) mentation about ("She thinks about") (3) the past event ("Her rabbit"). Another example is: "Because the gray airplane reminds him of when his dad went away and how lonesome he felt."

All transcripts were coded independently by two raters. Interrater agreement for the above categories was .97.

#### Analyses

All children correctly answered the four control questions (two for each of the two *personal cue* stories)

indicating that they followed the story presentations. Recall that each story began with two sad events (the prior events) followed by a final scene in which a cue appeared that was linked to one but not the other of the prior events. When children explained a character's sadness in the final scene by referring to a prior event, 98% of the time they referred to the appropriate prior event, the one associated with the cue in the final scene.

Children received scores from 0 to 2 reflecting the number of cognitive cuing responses given to the two stories. The top portion of Table 1 shows the average score for each age group. Preliminary analyses of variance on these scores revealed that story, between-story order, and whether the cued prior event happened first or second did not significantly affect children's cognitive cuing responses. Further analyses therefore collapsed the Mary and Brian stories and the various story orders. Gender differences were examined in an age (3)  $\times$  sex (2) ANOVA which yielded a significant interaction,  $F(2, 42) = 3.40, p < .04$ . Simple effects tests revealed no significant sex differences at 4 and 6 years of age. At 5 years, however, boys' ( $M = .67$ ) average score was less than half that of girls' ( $M = 1.57$ ),  $p < .03$ . We consider this result in the final discussion; gender differences were not central to the aim of the study and, thus, scores for boys and girls were collapsed together in the analyses that follow. A one-way ANOVA for cognitive cuing scores yielded a significant main effect for age,  $F(2, 45) = 27.94, p < .001$ . Post hoc comparisons (Tukey's HSD; all pairwise tests reported are Tukey's HSD) indicated that the 4-year-olds' scores ( $M = .06$ ) differed significantly from the 5-year-olds' ( $M = 1.06$ ), and the 5-year-olds' differed from the 6-year-olds' ( $M = 1.69$ ),  $ps < .05$ .

Table 1 also shows the number of participants with at least one cognitive cuing response (out of two trials). Chi-square analyses revealed that there were significantly fewer 4-year-olds with at least one cognitive cuing response than 5- or 6-year-olds,  $ps < .003$ . The difference in the number of 5- and 6-year-olds approached significance,  $\chi^2(2, N = 32) = 3.28, p < .07$ . In sum, when evaluating either the consistency of cognitive cuing responses or the number of participants with at least one such response, there was significant development in the understanding of cognitive cuing and emotional change from 4 to 6 years.

The bottom of Table 1 shows the sorts of explanations children used when not referring explicitly to cognitive cuing. In that table, "Highest response" refers to the most sophisticated response (with situational responses lowest and thinking responses high-

**Table 1** Children's Explanations for Personal Cue Stories in Study 1

Category of Response	Age		
	4	5	6
Cognitive cuing responses:			
Mean number per age group <sup>a</sup>	.06 (3%)	1.06 (53%)	1.69 (85%)
Participants with at least one <sup>b</sup>	1/16 (6%)	11/16 (69%)	15/16 (94%)
Alternative responses: <sup>c</sup>			
Percentage of participants (highest response): <sup>d</sup>			
Situational responses (%)	13	0	0
Cue responses (%)	50	18	6
Thinking responses (%)	31	13	0
Percentage of participants (entire responses): <sup>d</sup>			
Situational responses (%)	94	44	44
Cue responses (%)	81	88	75
Thinking responses (%)	38	25	6

<sup>a</sup> Percentage of cognitive cuing responses, out of two stories per child, is shown in parentheses.

<sup>b</sup> Percentage of participants out of 16 is shown in parentheses.

<sup>c</sup> Remaining responses after cognitive cuing responses have been considered; will not total 100%.

<sup>d</sup> Highest response is the most sophisticated response category given out of both personal cue stories.

<sup>e</sup> Entire responses include any response category given by a participant at any time during the two trials.

est) given to either personal cue story. "Entire responses" includes all mentions of all response categories a child provided.<sup>2</sup> As evident in Table 1, children's cue responses together with their cognitive cuing responses reveal that the majority of preschoolers understood that the cue was making the character feel sad. Moreover, children's thinking responses show an awareness of the connection between thinking about past events and emotional arousal, even in explanations not linking the source of this mentation to the cue.<sup>3</sup> Thinking responses added together with cognitive cuing responses will be called *mentalistic* responses because both reveal a clear understanding of the link between mental activity and emotions: over one-third of the 4-year-olds (38%), and the majority of 5- (82%) and 6-year-olds (94%) provided mentalistic explanations for at least one out of the two stories they heard.

Children's explanations also reveal preschoolers',

2. It is important to point out here that many children, predominantly the 4-year-olds, often gave a variety of explanations to explain the characters' sadness. For example, a child may first state that Mary's sad because "the puppy bit her" and right afterward say she is also sad "because she thinks it is the same dog." As stated in the methods section, the experimenter always encouraged children to "think of all their guesses" before moving to the next story.

3. Recall that cognitive cuing responses require mention of three connected pieces: (1) the cue elicits (2) thinking about (3) the past event. In essence, therefore, cue responses show knowledge about 1 and often 3 but not 2; and thinking responses reveal understanding of 2 and 3 but not 1.

especially 4-year-olds', tendency to assert that immediate situations cause people's feelings—even when no sad external events had occurred in the final scene itself. Nearly all 4-year-olds (94%) provided at least one situational explanation. A situational explanation typically involved the child adding to or changing the story presentations. For example, for the *Mary* story, 4-year-olds said Mary would feel sad because "The dog (in the final episode) scared Mary," "Bit Mary," "Pushed Mary around," and "Jumped on her," and "Maybe one of the children will roar." None of these events actually occurred in the story. Although less frequent, 44% of the 5-year-olds and 44% of 6-year-olds gave a situational response in their entire responses; however, none of them did so for their highest response.

One final aspect of children's cue responses is of interest. Several preschoolers made a clear distinction between whether the cue had to be the same object that was at the initial sad event to make the characters feel sad, or whether the characters had to at least believe (mistakenly) that it was the exact same object. Thirty-nine percent of the children who gave cue responses indicated that the character felt sad because he or she misrepresented the cue as the earlier object: "Because he thinks that's the same car that hits the bicycle because he doesn't remember if it had a hood or not"; "Because he [the puppy] has spots . . . because it looks like the same one as that one . . . because she might think that it is the right one"; "Because he can think because of the wheels and the



black tires it is the same car." Younger preschoolers, especially, sometimes transformed the cue so as to make it the same exact entity from the past event. For example, one child explained that the spotted puppy could in fact even be the same big dog that chased Mary's rabbit away because "It was the other dog that just got into a costume so it looks like a puppy!"

### Semantic Cue Stories

#### Coding

In the Cat and Fish stories, children were asked to explain why a character felt sad after seeing a cue that was semantically associated with the past sad event. Essentially, responses were coded into the same categories used for the personal cue stories. However, *situational* responses were rarely given, and, instead, children often referred directly to the past event. Thus, the *situational* category was replaced by *past event responses*: Children explained that the characters feel sad because of the past event (e.g., "Because his fish died"). The most complete or sophisticated answers were again *cognitive cuing responses*: Children explained that the characters feel sad because they started to think about the past sad event when they saw the related cue. Some examples include: "He sees the fishbowl and it makes him remember his dead fish"; and "Now she is thinking about the kitty because she saw the little mouse." Interrater agreement for these categories was .94. Discrepancies were resolved by mutual discussion.

#### Analyses

Table 2 shows the primary results. Initial analyses of variance for cognitive cuing scores showed no significant differences between the two different stories, the two story orders, or between boys and girls. These factors were not considered further.

In regard to cognitive cuing scores, a one-way ANOVA yielded a significant main effect for age,  $F(2, 45) = 35.62, p < .001$ . Tukey's HSD comparisons indicated that the average cognitive cuing score of 4-year-olds ( $M = 0.5$ ) was significantly lower than the 5- ( $M = 1.88$ ) and 6-year-olds' ( $M = 1.81$ ),  $ps < .01$ , with no significant difference between the 5- and 6-year-olds' scores. In addition, as shown in Table 2, fewer 4-year-olds gave at least one cognitive cuing response than did 5- or 6-year-olds:  $\chi^2(2, N = 32) = 12.52, p < .001$ , and  $\chi^2(2, N = 32) = 9.31, p < .002$ , respectively. Thus, the semantic cue stories evidenced a similar developmental pattern as the personal cue stories: Fewer than half the children at 4

years compared to most of the 5- and 6-year-olds explained that a semantically related object, the cue, can elicit memories of a past sad event and, as a result, change the way a person feels.

Table 2 also shows the alternative explanations children gave to the semantic cue stories. Four-year-olds' explanations were almost equally split between past event, cue, and thinking responses. When cognitive cuing and thinking responses are considered together jointly as *mentalistic responses*, 75% of the 4-year-olds and nearly all of the 5- and 6-year-olds attributed the source of one or both characters' sadness to thinking about a past event.

#### Thinking and Feeling

In the thinking and feeling section of the Cat and Fish stories, children were asked to predict and explain how characters would feel, and whether their emotions would change, when they started to think about a sad event or started to think about something distracting. First, children received a score from 0 to 4 reflecting how many times they correctly predicted that the characters' emotions would change in the appropriate direction (e.g., would switch from "sad" to "OK" when the character thought about something distracting). A one-way ANOVA for these prediction scores revealed no main effect; the emotion change scores of the 4- (64% of their responses), 5- (75% of their responses), and 6-year-olds (84% of their responses) were not significantly different. In addition, *t* tests indicated that all age groups performed significantly higher than chance,  $ps < .05$ .

Next, children's explanations for what caused these changes in emotion were coded into four ordered categories, paralleling those for the cuing stories in their emphasis on situational versus mentalistic responses:

1. *Other responses*. Children explained that the character is feeling sad (or OK, more sad, a little better) because he or she is "Over it" or "Just is" feeling that way (e.g., "He feels better because he is over that problem now"). This category also included "Don't know" responses (e.g., "I don't know [why he is OK], I can't see his face").

2. *Situational responses*. Children explained that the character is feeling a certain way because he or she is going to do an activity (e.g., "Maybe she feels happy that she is drawing"; "He feels better because my mom says that food makes you feel a little better") or because the consequences of the sad event have not changed (e.g., "He feels sad because he will never be able to watch his fish again"). This category at times included children's creative reconstructions

Table 2 Children's Explanations for Semantic Cue Stories in Study 1

Category of Response	Age		
	4	5	6
Cognitive cuing responses:			
Mean number per age group <sup>a</sup>	.5 (25%)	1.88 (94%)	1.81 (91%)
Participants with at least one <sup>b</sup>	7/16 (44%)	16/16 (100%)	15/16 (94%)
Alternative responses: <sup>c</sup>			
Percentage of participants (highest response): <sup>d</sup>			
Past event responses (%)	6	0	0
Cue responses (%)	19	0	0
Thinking responses (%)	31	0	0
Percentage of participants (entire responses): <sup>e</sup>			
Past event responses (%)	31	0	6
Cue responses (%)	44	0	6
Thinking responses (%)	50	6	6

<sup>a</sup> Percentage of cognitive cuing responses, out of two stories per child, is shown in parentheses.

<sup>b</sup> Percentage of participants out of 16 is shown in parentheses.

<sup>c</sup> Remaining responses after cognitive cuing responses have been considered; will not total 100%.

<sup>d</sup> Highest response is the most sophisticated response category given out of both personal cue stories.

<sup>e</sup> Entire responses include any response category given by a participant at any time during the two trials.

of events (e.g., "Now he is going to be happy because the fish came back to life").

3. *Psychological responses.* Children explained the character's feelings in terms of a psychological "attitude" or "stance" that character has about an event. The child's explanation included one or more of the following mental verbs: know, miss, want, like, or love (e.g., "He feels sad because his goldfish died and he misses him"; "She feels sad because she still wants her kitty").

4. *Mental activity responses.* Children justified the character's feelings in terms of mental activity by using the verbs think, remember, forget, or concentrate, or by making explicit reference to "the mind." These explanations were very specific about the emotional consequences of rumination on or distraction from unhappy thoughts: "She feels sad because now she is taking her mind away from drawing and she is just thinking about the cat"; "She feels more sad because if she thinks of Frisky, or something else really sad, it will just make her feel more sad"; and "He feels OK because playing the piano is pretty fun and it might take his mind off the fish."

Transcripts were coded independently by two raters. Interrater reliability for category of response was .97. Discrepancies were resolved by mutual discussion.

Children were given a score from 0 to 8 for the number of times they gave *mental activity responses* to justify a character's emotional state. We focus on this category, because, as with cognitive cuing responses, it requires strong knowledge about the influence of

thinking on emotional arousal. Preliminary analyses of variance for mental activity scores revealed no significant differences for story, within-story order, and sex. Therefore, these factors were not considered further.

Table 3 shows the primary results. A one-way ANOVA for mental activity scores revealed a main effect for age,  $F(2, 45) = 15.43, p < .001$ . Post hoc comparisons indicated that the 4-year-olds ( $M = .06$ ) gave significantly fewer mental activity responses than the 5- ( $M = 2.80$ ) and 6-year-olds ( $M = 4.19$ ),  $ps < .01$ , with no significant difference between the 5- and 6-year-olds' scores. Moreover, the number of 4-year-olds who gave at least one mental activity response was significantly lower than the number of 5-year-olds who did so,  $\chi^2(2, N = 32) = 18.29, p < .001$ ; however, 5- and 6-year-olds did not differ in this regard. In sum, although the majority of 4- through 6-year-olds were able to predict that a person will feel better when they start thinking about something distracting and feel worse when they think about something sad, older preschoolers evidenced greater and more consistent knowledge of why and how mental activity can affect a person's emotions.

Table 3 also shows children's alternative explanations. Children's psychological responses show that some young children demonstrated further awareness of the connection between the mind and feelings even in their explanations that did not meet the full criteria for mental activity responses. In fact, when psychological and mental activity responses are considered together, a number of 4-year-olds (31%) and



Table 3 Children's Explanations for the Thinking and Feeling Task of Study 1

Category of Response	Age		
	4	5	6
Mental activity responses:			
Mean number per age group <sup>a</sup>	.08 (1%)	2.80 (35%)	4.19 (52%)
Participants with at least one <sup>b</sup>	1/16 (6%)	13/16 (81%)	13/16 (81%)
Alternative justifications: <sup>c</sup>			
Percentage of participants (highest response): <sup>d</sup>			
Other responses (%)	0	0	0
Situational responses (%)	69	6	6
Psychological responses (%)	25	13	13
Percentage of participants (entire responses): <sup>e</sup>			
Other responses (%)	50	19	6
Situational responses (%)	100	88	88
Psychological responses (%)	31	50	44

<sup>a</sup> Percentage of mental activity responses, out of eight trials per child, is shown in parentheses.

<sup>b</sup> Percentage of participants out of 16 is shown in parentheses.

<sup>c</sup> Remaining responses after mental activity responses have been considered; will not total 100%.

<sup>d</sup> Highest response is the most sophisticated response category given out of all eight trials.

<sup>e</sup> Entire responses include any response category given by a participant at any time during the eight trials.

nearly all (94%) 5- and 6-year-olds were knowledgeable that the mind can influence emotional arousal. Moreover, the use of situational explanations for emotions declined with age, as references to mental activity steadily increased. In these fashions, the results closely parallel those for the personal cue stories.<sup>4</sup>

## Discussion

There were two primary findings: substantial knowledge of the interrelation between thinking and feeling generally, and the influence of cognitive cuing on emotions specifically in preschool-aged children,

4. It is noteworthy that in contrast to some claims (e.g., Harris, 1983, 1989; Harter, 1983; Harter & Buddin, 1987; Reissland, 1985) that children younger than 8 or 9 years of age cannot conceive of ambivalence, or simultaneous mixed emotions, we found that 13% of the 5-year-olds and 31% of the 6-year-olds insisted that a character would have *two* emotions—even though they had been specifically asked to choose *only one* out of two emotions. Some examples include: "Thinking about snack will take her mind away from Frisky [her cat], so she will feel OK but a little bit sad"; "He'll feel a little bit better but not all the way, because it will make him think about something else and forget about the fish for a little bit"; and "She'll feel sad and OK because she has something to do for her grandmother, so she feels sort of OK, because it will make her grandmother happy, and she doesn't have to think so much about the cat." These explanations are revealing not only about children's understanding of mixed emotions in general (i.e., a person can have them) but also about the mental sources for these mixed emotions specifically (i.e., conflicting thoughts).

coupled with significant changes during the years of 4 to 6 in this understanding. Knowledge of the mental sources of emotion was clearest in the 5- and 6-year-olds. For both the personal and semantic cue stories, the majority of 5- and 6-year-olds explained characters' emotional reactions by explicitly stating that the cue reminded the character of the related past sad event. Also, in the thinking and feeling task, the majority of 5- and 6-year-olds accurately predicted that characters' emotions would fluctuate if they changed the focus of their thoughts and went on to explain the mechanism for these changes in terms of mental activity. In contrast to older preschoolers, 4-year-olds evidenced a tendency to insist that current situations alone cause current emotional reactions, often making this kind of explanation plausible by creating additional events in the story scenarios. However, even 4-year-olds demonstrated some knowledge of mind and emotion. On the semantic cue stories, 44% of 4-year-olds explained characters' emotion in terms of cognitive cuing. Moreover, cognitive cuing responses are a stringent measure of children's knowledge because they required children to comprehensively explain that a character felt sad because a cue made him or her think about a prior negative experience. Even those preschoolers who could not provide a cognitive cuing response were able to show that they understood the relevance of one or more of these components—the cue, thinking, and the link to the prior event. In fact, for the semantic cue stories, 75% of the 4-year-olds demonstrated an appreciation for the in-

fluence of thinking on emotions by suggesting that thoughts and recollections of a previous event were the source of one or more character's sadness. In the thinking and feeling task, 64% of the responses of 4-year-olds correctly predicted changes in feelings due to changes in thinking.

Comparing Table 1 with Table 2 suggests that children demonstrated greater knowledge given semantic cue stories versus personal cue stories. An age (3)  $\times$  cue type (2) ANOVA for cognitive cuing score yielded a main effect for age,  $F(2, 45) = 53.24$ ,  $p < .001$ , for cue type,  $F(1, 45) = 17.37$ ,  $p < .001$ , and a significant age  $\times$  cue type interaction,  $F(2, 45) = 3.26$ ,  $p < .05$ . Simple effects tests indicated that the 4- and 5-year-olds offered significantly more cognitive cuing responses in the semantic cue task than in the personal cue task,  $ps < .03$ , whereas the 6-year-olds showed equal competence with both cue types. This comparison is suggestive at best; the personal and semantic cue stories varied in the number of pictures, story length and format, and the presence of additional sections (e.g., the thinking and feeling task section embedded within the semantic cue stories). Moreover, cue to event relations can vary along several dimensions that were not strictly delineated in Study 1. One dimension concerns the degree of similarity between the current cue and the past event. For example, the current cue (a spotted dog) could be exactly the same as a part of the past event (the same exact dog as before) or only similar (a recognizably similar yet different dog). In Study 1, personal cues were always similar, whereas semantic cues were exactly the same. A different dimension concerns the type of associative relations. For example, a cue could be associated with an item because of an individual past association (Joe wore red shoes) or because of a semantic relation (shoes, feet; babies, diapers; dogs, dog leash). In Study 1, personal cues depended on idiosyncratic past associations (lost rabbit, spotted dog), whereas semantic cues relied on general associations (cat, toy mouse).

## STUDY 2

Prior research concludes that until about age 8 or 9 children understand little if anything about the influence of thoughts on emotions (e.g., Harris, 1989) or the relevance of personal past experiences to emotional reactions in current situations (e.g., Gnepp, 1989a, 1989b). However, Study 1 revealed cogent knowledge at least in 5- and 6-year-olds. In fact, based on Study 1, we felt that young children may possess an even stronger understanding of cognitive

cuing and emotional change than we had yet demonstrated. In various ways, the tasks used in Study 1 were arguably complex. For example, the personal cue stories all contained two initial sad events (e.g., Mary's rabbit is chased away by a spotted dog, and Mary breaks her friend's red ball) followed by a final cue-situation (Mary sees a spotted dog, or Mary sees a red ball). We adopted this format initially because we were concerned that when asked to explain the characters' current sadness in the context of narrative sequences, children might just refer indiscriminately to prior story events without really considering specific cue-to-event relations. However, Study 1 showed that children were almost always appropriate and specific; 98% of the time they made reference to a past event as the cause of a character's sadness it was the event associated with the target cue. In Studies 2 and 3, therefore, we shortened the scenarios to focus on a single past event and its current cue. Given these less complicated scenarios, we then tested still younger children: 3-, 4-, and 5-year-olds.

A further methodological consideration involves the response demands that the Study 1 tasks placed on young children. Children were required to provide verbal explanations rather than make simple yes/no judgments. Moreover, the experimenter never mentioned thoughts or memories in her questioning unless the child himself or herself had done so already. In the end, however, we felt that children often meant more than they clearly expressed. For example, we believe that many young children may have meant that the character's emotions were caused by thoughts about a past event even when they failed to mention that explicitly in their responses; for example, saying, "She is sad about what happened to her rabbit" rather than "She was thinking about her rabbit and that made her sad." In Study 2, therefore, we followed up all children's responses that merely made reference to the past event as the cause of the character's current emotions with the question, "Is [the character] thinking about [past event] right now?" We will call this the *thinking prompt* in what follows. Because responses to this question are at the least less conservative than fully self-generated explanations (and may result in some false positives), these responses were coded as *prompted* and treated separately for some analyses.

In Study 2, in line with our aim of investigating younger children, every cue was exactly the same object that had appeared in the earlier sad event. As already noted, there were several indications in Study 1 that young children might be more knowledgeable about cues that captured exact parts of past



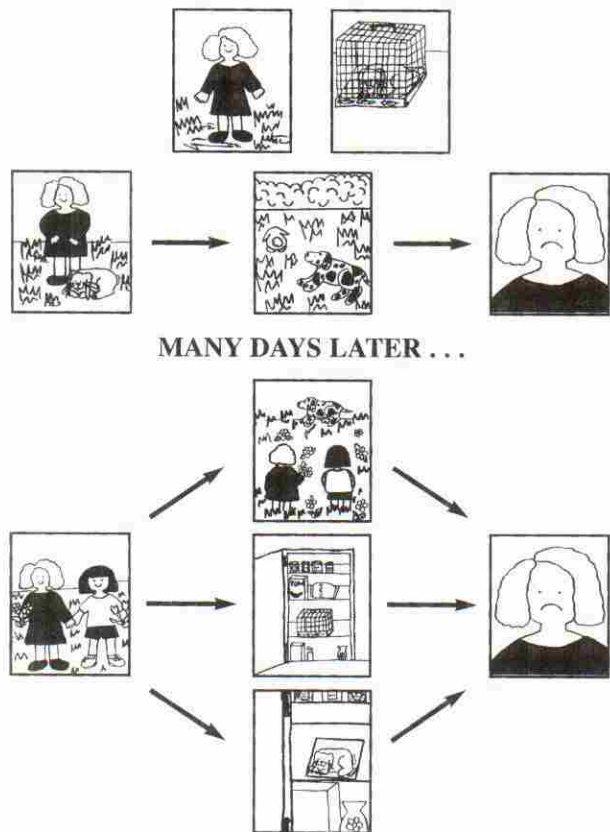


Figure 2 Illustrations for an *emotion cuing* story used in Study 2 shown uncolored in reduced form.

events than cues that were only similar. In addition, three different cue types were used representing three different types of associative relations: *personal*, *semantic*, and *photo cues*. For example, Figure 2 shows the illustrations for a new story for Study 2 about a girl named Mary who has a pet rabbit who lives in a typical rabbit cage. One day Mary's rabbit is chased away by a spotted dog. Mary later encounters either the same dog (personal cue), her rabbit's cage (semantic cue), or a photograph of her rabbit. All three cues show items that had actually appeared earlier (the same dog that frightened the rabbit, the rabbit's actual cage, a photo of the rabbit itself). The connection between the dog and the rabbit, however, depends on the idiosyncratic past event of the character, hence it is a personal cue; the connection between the cage and the rabbit is common and semantic (rabbit, rabbit cage); and the association between the photograph and the rabbit is that it pictures the missing rabbit itself. Study 3, which follows,

focuses on cues that are only similar to parts of the earlier events rather than being exactly identical to them.

## Method

### Participants

Fifty-four children participated; 18 3-year-olds ( $M = 3.6$ ; range = 3,1–3,11), 18 4-year-olds ( $M = 4.4$ ; range = 4,0–4,11), and 18 5-year-olds ( $M = 5.6$ ; range = 5,0–6,1), with equal numbers of boys and girls in each age group. The children were recruited from preschool classrooms affiliated with the University of Michigan that serve predominantly Caucasian, middle- to upper-middle-class families (86% European American, 10% Asian, 4% other), a sample that closely matched the participants tested in Study 1.

### Material and Procedure

We created six structurally identical cuing stories that each consisted of eight simple colorful pictures on  $5 \times 6$  inch laminated cards. In each of the six stories, a character experiences a mildly sad event. Many days later in a happy situation, the character suddenly feels sad after encountering an object that serves as a reminder for the past sad event. All six stories had three possible endings where a cue appears—a personal, semantic, or photo cue ending—resulting in 18 different stories. The personal cues were the exact objects or animals present at the past event (in three out of the six personal cue stories, these entities actually caused the sad events). The semantic cues were actual “possessions” of the lost, broken, or missing person/animal/object. Finally, the photo cues were pictures of the lost, broken, or missing person/animal/object themselves. In pilot testing, we developed stories that were interesting and meaningful to young children. They not only dealt with the loss of material objects (broken doll and bicycle), but also with separations from pets (hurt dog at veterinarian, lost rabbit) and from loved ones (dad on business trip, sick grandmother in hospital). Furthermore, informal pilot testing with college students confirmed that adults typically saw these simple situations in terms of the cognitive cuing of emotions and that the scenarios depicted salient cue-to-event relations.

In the testing procedure, 4- and 5-year-olds were read aloud six stories as the picture cards were placed individually on the board in front of them. Two stories had personal, two had semantic, and two had

photo cue endings. Three-year-olds received only one story of these three types. To ensure that the child was paying attention to and remembering the key points in each story, a control question was included after the initial sad event that asked the child to explain why the character felt sad. After the final event of each story (where the cue appeared), children were told (and shown) that the character started to feel sad and were asked the test question: "Why did [the character] start to feel sad right now?" As with Study 1, the supplementary test question: "What made [the character] think about the [past event] right now?" was additionally asked if a child explained that a character was thinking about a previous experience, but he or she did not mention the cue. To help elicit children's understanding about the cause of sadness, the experimenter paraphrased children's responses and encouraged them to provide additional explanations. In addition, as mentioned previously, Study 2 included a *thinking prompt* (if needed) that was not included in Study 1. Specifically, if children's initial explanation referred back to the past sad event but did not explicitly mention mental states such as thoughts or memories (e.g., "Because her rabbit ran away" rather than "Because she remembered her rabbit ran away") then the experimenter would ask, "Is [the character] thinking about [past event] right now?"

With regard to randomization and counterbalancing, it was prohibitive to test all the order permutations of 18 different story combinations (i.e., 6 stories  $\times$  3 cue endings each). For this reason, we reduced the number of test versions to 18, one version for each child (at every age group) containing a set of six different story combinations. First, all six stories had an equal chance (three times) of appearing in each order slot (i.e., first through sixth story presented to the child). Eighteen different sequences (e.g., 6, 1, 4, 5, 2, 3) with this criterion were generated. Second, each participant had to receive a combined set of two personal, two semantic, and two photo cue stories, with the constraint that each type of cue ending appeared an equal number of times (six times) for each of the six stories. Eighteen different sequences with this criterion were generated. Finally, the random sequences created with the above criteria were paired together to produce the final combinations of story order and cue ending. The 3-year-olds' set of three stories was created using similar criteria, except that they only received one instead of two stories with each type of cue ending.

In addition to these emotional cuing stories, we included a *simple cuing task* as a check for whether these young children understood simple cue-to-event

associations. In the task, a character named Alex goes on three trips in random order—to the dentist, to the candy store, and to the beach. Pictures on 5  $\times$  6 inch laminated cards showed Alex (a girl picture for girl participants and a boy picture for boy participants) and each of the three locations. On each of these trips Alex brings "back an object, something to help her (or him) remember the trip." Alex puts all these things in a box. One day Alex decides to look in the box and pulls out (1) a toothbrush, (2) a pail and shovel, and (3) a lollipop (none of these items were shown in the location pictures). The children were told that Alex "started to think about one of her trips" upon seeing each of these items. The child was asked simply to "point to the trip Alex is thinking about." The simple cuing task always came first in the testing procedure. To check for the possibility that the simple cuing task may prime children to use cognitive cuing explanations when they would not have otherwise, only half of the participants in each age group received the simple cuing task (an equal number of boys and girls).

Every participant was interviewed individually by the same experimenter (a white female) in a private room after at least 4 days of building rapport in the classroom. Children's responses were tape-recorded and transcribed. The testing procedure lasted approximately 15 min.

## Results

### Simple Cuing Task

On the simple cuing task, 3-year-olds were 78% and 4- and 5-year-olds were 100% correct. All age groups were significantly above chance (33% correct),  $ps < .002$ . Thus, almost all children evidenced some knowledge of simple cue-to-event associations—even those framed in terms of thinking about past events.

### Emotion Cuing Stories

#### Coding

Children's explanations for why the characters began to feel sad in the final scene were coded into the same categories used for personal cue stories in Study 1: *situational*, *cue*, *thinking*, and *cognitive cuing responses*. Recall that cognitive cuing explanations explicitly link (1) the cue with (2) mentation about (3) the past event, as in, "Because she sees that picture and she remembers her grandmother in the hospital."

The inclusion of the thinking prompt in Study 2



necessitated an additional coding dimension (*prompted* versus *unprompted*) that was not used in Study 1. Specifically, cognitive cuing and thinking responses in which the child used mental language spontaneously, before the thinking prompt, were coded as *unprompted*. This mental activity language included thinking, remembering, reminding, missing, and wanting.<sup>5</sup> Responses were considered *prompted* if the child used no mental activity language spontaneously in reference to the past event (e.g., "Because her rabbit ran away" instead of "Because she is thinking about her rabbit") but did so when asked the thinking prompt by the experimenter. An example of a prompted response is: "Because she saw a picture of her doll and she's all sad because that doll got ruined. [Prompt: Is she thinking about her doll right now?] Yes, because of the picture." If children were unable to articulate the source of the characters' thoughts, even when given this prompt, their responses were *not* coded as prompted cognitive cuing responses but, rather, as prompted thinking responses. Therefore, both prompted and unprompted cognitive cuing responses required children to do more than simply answer "yes": children had to refer to the past event, state or agree that the character was thinking about that event, and report the source of the character's thoughts.

All transcripts were coded independently by two raters. Interrater agreement for the category of the response fit, including whether the response was prompted or unprompted, was .99. All discrepancies were resolved by mutual discussion.

### Analyses

Children's cognitive cuing scores reflect the number of times they gave cognitive cuing responses out of the total number of stories received. Therefore, for all analyses, 3-year-olds' scores were multiplied by 2 because they received only three trials instead of six. Preliminary analyses of variance revealed (1) that children who participated in the simple cuing task did not give more cognitive cuing responses than those who had not; (2) that unprompted cognitive cuing responses did not systematically increase from the first three to the last three stories children heard

(therefore the thinking prompt did not serve as a general hint or training for subsequent trials); and (3) that boys performed similarly to girls at each age group.

Table 4 shows the primary results.<sup>6</sup> An age (3)  $\times$  cue type (3) ANOVA for unprompted cognitive cuing responses yielded only a main effect for age,  $F(2, 51) = 20.91, p < .001$ . Children gave similar numbers of cognitive cuing explanations for personal (41%), semantic (47%), and photo cues (50%). However, the 3-year-olds (7%) differed significantly from the 4-year-olds (34%), and the 4-year-olds differed significantly from the 5-year-olds (74%), in the percentage of unprompted cognitive cuing responses they used,  $ps < .05$ , Tukey's HSD. A similar age (3)  $\times$  cue type (3) ANOVA for total responses (unprompted plus prompted cognitive cuing responses) also yielded a main effect for age,  $F(2, 51) = 35.12, p < .001$ , and no effect for cue type, with all between-age comparisons significantly different,  $ps < .01$ . Next, we examined the number of children with at least one unprompted response using chi-square analyses. There were significantly fewer 3-year-olds than 4-year olds, and fewer 4-year-olds than 5-year-olds,  $ps < .02$ . These same between-age differences emerged when the number of children with at least one total cognitive cuing response was considered,  $ps < .006$ .

As noted before, cognitive cuing responses are a stringent measure requiring a connected mention of three things: (1) the cue elicits (2) thinking about (3) the prior event. Many children without full cognitive cuing explanations demonstrated substantial knowledge of one or more of these parts. Indeed, as shown in Table 4, 67% of the 3-year-olds and 50% of the 4-year-olds offered a cue response, showing knowledge that the cue and often the past event caused the character's current emotion (e.g., "Because it's the same clown that broke her doll"). An additional 28% of 3-year-olds and 18% of 4-year-olds gave unprompted thinking responses, revealing knowledge that thinking and specifically thinking about the past event influenced emotion (e.g., "She remembers when Bozo stepped on her doll"). Combining thinking and cognitive cuing responses as a larger category of mentalistic responses: 39% of the 3-, 83% of the 4-, and 94% of the 5-year-olds provided unprompted mentalistic explanations that attributed

5. We elected to include "missing" and "wanting" as unprompted responses after careful deliberation. Whereas it could be argued that these are less mentalistic verbs than "thinking" or "remembering," three considerations lead to their inclusion: (1) they appeared infrequently, (2) they were used in reference to the past event, and (3) the experimenter always followed these responses with the thinking prompt to clarify whether children were intending these verbs to describe mental activity.

6. Note that the data presentation for Study 2 in Table 4 is identical to that of Table 1 in Study 1 in all respects except for the consideration of prompted versus unprompted thinking and cognitive cuing responses. Because the thinking prompt was not used in Study 1, then, in the terms of Study 2, all children's responses in Table 1 (and Tables 2 and 3) would be considered unprompted.

Table 4 Children's Explanations for the Same Exact Cue Stories of Study 2

Category of Response	Age		
	3	4	5
Cognitive cuing responses:			
Mean number per age group: <sup>a</sup>			
Unprompted	.22 (7%)	2.06 (34%)	4.44 (74%)
Total	.39 (13%)	3.06 (51%)	5.72 (95%)
Participants with at least one: <sup>b</sup>			
Unprompted	2/18 (11%)	12/18 (65%)	17/18 (94%)
Total	7/18 (39%)	15/18 (83%)	18/18 (100%)
Alternative responses: <sup>c</sup>			
Percentage of participants (highest response): <sup>d</sup>			
Situational responses (%)	6	0	0
Cue responses (%)	11	0	0
Thinking responses:			
Unprompted (%)	28	18	0
Total (%)	44	18	0
Percentage of participants (entire responses): <sup>e</sup>			
Situational responses (%)	78	33	0
Cue responses (%)	67	50	0
Thinking responses (%)	72	72	11

<sup>a</sup> Percentage of cognitive cuing responses, out of six stories per child (or three for 3-year-olds), is shown in parentheses.

<sup>b</sup> Percentage of participants out of 18 is shown in parentheses.

<sup>c</sup> Remaining responses after cognitive cuing responses have been considered; will not total 100%.

<sup>d</sup> Highest response is the most sophisticated response category given out of all six (or three) stories.

<sup>e</sup> Entire responses include any category given by a participant at any time during the six (or three) stories.

the cause of sadness to thinking about a past event.<sup>7</sup> Considering total prompted and unprompted responses: 83% of the 3- and 100% of the 4- and 5-year-olds offered at least one mentalistic explanation. This increasing awareness of mental causes for feelings was simultaneously reflected in the sharp decline of situational explanations with age.

## Discussion

Like Study 1, these data show considerable knowledge about cognitive cuing and emotional change in young children as well as clear developmental changes in children's understanding. A minority of 3-year-olds (39%) compared to the vast majority of 4-year-olds (83%) and 5-year-olds (100%) verbally explained that one or more characters were sad because an associated cue made them think about a previous event. Recall that in this study as in the prior one, children generated and articulated these explanations on their own in response to open-ended explanation questions, "Why did [character] start to feel sad right now?" Open-ended responding of this sort

is often thought to require more robust knowledge than other types of responses, such as yes-no answers or forced choice alternatives. Furthermore, cognitive cuing responses required a connected mention of several factors—the cue, thinking, and past events as the joint cause of emotion. These data therefore demonstrate a substantial, albeit still developing, understanding of thinking and feeling in these young children.

In part, our simplified procedures (i.e., all same exact cues; only one sad event per story) helped these young children articulate their early understanding: whereas only 6% of the 4-year-olds offered a cognitive cuing response in the personal cue task of Study 1 (44% in the semantic cue task), 65% of the 4-year-olds in Study 2 provided unprompted cognitive cuing explanations. Even the majority of 3-year-olds (83%) demonstrated knowledge that thinking about a past event caused sadness, although often failing to explain that these memories were triggered by the associated cues. Finally, knowledge about cognitive cuing and emotion in these preschoolers generalized to several distinctive types of cues: personal cues, semantic associates, and photographs. Good performance with personal cues seems especially noteworthy because personal cues required that the child take

7. Recall that the only difference between thinking and cognitive cuing explanations is whether or not children indicate that the cue caused the character to think about the past event.



into account a person's idiosyncratic past experience—the specific connection formed in the past between person, event, and cue.

### STUDY 3

Study 3 was designed to parallel Study 2 but with similar rather than same exact cues, to compare these two different kinds of cue representations. We again included personal, semantic, and photo cues, in this case cues that were related to prior events only via a similarity in appearance (e.g., a dog that looks sort of like the one seen before, not the identical dog).

An additional goal of Study 3 was to further confirm young children's understanding of the individuated, personal nature of emotional experiences: that two people can have different emotional reactions to the same current situation in light of their past experiences. In both Studies 1 and 2 we believe that, at least when children provided cognitive cuing responses, they understood that the target characters were feeling sad because of an experience individual to them. That is, they understood that emotional reactions were unlikely to be experienced by someone else in the current situation who had not experienced the prior events. Indeed, in Study 2 we checked this assumption in an unsystematic fashion. In that study, some of the stories featured two characters in the final scene—the target character and a friend who was naive to the prior event. For these particular stories, some children were not only asked to explain the target character's sadness but also how the friend was feeling in the final scene. Thirty-three percent of the 3-, 72% of the 4-, and 78% of the 5-year-olds were asked this question on one or more occasions, yielding 6, 17, and 19 total responses, respectively. We found that 83% of the 3-year-olds' and 100% of the 4- and 5-year-olds' responses correctly predicted that the friend would not feel sad. In Study 3, we modified the six story endings so that a friend was always present in the final scenes where the personal cue appeared so that every child was asked to both predict and explain this *other person's emotion*.

### Method

#### Participants

Fifty-four children participated: 18 3-year-olds ( $M = 3,6$ ;  $range = 3,2-4,0$ ); 18 4-year-olds ( $M = 4,6$ ;  $range = 4,1-4,11$ ); and 18 5-year-olds ( $M = 5,6$ ;  $range = 5,0-6,2$ ), with equal numbers of boys and girls in each age group. The children were recruited from the same schools used for Study 2.

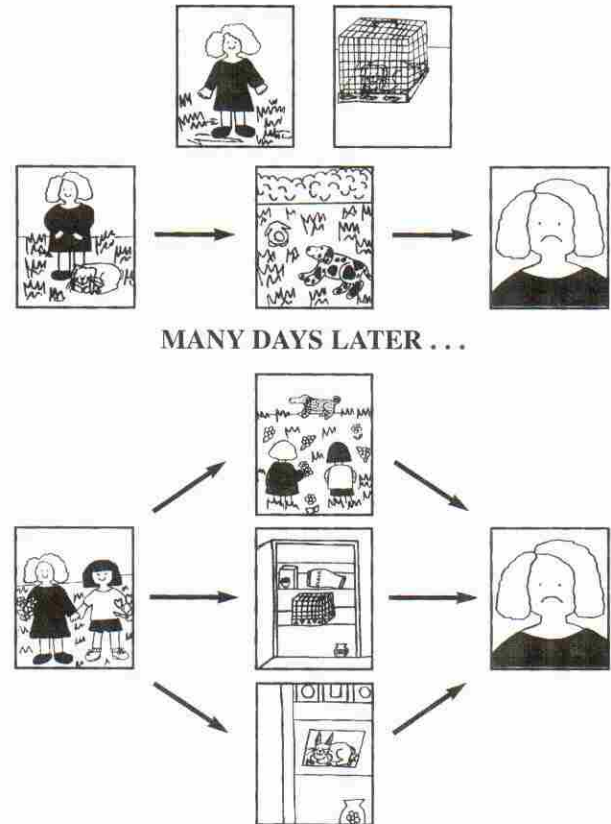


Figure 3 Illustrations for an *emotion cuing* story used in Study 3 shown uncolored in reduced form.

#### Material and Procedure

The procedure was nearly identical to that of Study 2. Minor modifications were made to the six stories, so that all of the cues were only similar to, and noticeably different from, the entities from the past sad events. Figure 3 illustrates these changes. Here Mary's rabbit is chased away by a spotted dog. She later sees a dog that is similar to, but different from, the dog that chased her rabbit (personal cue), or a rabbit cage that is a bit different from her rabbit's cage (semantic cue), or a picture that looks kind of like her rabbit (photo cue). Although not clearly evident from the reduced black and white pictures in Figure 3, these objects were easily distinguishable as different from, although similar to, their counterparts in the original situations.

Slight changes were made to the personal cue endings of the stories so that a friend was always present in the final scene. When personal cue stories were presented, children were asked to explain the target character's emotional reaction and then predict and explain the friend's emotional reaction to the final event (the *other person's emotion* task). All of the re-

maining procedures were the same as Study 2—including the administration of the simple cuing task, control questions, randomization and counterbalancing, the standard follow-up questions, and the thinking prompt. Again, 4- and 5-year-olds received two stories of each type (personal, semantic, and photo cues); whereas 3-year-olds received one story of each type. Participants were tested individually by the same experimenter (a white female) in a private room after at least 4 days of building rapport in the classroom, and again the testing procedure lasted approximately 15 min.

## Results

### Simple Cuing Task

Three-year-olds were again highly accurate on this task, 89% correct, which was not significantly different from the 4- (100%) or 5-year-olds (96%).

### Emotion Cuing Stories

#### Coding

Children's explanations were coded into the same categories used in Study 2. Interrater agreement was .98.

#### Analyses

Initial analyses of variance indicated that participation in the simple cuing task did not significantly affect children's unprompted or total cognitive cuing scores, and unprompted cognitive cuing responses did not systematically change from the first three to last three stories children heard. An age (2)<sup>8</sup> × sex (2) ANOVA for total cognitive cuing responses yielded a main effect for age,  $F(1, 32) = 4.06$ ,  $p < .05$ , and for sex,  $F(1, 32) = 6.94$ ,  $p < .013$ . Tukey's HSD comparisons revealed that the 4- ( $M = 3.78$ ) and 5-year-old girls ( $M = 5.22$ ) outperformed boys at both respective age groups (4-year-old  $M = 1.89$ , 5-year-old  $M = 3.33$ ),  $ps < .01$ . This gender difference will be addressed in the general discussion; the analyses that follow collapse across gender.

Table 5 shows the primary results. An age (3) × cue type (3) ANOVA for unprompted cognitive cu-

ing scores<sup>9</sup> resulted only in a main effect for age,  $F(2, 51) = 10.69$ ,  $p < .001$ . As with Study 2, children demonstrated equivalent knowledge about cognitive cuing with personal (41%), semantic (47%), and photo cues (49%). Post hoc Tukey's HSD comparisons indicated that the unprompted cognitive cuing scores of the 3- (9%) and 4-year-olds (22%) differed significantly from the 5-year-olds' (54%),  $ps < .01$ , with no difference between the 3- and 4-year-olds' unprompted scores. Identical analyses carried out for total responses (prompted plus unprompted cognitive cuing responses) also yielded a main effect for age,  $F(2, 51) = 9.38$ ,  $p < .001$ ; however, post hoc comparisons revealed a significant difference only between the 3- (19%) and 5-year-olds' (71%) scores,  $p < .01$ . Finally, for both unprompted and total responses, significantly fewer 3-year-olds provided at least one cognitive cuing response than did 4-year-olds,  $ps < .015$ ; however the 4- and 5-year-olds did not significantly differ.

*Comparison of same exact versus similar cues.* Studies 2 and 3 together compare children's understanding of same exact versus similar cues. Three-year-olds were excluded from this analysis to eliminate possible floor effects and because they received only three instead of six trials. An age (2) × cue representation (2) ANOVA for unprompted cognitive cuing scores yielded a main effect for both age,  $F(1, 68) = 20.55$ ,  $p < .001$ , and cue representation,  $F(1, 68) = 4.25$ ,  $p < .04$ . Specifically, the average cognitive cuing scores of both the 4- and 5-year-olds were significantly lower for similar cue stories than for same exact cue stories. When total cognitive cuing responses are considered, performance was again worse for similar in comparison to same exact cue stories,  $p < .08$ .

*Alternative explanations.* As with Studies 1 and 2, even when failing to provide cognitive cuing responses, young preschoolers evidenced considerable understanding about the influence of past events, cues, and thinking on emotional arousal. As shown in Table 5, half of the 3-year-olds (50%) and nearly all of the 4-year-olds (89%) gave one or more cue responses. It is important to note that, as in Study 1, when children were given similar cue stories, many attempted to turn similar cues into same exact ones in various ways. For example, 39% of 4- and 5-year-olds physically transformed the similar cue to make it same exact: "She's sad because maybe that's the same clown . . . and he dyed his shoes red and his hat red." In addition, 39% claimed the character felt

8. Three-year-olds were excluded from this preliminary analysis because their average cognitive cuing score was so low, making floor effects a problem.

9. As with Study 2, cognitive cuing scores reflect the number of times children gave a cognitive cuing response. Because 3-year-olds received only three, instead of six trials, their scores were multiplied by 2 to equate the number of opportunities to respond across children.



Table 5 Children's Explanations for the Similar Cue Stories of Study 3

Category of Response	Age		
	3	4	5
Cognitive cuing responses:			
Mean number per age group: <sup>a</sup>			
Unprompted	.27 (9%)	1.33 (22%)	3.22 (54%)
Total	.56 (19%)	2.83 (47%)	4.28 (71%)
Participants with at least one: <sup>b</sup>			
Unprompted	3/18 (17%)	10/18 (56%)	14/18 (78%)
Total	5/18 (28%)	13/18 (72%)	15/18 (83%)
Alternative responses: <sup>c</sup>			
Percentage of participants (highest response): <sup>d</sup>			
Situational responses (%)	6	0	6
Cue responses (%)	17	0	0
Thinking responses:			
Unprompted (%)	11	27	5
Total (%)	50	27	11
Percentage of participants (entire responses): <sup>e</sup>			
Situational responses (%)	44	50	22
Cue responses (%)	50	89	39
Thinking responses (%)	67	56	50

<sup>a</sup> Percentage of cognitive cuing responses, out of six stories per child (or three for 3-year-olds), is shown in parentheses.

<sup>b</sup> Percentage of participants out of 18 is shown in parentheses.

<sup>c</sup> Remaining responses after cognitive cuing responses have been considered; will not total 100%.

<sup>d</sup> Highest response is the most sophisticated response category given out of all six (or three) stories.

<sup>e</sup> Entire responses include any category given by a participant at any time during the six (or three) stories.

sad because he or she had misrepresented the cue: "He doesn't know what his real bicycle looks like, so he thinks that's a picture of his real bicycle."

Table 5 also shows children's thinking responses and shows that an additional 11% of 3-year-olds and 27% of 4-year-olds spontaneously suggested, without the aid of the thinking prompt, that thinking about the past event was the cause of one or more character's sadness. In fact, when thinking and cognitive cuing explanations are considered jointly, 28% of the 3-year-olds and 83% of the 4- and 5-year-olds provided unprompted references to thinking. These figures rise to 78% for 3-year-olds and nearly 100% for 4- and 5-year-olds for total (prompted and unprompted) mentalistic explanations. Moreover, as with Studies 1 and 2, situational responses (e.g., "Because she ripped one of her flowers") were largely used by the 3- and 4-year-olds, revealing that with age, children are more likely to consider mental, rather than situation-based causes for feelings.

*Other person's emotion.* Children received a score from 0 to 2 reflecting the number of times they correctly predicted that the friend would not feel sad in the final scene. Three-year-olds' scores were multiplied by two because they received only one trial. A one-way ANOVA indicated that the number of cor-

rect predictions from 3-year-olds (83%) did not differ significantly from 4- (89%) or 5-year-olds' (92%). *T* tests indicated that all age groups were above chance (50%),  $ps < .001$ . However, 3-, 4-, and 5-year-olds did not give equivalent reasons for this opposite emotion in terms of the friend's lack of knowledge about, or lack of direct experience of, the prior event as in, "She's OK, because it wasn't her rabbit that got chased away," or "She's OK because she doesn't know what happened to Anne's doll." Whereas only 6% of the 3-year-olds explanations made reference to the past event, 47% of the 4-year-olds and 75% of the 5-year-olds did so,  $F(2, 51) = 16.48, p < .001$ .<sup>10</sup> In contrast, 56% of the 3-year-olds', 31% of the 4-year-olds', and 8% of the 5-year-olds' responses made reference to only the current situation (e.g., "She's happy because she is playing with her friend").

## Discussion

The majority of 3-, 4-, and 5-year-olds correctly predicted that a friend, who had never experienced a character's prior sad occurrence, would not feel sad when he or she encountered the associative cue. That

10. All transcripts were coded independently by two raters. Interrater agreement was .99.

is, they demonstrated understanding that emotional reactions are unique and individuated—the feelings a situation provokes in one person can be different from the emotions elicited in another. Focally, the comparison between the same exact cue stories of Study 2 and the similar cue stories of Study 3 revealed that 4- and 5-year-olds' ability and willingness to explain emotions in terms of cognitive cuing were affected by the representational nature of the cue. That is, young children evidenced significantly more knowledge about how reminders that were actually exact parts of past events could trigger related thoughts than they did about cues that were only symbolically related to past events via a similar appearance.

This difference between children's understanding of same exact versus similar cues is further supported by the details of children's explanations in this study and Study 1 (the personal cue task). When presented with similar cues young children often actively converted them to exact replicas—saying a small current puppy actually was the larger dog from the prior event (but had shrunk or been disguised) or saying that at least the target character had mistaken it for the prior one in his or her mind. It is important to note that when faced with same exact cues, children did not confuse the current story situation for the past one; they carefully explained that the cue, because it was present in the prior situation too, reminded the target character of the past. Other research on children's understanding of beliefs and knowledge has found that children under 6 years of age view the mind as a passive receptacle or "copy container" of the external, physical environment (Chandler & Boyes, 1982; Flavell, 1988; Pillow, 1988; Wellman, 1990). Perhaps preschoolers have an analogous "copy" concept of memory storage and retrieval as well: memories are automatically or easily elicited if the person directly re-witnesses some exact part of them. Taking the Mary vignette as an example, preschoolers may believe that when Mary first sees the dog chasing her rabbit away, that event is copied into her memory. If she sees the same dog on a later occasion this will trigger the memory, but if it is a different dog, it will not. This is speculative, but at the least our findings demonstrate that young children's understanding of cues as a source of thoughts is especially linked to, and thus especially revealed in, situations where cues are exact replicas of key portions of past significant events.

## GENERAL DISCUSSION

These three studies demonstrate substantial understanding of the relation between cognitive cuing and

emotions, and hence thinking and emotions, in preschool-aged children—especially older ones. Across the studies, 5- and 6-year-olds' performance was consistently high. When the task complexity of Study 1 was reduced, 4- and even 3-year-olds evidenced considerable knowledge about cues, thoughts, and their combined influence on emotion. This was particularly apparent in Study 2 where all the cuing situations used same exact cues, reminders that were themselves parts of the earlier to-be-remembered situations. There were also notable developments over these early years. Three- and 4-year-olds had a decided tendency to explain emotions in terms of current external situations, a finding that is consistent with prior research. Yet, these tendencies co-existed with, rather than completely precluded, an emerging understanding of mental influences on emotional induction and change. Our data from 3-year-olds are the least robust, but by 4 and 5 years certainly, children evidenced substantial knowledge about mind and emotion. Indeed, as outlined in the introduction, young children's understanding of cognitive cuing and emotional change revealed several critical conceptions: (1) an understanding that people's emotions can be independent of objective events—people's prior experiences, desires, beliefs, and thoughts can affect their emotional reactions to situations; (2) an awareness of and the ability to infer mental activity (e.g., thinking or remembering) in people; (3) an understanding of how mental activity can influence emotional arousal; and (4) knowledge about sources of thoughts, specifically, cognitive cuing.

### Understanding That People's Emotions Can Be Independent of Objective Events

In Studies 2 and 3, the majority of even the youngest participants, 3-year-olds, not only gave cue responses, revealing an understanding that unique, rather than common, properties of a situation can elicit emotional reactions, but they also indicated that thinking about a prior experience, not the current situation, was making a character feel sad. In fact, the vast majority of 4-, 5-, and 6-year-olds elaborated on this link between the cue and the past event by explaining that a consensually benign or happy occasion (e.g., eating ice-cream with a friend) can provoke sadness if there is a particular feature in that situation (e.g., a dog leash) that makes an individual think about an associated unhappy event from his or her past (i.e., a cognitive cuing response). These preschoolers were not only able to explain how photographs could make a person remember associated events but were also equally capable of appealing to such cue-to-event relations with idiosyncratic per-



sonal associates. Understanding of personal cues is especially linked to knowledge of individual differences in emotions, because personal cues, as opposed to either photographs or common associates, rely on specific individual experiences connecting cue and event in a person's past. Moreover, in Study 3, 3- to 5-year-olds were near ceiling in their ability to predict that a friend, who had never experienced a character's prior sad experience, would not feel sad after encountering the same associated cue.

These data suggest that young preschoolers are aware that the same situation can provoke different emotions in people dependent upon individual past histories and experiences. This is in contrast to earlier research indicating that preschoolers have little understanding that people can have different psychological reactions to an identical situation (e.g., Gove & Keating, 1979) and that children younger than 8 or 9 show little appreciation for the impact of prior experiences on current emotions (e.g., Gnepp, 1983, 1989a). Preschoolers' higher performance on our tasks may be partly attributable to the fact that, at least in the cognitive cuing stories, we specifically stated (and pictorially showed) that characters were experiencing atypical, or anomalous, emotional reactions to current events (e.g., feeling sad at a birthday party). This may have encouraged children (like adults) to consider explanations for sadness other than the present situation—namely, the relevance of a past event.

### Understanding the Presence and Influence of Mental Activity on Emotional Arousal

In their explanations, 4- through 6-year-olds were very willing to attribute thinking and remembering to characters in emotionally charged situations: 83% of 4-year-olds and 93% of the 5- and 6-year-olds gave unprompted thinking responses to one or more stories they heard. That is, they verbally explained, in their own words without any prompting by the experimenter, that a character was sad because he or she was currently thinking about something. Because children were simply asked why the character felt sad, they could have easily referred to only external aspects of the person or the situation. Many children did this at times. But in addition, the vast majority of 4- and 5-year-olds made unprompted references to thinking. When total (unprompted and prompted) responses are considered, over 60% of the explanations in every age group (including 3-year-olds) made reference to ongoing mental activity.

These same data speak not just to an awareness of mental activity but to a recognition of how such mental activity influences emotions. Consistent with

prior findings (e.g., Harris, 1989; Harris & Lipian, 1989; Harris & Olthof, 1982), our data showed that preschoolers often look to immediate situations to explain emotional reactions. At the same time, however, young children evidenced substantial knowledge and awareness about mental sources for feelings. Across all three studies less than 7% of the 3- and 4-year-olds exclusively attributed every character's sadness to immediate external situations. In contrast, the majority of the explanations of 3-, 4-, and 5-year-olds were mentalistic: characters were not sad because of the current event, *per se*, but rather because remembering a previous sad experience reinstated some of the same negative feelings. The thinking and feeling task of Study 1 pointed to similar conclusions. In that task, the majority of 4- to 6-year-olds accurately predicted that people's emotions will change if they only change the focus on their thoughts: a person will feel worse if he or she focuses on a negative experience and will feel better if he or she thinks about something distracting. Flavell and his colleagues (1995) have recently documented a reluctance in preschool children to infer that people are thinking in cognitive situations where older children and adults readily infer mentation (e.g., reading, problem solving, attending). In only one case in one study did preschoolers more readily attribute thinking and remembering to characters, and this was in certain emotional situations. As we discuss shortly, it is possible that children's initial understanding of thinking as a prevalent human activity focuses on thinking about emotionally charged experiences or reactions.

### Understanding of Cognitive Cuing

Young children's specific understanding that cues can trigger thoughts about associated events was clearly revealed in their cognitive cuing responses, because, to reiterate, in these explanations children had to state that (1) the cue made the character (2) think about (3) the past event. In Studies 2 and 3, few 3-year-olds (14%) compared to the majority of 4- and 5-year-olds were able to provide unprompted cognitive cuing responses; thus, spontaneously connecting these three components of cognitive cuing and emotional change (e.g., "Because the leash reminds him of his own doggy"). When total responses are considered, 33% of the 3-year-olds, 78% of the 4-year-olds, and 92% of the 5-year-olds made explicit reference to the cue as the source of one or more characters' thoughts and ensuing sadness. In such responses, they showed appropriate inferences about *when* a person was thinking, *what* they were thinking about, and *where* the thoughts came from. This was



not always the case. Many times when young children, especially 3-year-olds, inferred that a character was thinking about a past event, they made no reference to the cue as the source of the character's thoughts. That is, they provided thinking responses instead of cognitive cuing responses. Our systematic use of the follow-up question in Studies 1 through 3, "What made the character think about the past event right now?" allowed us to gather information about preschoolers' alternative ideas about the sources of thoughts. Three-year-olds typically explained that thoughts originated from (1) nowhere (characters were thinking because "They just wanted to"), (2) emotional attachments to objects from the past events (e.g., "Because he liked to ride his bike so much, and he wants it so badly"), or (3) the memory of some specific content of the event (e.g., "Because Sparky is away at the vet's"). Four- and 5-year-olds suggested these alternative sources to increasingly lesser degrees. In fact, by the ages of 5 and 6, children rarely suggested a character was thinking about the past event without simultaneously indicating that the cue caused the character to remember—especially when the cues were same exact parts of those earlier experiences. These findings are consistent with related research on children's knowledge about the sources of knowledge and beliefs, with 3- and 4-year-olds demonstrating difficulty describing how they know what they know (O'Neill, Astington, & Flavell, 1988; O'Neill & Gopnik, 1991).

### Other Concerns

Our data include critical controls that support the validity of these conclusions by ruling out several alternative explanations. For example, it could be hypothesized that children's responses on our tasks evidence little if any understanding of emotion but, instead, only their own experience of emotion. That is, according to this alternative account, when listening to our stories children themselves became sad, and when asked to explain why a character felt sad, they merely referred to what was making themselves feel unhappy. However, to reiterate, in Study 3, nearly all 3- through 5-year-olds accurately predicted that someone else, who was never at the character's prior event, would *not* feel sad when he or she was faced with the same current situation. If children's answers only reflected projection of their own current emotions, children would have responded incorrectly to this question. A different concern might be whether young children really understood the influence of past events on current emotions or, instead, were simply repeating story events indiscriminately.

In Study 1, we included two prior sad events but only one final cue-event to assess this possibility. Over 98% of the time when these children made reference to a prior event, it was the appropriate one, the event associated with the cue in the final scene. Finally, it is worth stressing that our data do not reflect one-word responses to forced-choice questions. Primarily we required children to verbally explain, in their own words, what they thought caused the characters' sadness. If anything, our data may underestimate children's early understanding because we required them to give clear and coherent responses to open-ended questions. Nonetheless, children typically answered sensibly and cogently.

These findings raise the question of why young children, in our studies, demonstrated such compelling understanding of mind and emotion. In particular, they showed an understanding of the individuated, historic nature of emotion not apparent in other research (e.g., Gnepp, 1983, 1989a, 1989b; Gove & Keating, 1979; Harris & Olthof, 1982) and an understanding of the presence and influence of thinking on emotion, not revealed in earlier research—"preschoolers are generally poor at determining both when a person is thinking and what the person is thinking about" (Flavell et al., 1995, p. 79). In essence, we believe these two findings go hand in hand. Children may first achieve an early understanding of thinking in the context of emotions, including emotions arising from thoughts or memories about prior happenings. Complementarily, an understanding that people's *thoughts* can differ may help children appreciate that their emotions can be different as well.

To elaborate, consider children's understanding of thinking as a mental activity in more detail. We believe there are several reasons why emotion is a special situation in which children are first able to understand and talk about the sources, content, and consequences of mental activity in explicit and mature ways. Parents first start talking to their children about the causes of emotions around 18 months of age (Dunn, Bretherton, & Munn, 1987), and during the third year, the amount of time preschoolers talk about the causes of other people's emotional reactions dramatically increases (Dunn & Brown, 1991, 1993). Emotions, especially negative ones, are extremely salient to young children, and as a result, children are particularly concerned about learning their causes (Dunn & Brown, 1991; Dunn et al., 1987). Another feature of parent-child verbal dialogues starting around 18 months of age and becoming increasingly collaborative and child-initiated during the preschool years is talking or reminiscing about



past shared events (Hudson, 1990; Reese, Haden, & Fivush, 1993). These discussions—"Remember when we (did so and so) . . . and . . . (such and such) happened"—are often framed with emotional themes as well (e.g., Bretherton, Fritz, Zahn-Waxler, & Ridgeway, 1986; Fivush, 1991; Kuebli & Fivush, 1992), especially negative emotions (Hudson, 1991; Miller & Sperry, 1988). Therefore, young children not only readily inquire about the causes of emotions, but they also are encouraged, from very early ages, to remember and reminisce about their previous experiences and how they felt in the past.

Moreover, because thinking about past affect-laden events often reengenders some of the same feelings, it could facilitate awareness of the accompanying thoughts. We are in agreement with Flavell, Green, and Flavell (1993, p. 396) that "persistent worries and other preoccupations may be among the first examples of the stream of consciousness to be noticed by children." In stark contrast to emotionally charged situations, ongoing thoughts during everyday activities like reading, seeing, or talking have no obvious behavioral or emotional consequences to them, and, as a result, might more easily go unnoticed. Moreover, parents and children find little reason to talk about ongoing mental activity in these situations (Flavell et al., 1995). In this regard, our results do not necessarily contradict those of earlier studies; rather, they suggest that the salience of emotions to young children, especially negative emotions like sadness, contribute to an early awareness of the sources and content of thoughts as well as an early understanding of the influence of ongoing mental activity on a person's well-being.

One final set of findings from our studies deserves discussion and, in fact, helps underwrite the hypothesis that the salience of emotions combined with frequent conversations about their causes contributes to children's early understanding of thinking in the context of emotions. These findings concern the significant gender differences in children's knowledge, with girls often outperforming boys. Dunn and her colleagues have found that conversations about emotions are not equally distributed in all families and across all children: mothers talk more to their daughters than their sons about the causes of emotions, and, by the age of 2, girls talk more extensively about emotions than boys (Dunn et al., 1987). Moreover, individual differences in mothers' talk about feelings to both their sons and daughters is directly associated with children's talk about feelings in general and, as well, children's performance on emotion perspective-taking tasks several months later (Dunn & Brown, 1991; Dunn, Brown, & Beardsall, 1991; Dunn, Brown,

Slomkowski, Tesla, & Youngblade, 1991). Other researchers demonstrate that the frequency and quality of children's and parents' narratives about past events differ between boys and girls. Notably, Fivush (1991) and Kuebli and Fivush (1992) reported that parents talk with their 3-year-old daughters significantly more about the causes and consequences of sadness than with their sons in relation to past events. Moreover, Reese and Fivush (1993) found that although preschool-aged boys and girls share equivalent linguistic and memory skills, parents have more elaborate discussions with their daughters than with their sons about past experiences, and complementarily, daughters demonstrate a greater willingness to actively participate in these conversations. Therefore, individual differences in children's ability to reason about and verbally explain the causes of emotions may be strongly influenced by the frequency, quality, and duration of conversations they have with parents about the causes and consequences of emotions.<sup>11</sup>

Finally, our emphasis thus far on young children's noteworthy understanding of thinking and feeling should not obscure the sizable developmental changes evident in the period from 3 to 6 years. Most obviously, in these years children come to more fully appreciate the influence of cognitive cuing on emotions. Whereas even 3-year-olds demonstrated knowledge that current emotional responses can be affected by past events and were also able to pick out the unique feature in the situation, the cue, that was eliciting sadness in the character, most 3-year-olds failed to understand or articulate the mechanism that made the cue so provocative—that it made the character remember the associated experience from the past. Thus, with increasing age, children not only were more likely to explain that remembering a prior experience was causing sadness, but they also more frequently attributed the source of this mental activity to the cues in the environment. In Studies 2 and 3, the majority of 4-year-olds tested could give coherent unprompted thinking and cognitive cuing explanations for at least one out of the six trials they received. By age 5, not only did the vast majority of children offer an unprompted thinking or cognitive cuing re-

11. It is also notable that related clinical research strongly suggests that introspection on the causes of sadness may be more a female-oriented activity than a male-oriented activity: 8- to 11-year-old depressed girls are more contemplative and introspective, whereas depressed boys are more active and trouble making (Nolen-Hoeksema, Girgus, & Seligman, 1986); and women are more likely than men to ruminate, or concentrate on, their depressed state and the possible causes and consequences of these negative feelings (Nolen-Hoeksema, 1991).



sponse on at least one trial, but they also did so for the majority of the six stories they heard (ranging from 62% of the trials in Study 3 to 78% in Study 2).

Additional advancements in the preschool years involve a greater awareness of the causes, presence, and influence of ongoing mental activity. As revealed in the comparison between Studies 2 and 3, one further development involves a greater understanding of how objects that were never at past events can become elicitors of those experiences if they share common properties, for example, similar physical appearances. Five-year-olds are beginning to acknowledge that thoughts and events can link together in these more symbolic fashions, and by age 6 (Study 1) children evidenced quite consistent knowledge about cognitive cuing with similar cues, although there was still room for development. Finally, our data, like Flavell and his colleagues' (1995), show substantial development during the preschool years in children's ability to infer when people are currently thinking. Compared to 4- through 6-year-olds, 3-year-olds more often attributed the cause of characters' emotions to objective events in the past and present, frequently ignoring what to older children was the obvious role of thinking. Yet, even 4-, 5-, and 6-year-olds' knowledge about the presence and impact of thinking in our emotional situations must be understood in relation to their refusal, in Flavell et al.'s (1995) research, to acknowledge the presence of thinking in many others aspects of people's lives—for example, their reading, their attending, and their problem solving. In contrast to grade school children and adults, who believe that ongoing stream of consciousness, thinking, introspection, and inner speech are ubiquitous features of human experience, preschoolers' awareness of the role of thinking in strictly emotional circumstances seems limited indeed. Nevertheless, because understanding of thinking and emotions appears to be substantial in the preschool years, we believe it warrants further attention. We would not be surprised if future research shows that early knowledge about the mental causes of emotions provides young children with an early entry into understanding several more sophisticated aspects about the mind—including stream of consciousness, memory, thinking, and cognitive cuing.

#### ACKNOWLEDGMENTS

Study 1 was completed by K. H. Lagattuta in fulfillment of the Honors Program in Psychology at Stanford University in 1993 in collaboration with J. H. Flavell and was supported by a grant from Stanford University Undergraduate Research Opportunities to

Lagattuta and NIMH grant MH 40687 to Flavell. Studies 2 and 3 were supported by a Graduate Fellowship from the National Science Foundation to Lagattuta, and by NICHD grant HD 22149 to H. M. Wellman. We would like to thank the staff, parents, and children of the child-care centers and nursery schools near Stanford University and the University of Michigan who participated in the studies. Portions of this article were presented at the biennial meeting of the Society for Research in Child Development, April 1995 in Indianapolis, Indiana.

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