

The Preschooler's Understanding of the Causes and Consequences of Emotion

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RUSSELL, JAMES A. *The Preschooler's Understanding of the Causes and Consequences of Emotion*. CHILD DEVELOPMENT, 1990, 61, 1872–1881. This article reports evidence on 2 issues: (a) the preschooler's understanding of the causes and consequences of basic emotions, and (b) the relative power of a word, such as *happy*, versus a facial expression, such as a smile, to evoke that knowledge. Preschoolers ($N = 120$, mean age = 4-11) completed stories about fear, anger, sadness, happiness, and surprise by telling either why the protagonist felt that way or what the protagonist did when feeling that way. Responses were scored both "subjectively" (rated as appropriate or not) and more "objectively" (frequency of a judge guessing the question asked). By both criteria, the children did well, distinguishing causes from consequences and between most of the emotions. Contrary to what is commonly assumed, children were no more accurate—and sometimes less accurate—when the emotion was specified by a prototypical facial expression than when specified by a word.

The study reported in this article was aimed at gathering information on two questions about children's knowledge of emotion: (a) how much preschoolers know about the causes and consequences of basic emotions, and (b) the relative power of a word versus a facial expression to evoke that knowledge. I shall begin with the second issue.

The question is whether a facial expression is an especially good means of conveying an emotional message to a child. For instance, does a smile better convey to a preschooler the idea of happiness than does the word *happy*? Does a frown better activate the concept of unhappiness than does the word *unhappy*? There are reasons to believe that the answer to such questions is yes. A good theoretical rationale exists for believing that our biological heritage includes a preparedness to communicate emotion through facial expressions (Darwin, 1872/1965). Even infants have been said to recognize facial expressions of emotion (Bowlby, 1969; Field et al., 1983; Field, Woodson, Greenberg, & Cohen, 1982). Preschoolers' errors in labeling facial expressions of emotion are more likely to be attributed to deficiencies in vocabulary than to misunderstanding the face (Walden & Field, 1982). Younger children rely on facial over situational cues in interpreting the emotion of another (Camras, 1986). Children younger

than 7 have been portrayed as understanding only those emotions associated with a characteristic facial or other nonverbal display (Harris, 1989, p. 82). And the power of faces presumably remains through adulthood, when communication of emotion is said to be more powerful through nonverbal than through verbal channels (Mehrabian, 1972).

On the other hand, there is empirical evidence to the contrary. Camras and Allison (1985) asked children to guess which emotion another child would feel in various situations (Her mother has died. Does she feel happy, sad, or angry?). For the present discussion, the interesting feature of their study was that the response options were presented to the child either as words, as in the example given, or as the corresponding facial expressions. In Camras and Allison's words, "Performance was high on both response measures, but recognition of labels exceeded that of facial expressions" (p. 84). Camras and Allison called this result "particularly striking," in part because the facial expressions used were "highly stereotyped and have been shown to be universally identifiable in cross-cultural studies with adults" (p. 91).

One purpose of the study reported in this article was to examine the Camras-Allison result further because it is indeed striking, but

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also because it was unexpected, because it did not occur for all ages and all emotions, and because the situation presented to the child was not precisely the same for the two response modes. In the present study, preschool children, 4 or 5 years of age, were asked to describe the causes and consequences of particular emotions. The emotion in question was communicated to the child by (a) a photograph of a prototypical facial expression of that emotion, (b) the name of the emotion, or (c) both facial expression and name.

Children's behavior in this task also provided information on their knowledge of the causes and consequences of particular emotions. That knowledge, because it is key to children's understanding of the persons around them, was the second focus of the present study. Two general conclusions are suggested by previous research on this topic (Barden, Zelko, Duncan, & Masters, 1980; Borke, 1971, 1973; Fabes, Eisenberg, McCormick, & Wilson, 1988; Gnepp, 1983; Green, 1977; Harris, 1983; Harris & Olthof, 1982; Masters & Carlson, 1984; Reichenbach & Masters, 1983; Stein & Trabasso, 1989; Trabasso, Stein, & Johnson, 1981; Uberg & Docherty, 1976). First, even preschoolers have some knowledge of the causes of emotion. And second, the extent of that knowledge varies with the emotion. For example, most studies found that children know more about happiness than about fear, anger, or sadness. In addition, one study found that preschool children have some understanding of the consequences of different emotions, and moreover can differentiate causes from consequences (Surbey, 1979, reported by Trabasso et al., 1981).

Nevertheless, many issues remain contentious, and even the conclusions just stated are debatable—as is seen by reconsidering Surbey's (1979/1981) study of 32 3- and 4-year-olds. Surbey began telling each child a story about a fictional character who was happy, surprised, excited, angry, sad, or afraid. Surbey then asked the child to finish the story—to tell (in the cause condition) what had happened or (in the consequence condition) what would happen next. Children seemed to do well, differentiating between the various emotions and between causes and consequences. One problem might be that Surbey had credited a child with a correct response when two adult judges agreed that the response was correct. However, a story judged correct for *sad* might conceivably have also been judged correct for, say, *angry* as

well. A story judged correct as a cause might have been judged correct if given as a consequence. The adult judgments cannot therefore tell us whether children differentiated causes from consequences or sadness from anger. Surbey's analysis of the content of the children's stories provided some information on this issue. The stories given for causes were unlike those given for consequences, and the stories given for positive emotions were unlike those given for negative emotions. Beyond this, however, there was considerable similarity of story content: What children gave, for example, as the causes of one negative emotion were similar to what they gave as causes for the other negative emotions. The possibility remains that Surbey's preschoolers mainly distinguished causes from consequences and positive from negative emotions. If so, Surbey might have *overestimated* how much children know.

On the other hand, it is also conceivable that Surbey might have *underestimated* how much children know. The emotion in question was conveyed to the children through a word, such as *happy*, and the errors they made might have been due to limited vocabulary. If, as is commonly assumed, children's concepts of specific emotions are more strongly tied to facial expressions than to their lexicon, they might have done better had Surbey pointed to a picture of the story protagonist with an appropriate facial expression.

In short, available evidence cannot specify how finely grained is preschoolers' knowledge of emotions' causes and consequences or how best to tap that knowledge. Preschool children probably differentiate causes from consequences and positive from negative emotions. Perhaps they also differentiate between the negative emotions, but they may not. The present study explored these issues by building on Surbey's (1979/1981) study.

Method

Subjects

Subjects were 120 children aged 4-0 to 5-11 ($M = 4-11$). Distribution by age and sex is shown in Table 1. All were proficient in English and were enrolled in various day-care facilities in or near Vancouver, Canada.

Design

Children were assigned at random to one of six conditions: three levels of mode of presentation (face, word, both) crossed with two levels of task (cause, consequence). (Age and sex were therefore not balanced across con-

TABLE 1
AGE AND SEX DISTRIBUTION OF SUBJECTS

CONDITION	4-YEAR-OLDS		5-YEAR-OLDS	
	Boys	Girls	Boys	Girls
Face:				
Cause	4	2	6	8
Consequence	5	4	7	4
Word:				
Cause	7	7	3	3
Consequence	8	6	1	5
Face and word:				
Cause	9	2	4	5
Consequence	6	9	5	0
Total	39	30	26	25

ditions; see Table 1.) Each child was asked to tell five stories (six in the word-only condition), one for each emotion: happiness, surprise, fear, anger, and sadness (plus excitement in the word-only condition). The excitement condition served to help balance the proportion of positive and negative emotions, which was useful for the "objective" scoring procedure to be described shortly.

Photographs of Facial Expressions

Facial expressions were presented to subjects in the form of 5 × 7-inch glossy black-and-white photographs provided by Dr. L. Camras. Each photograph was of a 13-year-old girl who had been instructed to pose specific muscle configurations that are, according to research by Ekman and Friesen (1978), pancultural signals for happiness, surprise, anger, fear, and sadness. (No photograph was available for excitement.) Camras, Grow, and Ribordy (1983) describe the development of the photographs, their coding according to Ekman and Friesen's (1978) Facial Action Coding System, and their use in a study on recognition of emotional expressions.

Procedure

After becoming familiar with the child, the experimenter introduced a storytelling game about a girl named Jennifer: "In this game, we're going to make up a story together. I get to start telling the story, and then you get to help me finish it." At this point, the child was randomly assigned to one of three modes of presentation.

Face only.—The experimenter said: "One day, Jennifer was feeling this way [showing photograph]. She was feeling so much this way [pointing at the face] that everyone could tell she was feeling like this

[pointing again]. Her mom could tell, her father could tell, and all her friends could tell she was feeling this way [pointing again]."

Word only.—The experimenter said: "One day, Jennifer was feeling very, very X [*happy, excited, surprised, scared, angry, sad*]. She was feeling so X that everyone could tell she was X. Her mom could tell, her father could tell, and all her friends could tell she was feeling very X."

Face and word.—Story line was the same as in the word-only condition, but the corresponding photograph was also used, exactly as in the face-only condition.

In all three conditions, the experimenter then stated: "Okay, now it's your turn to finish telling the story." In the *cause* condition, the experimenter asked: "And why do you think Jennifer was feeling this way?" In the *consequence* condition, the experimenter asked: "And then what do you think Jennifer did?" The next trial was introduced by saying, "On the next day, Jennifer was feeling . . ." Emotions were selected in a separate random order for each child.

Scoring of Responses

Subjective method: Direct ratings.—The children had a total of 640 opportunities to tell a story. Fifty-two were nonresponses, such as silence, "No," or "I don't know." The 588 potential stories were transcribed and shown to four judges, working independently. Each judged whether the story was correct or incorrect, with the attempt to count as correct any reasonable story; implausible responses, even if possible, were to be counted incorrect. The judges agreed completely (i.e., four out of four) in 76.5% of the cases, demonstrating high reliability in their judgments. Another 16.7% of the cases were three-one

splits, which were allocated to the majority. The remaining 6.8% were two-two splits; these cases were discussed by the four judges until a consensus was reached.

Objective method: Blind ratings.—Harris, Olthof, Meerum Terwogt, and Hardman (1987) suggested replacing such subjective measures as the one just described with something more objective: the probability of a judge guessing the condition to which the child was responding.

One judge, who was blind to emotion, task (cause vs. consequence), mode of presentation, and age and sex of child, was given three tasks, which she carried out simultaneously. The first task was to eliminate those cases that provided no content by which the emotion could be guessed. Only 27 cases were so eliminated; examples are "because she wants to" and "because her brain told her to." These 27, plus the 52 previously classified as "nonresponses," left 561 stories for the next two tasks.

The second task (plausibility rating) was to indicate all of the 12 conditions (six emotions by cause vs. consequence) for which the story would have been a plausible response. These plausibility ratings agreed with the (subjective) direct ratings in 88.8% of the cases for which direct ratings had been obtained, and thus were reliable.

The third task (best guess) was to guess for which *one* of the 12 each story was a response. To assess the reliability of this best-guess judgment, a second judge was asked to guess. The best guess from the two judges coincided in 63.3% of the cases. The result to be expected by chance would be one in 12 (8.3% of cases). The 36.7% of cases that produced disagreement were discussed by the two judges until a consensus was reached. (Exclusion of 79 cases from this reliability test means that 63.3% overestimates how much agreement would have been achieved if the judges had been forced to guess for all 640 responses. This procedure was adopted because the 79 were automatically scored as incorrect in all the analyses of these data. On the reasonable assumption that the judges' guesses would have been random for the 79 excluded cases, it can be estimated that the judges would have agreed in 56.5% of the 640 cases.)

Results

By the (subjective) direct rating procedure, 73.6% of the children's responses were classified as correct, 26.4% as incorrect (in-

TABLE 2

NUMBER OF CONDITIONS FOR WHICH A RESPONSE WAS PLAUSIBLE

NUMBER OF STORIES				
0	1	2	3	4
79	307	200	52	2

NOTE.—Ratings were provided by a single judge, who was blind to emotion, mode of presentation, task, and age and sex of child. Total number of responses was 640. Maximum possible number of conditions was 12 (6 emotions \times 2 tasks: cause versus consequence). The 79 given as plausible for zero conditions include the 52 called "nonresponses" in the subjective rating procedure.

cluding the 52 nonresponses). One of the concerns over ratings of this kind is reinforced by the data summarized in Table 2, which show that 40% of children's responses were judged to be plausible responses to more than one condition. By the best-guess measure of correctness, 53.0% of children's responses were classified as correct, 47.0% as incorrect (including the 79 excluded cases). Because the judges had to agree for each story on one of 12 conditions (six emotions by two tasks), the result to be expected by chance alone would be 8.3% correct.

ANOVA

Four repeated-measures analyses of variance were conducted with alpha set at .05. Mode of presentation (face, word, both), task (cause, consequence), age (4, 5 years), and sex (boy, girl) were between-subjects factors; emotion (happiness, sadness, surprise, fear, anger) was a within-subject factor. Age and sex of subject were analyzed in separate but parallel analyses because of the small sample size and their unequal distribution across conditions. Although of secondary interest, age and sex were included in the analyses to assess the generality of the results across these variables.

The first analysis was a 3 (mode) \times 2 (task) \times 2 (sex) \times 5 (emotion) ANOVA with correctness (0 vs. 1) the dependent measure, determined by direct (subjective) ratings. The second analysis was identical to the first except that correctness (again, 0 vs. 1) was determined by the (objective) best-guess procedure. The results for these analyses are not reported here, except to note that girls obtained significantly higher correctness scores than did boys in both analyses. No interaction involving sex was significant in either analysis. Mean subjective rating was .78 for girls and .70 for boys. Mean objective score was .58

TABLE 3
ANALYSES OF VARIANCE FOR TWO MEASURES OF CORRECTNESS

SOURCE	SUBJECTIVE			OBJECTIVE	
	<i>df</i>	MS	<i>F</i>	MS	<i>F</i>
A (mode of presentation)	2	3.67	16.16**	1.33	4.93**
B (task)	1	2.47	10.86**	1.17	4.32*
AB	2	.20	.87	.63	2.34
C (age)	1	1.25	5.51*	.31	1.15
AC	2	.59	2.58	.62	2.28
BC	1	1.88	8.28*	.99	3.66
ABC	2	.17	.75	.82	.06
S—Within	108	.23	...	.27	...
D (emotion)	4	2.70	20.26**	3.78	20.34**
AD	8	.22	1.67	.44	2.38*
BD	4	.34	2.56*	.72	3.88**
ABD	8	.12	.89	.24	1.30
CD	4	.22	1.61	.14	.76
ACD	8	.14	1.05	.14	.73
BCD	4	.03	.22	.23	1.26
ABCD	8	.14	1.77	.35	1.88
DS—Within	432	.13	...	.19	...

* $p < .05$.

** $p < .01$.

for girls and .48 for boys. (In these cases, the mean is equivalent to proportion correct.)

The results were then reanalyzed, again using mode and task as between-subjects conditions and emotion as a within-subject condition, but with age instead of sex as the third between-subjects factor. In other words, the third and fourth analyses paralleled the first two, with age substituted for sex. The complete results of these two analyses are shown in Table 3. In the analysis of the subjective ratings, significant main effects were obtained for all four variables: mode of presentation, task, age, and emotion. In addition, there were two significant interaction effects, emotion \times task, and age \times task. In the analysis of the objective scores, significant main effects were obtained for mode of presentation, task, and emotion, but not for age. In addition, there were two significant interaction effects, emotion \times task, and mode \times emotion.

The main effect for age on subjective ratings was due to older children giving more correct responses (mean: .71 for 4's, .77 for 5's). The main effect was qualified by a significant age \times task interaction, however, which showed that improvement with age was limited to the task of specifying a cause ($t = 2.37, p < .05$). There was a slight but nonsignificant ($t = 1.0, N.S.$) decrease with age on the task of specifying a consequence.

The main effect of task, obtained for both dependent variables, was due to a higher correctness score for cause than for consequence. This effect was qualified by two interaction effects. The task \times age interaction, obtained with the subjective ratings, was already described. The task \times emotion interaction was obtained for both measures of correctness, and means for this interaction are shown in Table 4. Although specifying a cause was generally an easier task than was specifying a consequence, the difference was large enough to be significant only in the case of surprise and fear. Nevertheless, for no emotion was there evidence of a significant reversal (a small, nonsignificant reversal occurred with the best-guess measure of anger). The task \times emotion interaction effect might therefore be attributable largely to a ceiling effect for some emotions.

Mode of presentation, the variable of primary interest in these analyses, produced a significant main effect on children's responses. For both ways of scoring correctness, children did not produce more correct responses in the face condition than in the word condition. Indeed, the opposite was the case: in the analysis of subjective ratings, the mean correct (.61) in the face condition was significantly lower ($t = 2.25, p < .05$) than the mean correct (.74) in the word condition, which, in turn, was significantly ($t = 2.36, p < .05$)

TABLE 4
MEAN CORRECT FOR CAUSE VERSUS CONSEQUENCE

Emotion	Cause	Consequence	<i>t</i>
Subjective method: direct rating:			
Happiness .....	.90 (.30)	.85 (.36)	.82
Surprise .....	.60 (.49)	.35 (.48)	2.81**
Fear .....	.80 (.40)	.62 (.49)	2.24*
Anger .....	.88 (.32)	.77 (.43)	1.69
Sadness .....	.85 (.36)	.75 (.44)	1.37
Mean .....	.81 (.25)	.67 (.24)	3.13**
Objective method: best guess:			
Happiness .....	.65 (.48)	.60 (.49)	.56
Surprise .....	.28 (.45)	.08 (.28)	2.91**
Fear .....	.73 (.45)	.45 (.50)	3.27***
Anger .....	.63 (.49)	.67 (.48)	.38
Sadness .....	.63 (.49)	.57 (.50)	.74
Mean .....	.59 (.24)	.47 (.25)	2.58*

NOTE.—*df* = 118. Mean is equivalent to proportion correct. (Standard deviation is given in parentheses.)

* $p < .05$.

** $p < .01$.

*** $p < .001$.

lower than the mean correct (.88) in the face and word condition. In the analysis of objective ratings, the mean correct (.46) in the face condition was lower, although only marginally significantly so ($t = 1.96$, $p = .05$), than the mean correct (.56) in the word condition, which, in turn, was only slightly and nonsignificantly lower than the mean correct (.58) in the face-and-word condition ($t = 0.27$, N.S.).

For the objective measure of correctness, the main effect of mode was qualified by a significant mode-of-presentation \times emotion interaction, which is analyzed in greater detail in Table 5. First, *t* tests were used to compare the face condition with the word condition for each emotion; these results are shown in Table 5. The word condition produced significantly more correct responses only for fear. Note that for no emotion, however, did the face condition produce more correct than did the word condition. Second, *t* tests were used to compare the word condition with the face-and-word condition; none of these results were significant, and they are not presented here. In short, a word generally

communicated an emotional message to the children better, or at least no worse, than did a face.

Nonparametric Analyses

To explore how sharply the children differentiated between the various emotions given to them and between causes and consequences, the nature of the overlap seen in Table 2 was analyzed. How often each condition overlapped with every other condition was tallied, and the tally was treated as a measure of the similarities between the conditions. The resulting 12×12 pairwise similarity matrix was analyzed by nonmetric multidimensional scaling (SSA-1; Lingoes, 1965, 1973). Two clear dimensions emerged: cause versus consequence and negative (sadness, anger, fear) versus non-negative (happiness, excitement, surprise). In other words, children had clearly differentiated causes from consequences as well as negative from non-negative emotions (with surprise included with the positive emotions). What confusions children created were mainly within the four clusters defined by these two con-

TABLE 5
MEAN CORRECT FOR EMOTION AND MODE OF PRESENTATION

EMOTION	MODE OF PRESENTATION			<i>t</i> ^a
	Face	Word	Face and Word	
Happiness . . . . .	.65 (.48)	.65 (.48)	.58 (.50)	.0
Surprise . . . . .	.12 (.34)	.15 (.36)	.28 (.45)	.32
Fear . . . . .	.30 (.46)	.72 (.45)	.75 (.44)	4.15**
Anger . . . . .	.62 (.49)	.70 (.46)	.62 (.49)	.70
Sadness . . . . .	.58 (.50)	.58 (.50)	.65 (.48)	.0
Mean . . . . .	.46 (.25)	.56 (.23)	.58 (.26)	1.96*

NOTE.—Figures given are mean correct as determined by blind ratings (with standard deviations in parentheses); for these variables, mean correct is equivalent to proportion correct.

^a *t* test was used to compare face condition with word condition.

* *p* = .05.

** *p* < .001.

trasts. These results accord precisely with those reported by Surbey (1979/1981).

The next question was how much children differentiated within the set of negative emotions and within the set of non-negative emotions. To explore this question, Table 6 gives the frequency of best guesses for each emotion stimulus, collapsed across the cause-consequence variable. All the best guesses are shown, but analyses were restricted to a subset of cases: chi-square was calculated for each non-negative emotion on just those stories judged as coming from some non-negative emotion, and for each negative emotion on just those stories judged as coming

from some negative emotion. The results showed that happiness was sharply differentiated from the other two, excitement and surprise. Excitement was differentiated from surprise, but not from happiness. For surprise, the chi-square showed that best guesses were not randomly distributed across the set (happiness, excitement, surprise), but this result appears largely due to happiness being a more likely guess than excitement; further analysis of surprise is reported in the next paragraph. Sadness, anger, and fear were sharply differentiated from each other.

Further analysis failed to yield any results of interest, with one exception. Children

TABLE 6
BEST-GUESS JUDGMENTS FOR EACH EMOTION

STIMULUS EMOTION	RESPONSE JUDGED						χ^2	<i>df</i>	<i>n</i>
	Happiness	Excitement	Surprise	Sadness	Anger	Fear			
Happiness . .	85	9	5	5	0	2	123.15*	2	99
Excitement .	17	16	0	0	1	0	28.08*	2	33
Surprise . . .	38	14	26	8	3	9	11.08*	2	78
Sadness . . .	10	0	0	75	14	8	85.10*	2	97
Anger	4	1	0	19	80	4	94.48*	2	103
Fear	12	5	0	6	7	78	112.50*	2	91

NOTE.—Both stimulus and judgment ignore the distinction between cause and consequence. Chi-square values were calculated on a subset of cases: for stimulus emotions happiness, excitement, and surprise, the cases were those judged happiness, excitement, or surprise. For stimulus emotions sadness, anger, and fear, the cases were those judged sadness, anger, or fear.

* *p* < .01.

TABLE 7
BEST GUESS JUDGMENTS FOR SURPRISE

MODE OF PRESENTATION	RESPONSE JUDGED					
	Happiness	Excitement	Surprise	Sadness	Anger	Fear
Face	11	1	6	4	2	5
Word	16	7	7	2	0	1
Face and word .	11	6	13	2	1	3

NOTE.—The facial expression of surprise was more often judged negatively than was the word *surprise*. To examine the reliability of this pattern, the positive (happiness, excitement) categories were collapsed, the negative (sadness, anger, fear) categories were collapsed, the surprise category was omitted, and a chi-square was calculated. The result was $\chi^2(2,72) = 13.92$, $p < .01$.

interpreted the word *surprised* differently than they interpreted the surprised facial expression (Table 7). When the mode of presentation was a word, *surprised*, children's errors were largely positive: stories that the raters guessed had been given for either happiness or excitement. When the mode of presentation was a facial expression alone, the raters guessed the incorrect stories were about as likely to have been a response to a positive emotion (happiness or excitement) as to a negative one (sadness, fear, or anger). When the child was given both the word and the facial expression, the results were between these extremes. These results, although unanticipated, were consistent with previous findings. Children have been found to be much more likely than adults to give a positive sense to the word *surprise* (Bullock & Russell, 1984). Yet, on a task not involving verbal labels, 4- and 5-year-olds treated a facial expression of surprise as neither positive nor negative (Russell & Bullock, 1985).

Discussion

I shall discuss the results first from a methodological point of view and then from a substantive point of view. In an investigation of the child's understanding of emotion, two issues immediately arise: how to put the question to the child, and how to score his or her response. One worry has been that specifying the emotion by a word, such as *angry* or *sad*, might underestimate the child's knowledge. The present study showed that specifying the emotion by pointing to a facial expression can do worse. What's more, at least for surprise, a facial expression may not give exactly the same results as does a word. Children generally obtained higher scores here when both word and face were used to specify the emotion. To my knowledge, no study on preschoolers' knowledge of emotion

has used both word and face as a stimulus, and the literature may therefore be systematically underestimating children's knowledge in this domain. Of course, such a procedure would not be appropriate for all research questions, and it remains to be seen if similar findings occur with children of other ages and with other tasks.

How the child's response is scored has also been thought to affect the outcome of the study. Subjective and objective procedures have been proposed (the words *subjective* and *objective* are used here for ease of communication only). The commonly used subjective scoring procedure proved in this study to be reasonably reliable. It was more generous than the more objective procedure in evaluating children's responses and might therefore be accused of overestimating their knowledge. This concern was reinforced by the finding (Table 2) that the same response was sometimes judged appropriate for more than one condition. Of course, such overlap cannot be taken to invalidate the ratings. After all, a given causal event may, in fact, be antecedent to more than one emotion. A given consequence may, in fact, follow more than one emotion. Being taunted by a peer could cause anger or sadness, and staying in one's bedroom could be a consequence of sadness or fear. Giving similar causes and consequences for two emotions therefore need not be considered an error.

The objective procedure suggested by Harris et al. (1987) also proved valuable. It was a stricter criterion of accuracy and might therefore be accused of underestimating children's knowledge. It was also only moderately reliable. On the other hand, the objective method did allow a clear determination that children's responses were not random. It also facilitated an analysis of similarity in chil-

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dren's responses and therefore revealed such things as the confusion between surprise and the positive emotions and the subtle difference between the word *surprise* and a surprised facial expression.

Choosing between the subjective and the objective scoring procedures largely depends on the purposes of the investigation. Neither provides an absolute criterion of the accuracy of children's beliefs, merely an index of the reasonableness of those beliefs. The subjective rating might be thought of as an upper bound of reasonableness, the best-guess criterion as a lower bound. Their convergence strengthens the substantive conclusions of a study. Each method has its strengths, and where possible both should be used.

On the substantive side, the present results showed that by the age of 4 or 5, most children are able to specify plausible causes and consequences for basic emotions, with possible exceptions of excitement and surprise. This conclusion was found across both more subjective and more objective methods of evaluating their responses and is consistent with previous research.

What was more surprising was that preschoolers' knowledge of the causes and consequences of an emotion was evoked no better by a facial expression of that emotion than by its name. Of course, the generality of this result remains to be seen. Perhaps facial expressions are more powerful for younger children. Or perhaps this result is limited to the task of specifying causes and consequences. (For example, children may find facial expressions easier than words to interpret in terms of such general dimensions as pleasure-displeasure and arousal-sleepiness.) The facial expressions used in this study were also still photographs. In a more natural setting, the child encounters moving expressions of living persons.

The results of this study, together with those of Camras and Allison (1985), suggest for further study the important hypothesis that a word for an emotion might communicate with the child even better than does a facial expression. In addition to the questions of generality raised in the preceding paragraph, another question regarding this hypothesis stems from the interaction observed here between mode of presentation and emotion: the superiority of word over facial expression may be limited to some emotions, although it may have just been obscured here by a ceiling effect for other emotions. In Camras and Allison's (1985) study, mode of presentation

produced a significant main effect, but the superiority of word over facial expression was greatest for fear and disgust. For happiness, surprise, anger, and sadness, similar accuracy was achieved with both facial expression and word, although this similarity might again have been due to a ceiling effect (the proportion correct ranged from .87 to .98). Again, further research is required.

Establishing the power of a word to convey an emotional message to a child would reinforce the argument that even young children understand words for emotions very well (Bretherton & Beeghly, 1982; Lewis & Michalson, 1983; Ridgeway, Waters, & Kuczaj, 1985). More importantly, if children's knowledge about even some basic emotions is found to be generally more closely tied to words than to faces, then questions would have to be raised about the structure of children's knowledge and about the origins of that knowledge. The image of the preschooler to emerge would be importantly different from that now painted in the literature. The child would continue to be seen as highly knowledgeable about basic emotions, but the core of that knowledge could come to be seen as more conceptual, with more emphasis on causes, consequences, and verbally labeled concepts, and with perhaps less emphasis on nonverbal expressions. Words could come to be seen as playing a larger role than is currently believed in the use and development of that knowledge.

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