

Development of Children's Inferences of the Emotions of Others

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According to Weiner's attribution-emotion model, the development of children's inferences of emotion in others may be affected by an increasing ability to consider causal attributions and situational outcomes together, rather than outcomes alone, when making emotional judgments. This formulation was tested in the present study of developmental changes in emotional inferences and children's justifications for them. Second graders, fifth graders, and college students heard 12 stories that varied systematically by situational domain (achievement or moral), outcome (positive or negative), and causal attribution (personal effort, another's intervention, or luck) and were asked to infer the story character's subsequent emotion and explain the reasons for it. Analyses of their responses revealed significant differences by age, with second graders offering more outcome-dependent inferences (e.g., happy, sad) and justifications focusing on the story outcome alone and fifth graders and adults providing more causal attribution-dependent inferences (e.g., pride, anger) with justifications entailing causal considerations in the story narrative. However, within each age group there were few consistent associations between the kind of emotional inference and the type of justification offered for it, and adults failed to consistently generate the kinds of attribution-dependent inferences predicted by the model. The contributions and limitations of the attribution-emotion model are assessed in light of these findings.

Children's understanding of emotion and of the determinants of emotional experience change markedly in middle childhood. For example, from 6 to 11 years children increasingly attribute emotional arousal to internal causes, their appreciation of the functioning of expressive display rules increases, they better understand that emotional states can be internally redirected (e.g., thinking happy thoughts in a sad situation), and their appreciation of the simultaneous experience of multiple emotions increases (see Masters & Carlson, 1984, for a review). With the growth of emotional understanding, the kinds of emotions children infer in others may increasingly reflect these attributional processes related to causal influences rather than simply being responses to another's general positive or negative experience. The research reported here focused on children's use of causal information when inferring emotions in others—testing a formulation derived from attribution theory—in order to better understand how children's

emotional inferences are affected by their use of different kinds of information about another's experience.

The work of Weiner and his colleagues is relevant to an understanding of emotion and its causal antecedents (see Weiner, 1985; Weiner & Graham, 1984). According to these researchers, one can infer two kinds of emotional reactions in others (Weiner, Russell, & Lerman, 1978, 1979). The first, called *outcome-dependent*, (*causal*) *attribution-independent* affects, are those such as happy, sad, upset, frustrated, glad, and disappointed. Emotional reactions like these can be inferred on the basis of another's general success or failure regardless of its cause. For example, one can assume that a student will feel happy after receiving a high grade regardless of whether the grade was due to diligent studying, the help of another, or luck. These kinds of emotional inferences thus reflect a global positive or negative reaction to success or failure outcomes, respectively, regardless of why they occurred.

The second kind of emotional inference entails (*causal*) *attribution-dependent* affects such as pride, guilt, surprise, anger, and gratitude. Inferring responses like these requires consideration not only of another's success or failure but also of the cause underlying that outcome. For example, if a high grade was due to studying, one would expect the student to feel pride; if it was because of another's assistance, gratitude instead of pride would be expected. Thus attribution-dependent inferences are conceptually more complex than are outcome-dependent inferences, because the former rely on consideration of both the situational outcome and its underlying cause.

Weiner and his colleagues identified a simple taxonomy of attribution-dependent emotional inferences based on the various causes to which a situational outcome can be attributed (see Weiner, 1985; Weiner & Graham, 1984). When success can be attributed to ability, feelings of confidence or competence are

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the result; to long-term effort, relaxation ensues; and to the intervention of another, gratitude is expected. Both ability and effort, as internal causes, also elicit pride. On the other hand, when failure is due to one's ability, feelings of incompetence and shame ensue; to effort, guilt results; and to the intervention of another, anger results. It is interesting that when luck is the causal agent, surprise is the result whether the outcome is success or failure.

Viewed developmentally, this formulation suggests that at younger ages, children are more likely to generate the less complex, outcome-dependent emotional inferences because, in part, outcomes are salient and easily understood sources of emotional arousal in others (Shantz, 1983). With increasing causal understanding and a growing appreciation of the psychological complexity of emotional experiences, children are likely to begin generating more sophisticated attribution-dependent inferences. To be sure, both Green (1977) and Trabasso, Stein, and Johnson (1981) found that even preschoolers could accurately identify the causes underlying a story character's emotional responses in short narratives. The extent to which such causal information is spontaneously used by children in generating their own emotional inferences is less clear, however.

The present study was designed to address this issue. Children in second and fifth grades and college-age adults were read a series of short stories, each describing a sequence of events leading to an outcome for the story character. The stories varied systematically by outcome (positive or negative), causal attribution (personal effort, the intervention of another, or luck),¹ and situational domain (achievement or moral) in a within-subjects design. Variations in situational domain were included to determine whether similar kinds of emotional inferences were offered by subjects in achievement and moral situations, which are important domains of reasoning at this time. Following each story, subjects were asked to describe how the story character felt at the story conclusion and their reasons for this inference. Simple open-ended and forced-choice inquiries were included to control for potential developmental differences in spontaneous verbalization capabilities. Although the youngest children in this investigation could be expected to easily understand the array of outcome-dependent (i.e., happy, sad) and theoretically relevant attribution-dependent (i.e., proud, guilty, angry, grateful, surprised, and neutral) response options included in the forced-choice measure (see Schwartz & Trabasso, 1984), simple line drawings of pertinent facial expressions were included with the written labels, and these options were discussed and reviewed during the procedure to assist in their comprehension. In addition, a memory check was conducted with an independent group of second graders to ascertain adequate retention of critical elements of the narrative. In these ways, the research was designed to ensure that observed developmental differences in emotional inferences and their justifications would not be due to verbal production deficiencies, inadequate comprehension of emotion options, or forgetting important aspects of the narrative.

Using a simpler design, Weiner, Kun, and Benesh-Weiner (1980) earlier found developmental increases in children's use of attribution-dependent emotional inferences in achievement contexts. On the basis of their findings, and in light of the considerations described above, I anticipated that the proportion of

theoretically predicted attribution-dependent emotional inferences would increase with age—that is, children would increasingly associate pride with situations entailing success due to effort, gratitude with success due to another's help, guilt with failure due to lack of effort, anger with failure due to another, and surprise or neutral affect with luck in either success or failure outcomes.² I also expected that in parallel fashion, children's consideration of causal factors in their justifications for their inferences would increase with age. Finally, but most important, I anticipated a linkage *within* each age group between the generation of attribution-dependent emotional inferences and the use of causally oriented justifications for these inferences, because the former are thought to depend on the latter in the attribution-emotion model. That is, when subjects offer inferences of attribution-dependent emotions like pride, anger, and gratitude, their explanations for these inferences should entail consideration of the relevant causes underlying the story character's experience to a greater degree than when outcome-dependent inferences are offered. The latter hypothesis is, of course, most crucial to the attribution-emotion formulation. Finally, I expected that adults would generate attribution-dependent emotion inferences consistent with those predicted by this model.

Although these developmental changes were of primary interest, the research was also designed to assess (a) whether subjects' inferences varied systematically according to the story domain, the type of outcome, or the causal condition and (b) whether age interacted with any of these factors. Prior theory and research did not, however, provide a sufficient basis for offering specific hypotheses concerning these influences.

Method

Subjects

Twenty-four second graders (mean age = 94 months, range = 80–102 months) and 24 fifth graders (mean age = 131 months, range = 123–136 months) participated in this study. At each age there were equal numbers of boys and girls. Children came from predominantly middle-class homes, and most were Caucasian. One additional fifth grader was tested but subsequently replaced because of interviewer error. A sample of 24 introductory psychology students (12 male) was recruited from psychology classes at a university. Finally, an additional 6 second graders (2 boys) were interviewed to assess their recall of significant elements of the story narratives. These children were recruited in the same manner as the larger sample.

¹ There were no causal attributions to the story character's ability because emotional inferences generated by ability attributions are not easily distinguished from those associated with effort attributions, especially in view of the limited vocabulary of the young children interviewed in this study.

² Pretesting indicated that causes involving luck often have a "discounting effect" on emotional experience, with subjects reporting that they would feel nothing because the outcome was a fortuitous one. For this reason, "neutral" was included (in addition to "surprise") as a predicted attribution-dependent inference in story conditions involving luck as a cause. The results of this study would have been little affected, however, if inferences of surprise had been considered alone.

Materials

A set of 36 paragraph-length stories was written that varied systematically by situational domain (achievement or moral), outcome (positive or negative), and causal attribution (effort, others, or luck). Stories were prepared in the following manner. A basic set of six stories was written, three concerning achievement situations (i.e., performance or competition in some area of skill acquisition) and three concerning moral situations (i.e., compliance to a social rule or value). The stories described experiences likely to be familiar to young children and were written to be easily understood. Each story was subsequently modified to create both positive-outcome (success) and negative-outcome (failure) versions. The resulting set of 12 stories was again modified to create three new versions of each story, with the cause for the story outcome attributed to either (a) the story character's effort or lack of effort, (b) the intervention of another person, or (c) good or bad luck. The resulting 36 stories thus varied systematically by situational domain, story outcome, and causal attribution. The purpose of this procedure was to ensure that stories were consistent on all content dimensions except those that were specifically varied. In addition, this procedure made it possible to test children in each of the 12 different story conditions without having to repeat the same story in several versions. Stories are further described in the Appendix.

Stories were pretested with an adult sample and revised prior to their use in this study. Stories were presented with equal frequency across subjects at each age. The sex of the story character varied systematically for each subject, and stories were comparable in length and linguistic complexity. Later analyses were conducted to determine whether there were significant variations in children's responses across the response measures to the three stories within each of the 12 story conditions. There was only one instance in which this occurred, so the stories within each condition were collapsed for subsequent analyses.

A set of simple line drawings of facial expressions of emotion was drawn to correspond to the eight response options for the forced-choice measure: happy, sad, proud, guilty, grateful, angry, surprised, and neutral. These were arranged on an 8½ × 11 in. sheet of cardboard with written labels underneath each drawing. For two emotions, additional written labels were used to clarify the meaning of the primary emotion label: to "guilty" was added "bad about yourself," and to "neutral" was added "nothing."

Procedure

Children in second and fifth grades were interviewed individually by one of two researchers in a quiet room at the school. After gathering background information, describing the purpose of the study, and obtaining the child's informed consent, the interviewer displayed the line drawings corresponding to the forced-choice measure and asked the child to identify each emotion with its label and to provide an example of when it might be experienced by someone. Children were highly accurate in their identification of the drawings (most could read the labels also) and in the examples they provided. No child had to be eliminated from the study because of difficulty identifying the eight emotions depicted. In rare instances when a child's understanding was unclear, that emotion was identified and described to the child, who was subsequently reassessed to ensure understanding. During the testing, the forced-choice options were reviewed with the child on several occasions.

Following this, each child was read 12 stories, one for each Domain (2) × Outcome (2) × Causal Attribution (3) condition, with presentation order randomized. After hearing each story, children were asked to tell, in their own words, how the story character felt at the story conclusion and why. Children were encouraged to provide as many different emotional inferences as they wished. Then the interviewer displayed the line drawings and asked the child to choose from among the eight options the emotion that best described the feelings of the story character.

The forced-choice measure consistently followed the open-ended response so as not to unduly constrain the child's spontaneous inferences of emotion; the options were concealed during the open-ended inquiry. However, following the initial story, children's subsequent open-ended responses may have been influenced by the forced-choice array; there was insufficient time allowed to repeat the 12 stories for each response measure. After the final story the child was given positive feedback, thanked for participating, and returned to the classroom. The entire interview took about 30 min.

The adult sample was assessed using a similar procedure, except that their responses were written, they were tested in small groups, and their responses to the entire set of 36 stories (in random order) were obtained (following a similar procedure by Weiner, Graham, Stern, & Lawson, 1982). From these, the responses to the specific set of stories pertaining to each subject's experimental condition were selected.

Assessment of recall. Six second graders were read sets of 12 stories in a manner identical to that described above. After each story, children were asked three questions designed to assess their understanding and retention of critical elements of the story narrative: (a) How did the story end? (b) Why did that happen? and (c) a question specifically pertaining to that particular causal attribution (e.g., "What did Paul do to get a high grade on the test?"). The 72 responses obtained to these questions were each scored for retention of story content. Concerning the first question, 100% of the children's responses revealed accurate understanding of the story outcome; 97% of the responses to the second question and 93% of the responses to the third question revealed an accurate understanding of the cause underlying that outcome. Thus second graders demonstrated fully adequate retention of important elements of the story narrative. This assessment was performed only with second graders because of an expectation that retention difficulties were most likely to influence the emotional inferences of the youngest sample.

Response Measures

Responses to the open-ended measure were coded categorically in a manner corresponding to the eight emotion categories of the forced-choice measure, with an additional ninth category for all other (unclassifiable) responses. Two raters working independently coded all of the open-ended responses and agreed exactly for 96% of the responses.

The reasons offered by subjects for their emotional inferences were coded according to whether or not the reason included consideration of the relevant cause underlying the story outcome. Two raters working independently coded all responses and agreed exactly for 92% of the responses.

Results

To examine variations in the use of attribution-dependent emotional inferences by age and story condition, responses to the open-ended and forced-choice measures were subsequently recoded to indicate the presence or absence of the attribution-dependent inference theoretically predicted for each story condition by the attribution-emotion formulation described in the Introduction. Inspection of the data and preliminary analyses indicated no experimenter effects and no significant sex differences in the response measures, so these factors were eliminated from consideration in subsequent analyses. The two measures of emotional inferences and the measure of children's justifications for their inferences were each submitted to an Age (second grade vs. fifth grade vs. adult) × Domain (achievement vs. moral) × Outcome (positive vs. negative) × Causal Attribution (effort vs. others vs. luck) analysis of variance (ANOVA) with repeated measures on the last three factors (Winer, 1971, pp.

303–305). Cognizant of the issues raised by Winer (1971) and McCall and Appelbaum (1973) concerning potential violations of homogeneity of covariance assumptions when repeated-measures designs are used, I reevaluated F ratios against critical values that were conservatively corrected by the lower-bound estimate of the ϵ method outlined by Greenhouse and Geisser (1959; see also Geisser & Greenhouse, 1958; McCall & Appelbaum, 1973; Winer, 1971, pp. 542–543) whenever applicable. The significant F tests reported below are those that remained significant using this conservatism criterion, even though unadjusted degrees of freedom are reported. Post-hoc Newman-Keuls tests of pairwise differences among means were used to further evaluate significant F tests involving more than two comparison groups. Reported differences were significant at $p < .05$.

Emotional Inferences

The responses to the open-ended measure and the forced-choice measure were very similar: Subjects offered emotional inferences that were identical on both measures for 85% of the stories (with mean values of 87%, 82%, and 86% for second-grade, fifth-grade, and adult samples, respectively). For this reason, the results of analyses for the open-ended and forced-choice measures were similar, and the findings reported below are those that were consistent across the two response measures.

The ANOVAs revealed a significant main effect for age: open-ended, $F(2, 69) = 7.06$; forced-choice, $F(2, 69) = 6.81$; both $ps < .01$. As revealed in Table 1, adults and fifth graders provided more of the predicted attribution-dependent emotional inferences than did the second graders, who tended to offer more outcome-dependent inferences such as happy or sad. Newman-Keuls tests revealed that second graders differed significantly from both of the older samples but that fifth graders and adults were not consistently different from each other.

There were no consistent main effects for either situational domain or story outcome, nor did age interact with either of these factors. There was, however, a highly significant main effect for causal attribution: open-ended, $F(2, 138) = 61.70$; forced-choice, $F(2, 138) = 66.88$; both $ps < .01$. As Table 1 shows, subjects at all ages provided the highest proportion of predicted attribution-dependent inferences for stories entailing effort attributions (i.e., inferences of pride and guilt) and the smallest proportion of such inferences for stories entailing luck attributions (i.e., inferences of surprise or neutral affect). Newman-Keuls tests revealed that all pairwise comparisons between effort, others, and luck attributional conditions were significantly different. There were no interactions between age and causal attribution condition.

There were two interactions among the within-subjects factors. First, a significant Outcome \times Causal Attribution interaction was revealed: open-ended, $F(2, 138) = 9.65$; forced-choice, $F(2, 138) = 7.50$; both $ps < .01$. Thus, negative outcome stories yielded a higher proportion of attribution-dependent emotional inferences than did positive outcome stories except when the outcome was due to luck, when the reverse was true. Second a significant Domain \times Outcome \times Causal Attribution interaction was also revealed: open-ended, $F(2, 138) = 5.75$; forced-choice, $F(2, 138) = 7.10$; both $ps < .01$. This was mainly attrib-

Table 1
Mean Proportion of Predicted Attribution-Dependent Emotional Inferences by Age and Story Characteristics

Story characteristics	Second grade	Fifth grade	Adults
Achievement domain			
Positive outcome			
Effort	.42	.50	.67
Others	.12	.38	.38
Luck	.17	.08	.17
Negative outcome			
Effort	.33	.38	.58
Others	.46	.38	.71
Luck	.08	.04	.12
Moral domain			
Positive outcome			
Effort	.38	.46	.71
Others	.21	.42	.42
Luck	.21	.38	.33
Negative outcome			
Effort	.79	.79	.71
Others	.25	.54	.46
Luck	.08	.12	.17

Note. Data are based on responses to forced-choice measure.

utable to a higher proportion of attribution-dependent inferences in two story conditions: achievement/positive-outcome/effort and moral/negative-outcome/effort.

Justifications for Inferences

The reasons offered by children for the emotional inferences they provided to the open-ended inquiries were analyzed in an identical manner. The ANOVA revealed a significant main effect for age, $F(2, 69) = 4.70$, $p < .05$. As shown in Table 2, when offering reasons for their emotional inferences, adults and fifth graders more often cited the causal elements in the story narrative than did second graders, who instead more frequently cited the story outcome alone. Newman-Keuls tests revealed that second graders differed significantly from both of the older samples but that fifth graders and adults were not significantly different from each other.

There also was a significant main effect for causal attribution, $F(2, 138) = 5.96$, $p < .01$. As Table 2 reveals, when the story outcome was due to the intervention of another, subjects at all ages were more likely to include causal considerations in their reasons for their inferences. On the other hand, such considerations were least likely to be evident when the story outcome was due to luck. Effort attributions were in between these two. Newman-Keuls tests revealed that attributions to others differed significantly from effort and luck attributions, whereas the latter did not differ significantly from each other. There were no interactions between age and causal attribution condition.

Finally, there was a significant main effect for story outcome, $F(1, 69) = 31.62$, $p < .01$, revealing that for subjects of all ages, the reasons offered for emotional inferences were most likely to include causal considerations when the story had a negative outcome. There was no main effect for story domain, and age

Table 2
Mean Proportion of Inference Justifications Entailing Causal Considerations by Age and Story Characteristics

Story characteristics	Second grade	Fifth grade	Adults
Achievement domain			
Positive outcome			
Effort	.29	.54	.54
Others	.38	.50	.71
Luck	.12	.50	.50
Negative outcome			
Effort	.67	.67	.58
Others	.62	.83	.79
Luck	.42	.58	.54
Moral domain			
Positive outcome			
Effort	.21	.50	.67
Others	.46	.46	.25
Luck	.29	.21	.54
Negative outcome			
Effort	.38	.46	.46
Others	.67	.83	.67
Luck	.62	.58	.67

did not interact with either domain or outcome. There were also no significant interactions among the within-subjects factors.

Linkages of Inferences and Their Justifications

In order to examine specific linkages between emotional inferences and the justifications offered for them, the quality of the justification (i.e., entailing either causal considerations or outcome considerations alone) was tabulated for each emotional inference generated by the open-ended inquiry. These data are presented in Table 3 according to the age of the respondent. In addition to reflecting the developmental differences noted earlier, this table reveals that certain emotional inferences were reliably associated with causally oriented reasons at all ages. Specifically, inferences of gratitude and anger were accompanied by a high proportion of reasons citing the appropriate cause underlying the story outcome (i.e., the intervention of another). Other emotional inferences became progressively linked with causally oriented justifications over the age span of the study; this was true of pride and guilt. In contrast, the remaining inferences entailed somewhat more equal proportions of outcome-oriented and causally oriented reasons at all ages and thus failed to exhibit the expected linkages to particular kinds of attributional reasoning in children's justifications for their inferences.

Discussion

The results of this study provide some support for the hypothesized developmental changes in emotional understanding, but they also indicate some important limitations in the attribution-emotion formulation.

It was clear that with increasing age, children offered a greater proportion of attribution-dependent emotional inferences such

as pride, guilt, gratitude, and anger and a comparatively smaller proportion of outcome-dependent inferences such as happy and sad. Furthermore, a parallel developmental trend was evident with respect to the kinds of reasons children offered for their inferences. With increasing age, children provided a higher proportion of justifications that included consideration of the relevant causal influences in the story narrative, rather than consideration of the story outcome alone.

In both cases, the greatest differences with age were between the second-grade and fifth-grade samples. This was expected in view of the significant changes in emotional understanding that occur over this period. In view of the methodological controls incorporated into the study design, these age differences do not seem attributable to the youngest children's verbal production difficulties, inadequate retention of critical elements of the story narrative, insufficient understanding of the emotion options, or inadequate understanding of the causes underlying emotional reactions. Instead, these data suggest that over this period, children are increasingly considering causal information in their judgments of emotion in others and are spontaneously generating emotional inferences that—according to the attribution-emotion model—entail this information.

Of course, these parallel developmental trends could be independent. For this reason, the more critical issue is whether there were reliable *associations* between the kinds of emotional inferences subjects offered (i.e., outcome-dependent or attribution-dependent) and the reasons they gave for these inferences (i.e., drawing on causal elements of the story narrative or not). This linkage is, of course, central to a test of the attribution-emotion model because attribution-dependent inferences are thought to be based on causal understanding. The results are less supportive on this issue. As Table 3 indicates, the linkage between specific inferences and their justifications varied according to the emotion in question. For certain attribution-dependent emotions (i.e., grateful and angry), inferences were consistently associated with causally oriented justifications, as predicted. For other emotions (i.e., proud and guilty), there is evidence that these inferences became progressively linked to causally oriented justifications over the age span studied (see Graham, Doubleday, & Guarino, 1984, for similar findings). For the remaining emotions, weaker developmental changes were apparent, and more equal proportions of outcome-oriented and causally oriented reasons were given at each age, reflecting little attribution-emotion linkage. Thus although there were clear developmental changes in both the *kinds* of emotional inferences and the *reasons* given for them (as predicted), these parallel developmental trends were *linked* in different ways depending on the emotion in question, contrary to theoretical expectations. These findings indicate, therefore, that not all attribution-dependent inferences are necessarily predicated on causal reasoning.

To better understand these findings, it is necessary to consider other developmental processes related to emotional understanding that are currently outside the scope of the attribution-emotion model. For example, with respect to inferences of pride and guilt, it was apparent that even the youngest children had a good grasp of the situations that should elicit these feelings in a story character, probably because young children acquire achievement and moral values in contexts that elicit pride

Table 3
Proportion of Justifications Entailing Outcome Considerations or Causal Considerations for Each Kind of Emotional Inference

Emotional inference	Quality of reason offered					
	Second grade		Fifth grade		Adult	
	Outcome-oriented	Causal-oriented	Outcome-oriented	Causal-oriented	Outcome-oriented	Causal-oriented
Happy	.79	.21	.69	.31	.51	.49
Sad	.44	.56	.49	.51	.47	.53
Proud	.82	.18	.50	.50	.42	.58
Guilty	.49	.51	.43	.57	.36	.64
Grateful	.31	.69	.12	.88	.15	.85
Angry	.33	.67	.06	.93	.25	.75
Surprised or neutral	.65	.35	.43	.57	.46	.54
All others	.36	.64	.65	.35	.68	.32

and guilt. Later, the specific linkages of these affects to the expenditure of personal effort emerges with further experience in the effort-oriented reward structure of the school (Dweck & Elliot, 1983) and the emergence of conformity-based conventional moral reasoning (Kohlberg, 1976). Over this period, the growth of social-comparison processes (Ruble, 1983) further highlights the role of personal effort in achievement and moral contexts. Thus the progressive linkage of these inferences with the relevant causal attributions may be an outcome, in part, of children's developing mastery of these value systems due to increased experience in these early socialization contexts, together with allied changes in social-cognitive understanding.

In contrast, the linkages of anger and gratitude inferences with the relevant causal-attributional cues are strong and early emerging. This is probably because the causal agent (another person) is external to the self and thus highly visible, whereas other causes (e.g., effort and luck) are invisible and often complexly determined (see also Graham et al., 1984; Weiner et al., 1982). Thus although the parallel developmental trends noted in this study are consistent with the attribution-emotion formulation, the variable linkages between inferences and their justifications mandate additional consideration of developmental processes related to the socialization of emotion knowledge and the salience of different attributional cues to children.

Another challenge to the model is indicated by the failure of the adult findings to conform closely to theoretical expectations. In particular, a very small proportion of the adult sample provided the predicted inference of surprise (or neutral affect) in attributional conditions involving luck. Similar findings have been reported by Weiner, Russell, and Lerman (1978, 1979), who also found that in luck conditions adults more frequently provided inferences of happiness or sadness (i.e., the relevant outcome-dependent affects). These results indicate that the linkage between luck as a causal cue with surprise as the derivative emotion is not well established even in adults, contrary to the predictions of the attribution-emotion model. This may be due to (a) culture-specific attributional tendencies relating to luck (e.g., "bad luck" is really due to one's carelessness or lack of effort; see Connell, 1985), (b) a tendency in adults and children to misattribute anhedonic emotions like surprise or neutral affect (see Felleman, Barden, Carlson, Rosenberg, & Mas-

ters, 1983), or (c) the fact that surprise is a more transient emotional state than other attribution-dependent affects. These alternative explanations merit further exploration. Clearly, however, this aspect of the attribution-emotion formulation also requires reconsideration in light of the failure of adults (as well as children) to confirm the predicted linkage (see Weiner, 1985, for some initial steps in this direction).

To summarize, although the parallel developmental trends predicted by the attribution-emotion model were confirmed, other findings indicate that this formulation should be expanded to include other developmental processes related to emotional understanding that may interact with the emergence of global attributional skills in children. This should not be a startling conclusion given that emotional experiences are complex and multidetermined, and from a developmental standpoint a variety of social-cognitive and social-contextual processes contribute to the development of emotional inferences besides attributional understanding (see Thompson, in press). Thus an attributional analysis can account for some—but certainly not all—of the meaningful variance in emotion inferences and their developmental changes, and must be broadened if it is to provide a useful developmental analysis.

Finally, two other findings from this study merit brief comment. First, there were no consistent main effects for situational domain (i.e., achievement or moral) in children's emotional inferences, which suggests that one way in which the development of reasoning in these domains is comparable is with respect to the affective outcomes of success and failure experiences. Second, the nature of the story outcome (i.e., positive or negative) significantly affected the kinds of justifications offered for emotional inferences, with greater concern for causal considerations when story outcomes were negative. This finding—together with a similar report by Trabasso et al. (1981)—suggests that failure may heighten the salience of causal circumstances for children and adults, perhaps because of an increased motivation to account for one's lack of success (see also Wong & Weiner, 1981).

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Appendix

The situations described in the three achievement stories concerned (a) competing in a swimming race, (b) mastering a competitive game with a friend, and (c) taking a spelling test in class. The situations in the three moral stories concerned (a) complying with a parental request, (b) keeping (or telling) a friend's secret, and (c) doing an errand for mother. An example of one set of story variations follows.

Positive Outcome: Effort

Mark was learning how to play a new game with one of his friends. It was a game which his mother bought him, and Mark had never played it before. So the day before, Mark took out the game, looked at all the pieces, and read the rules to himself so he would know how to play. He also practiced different kinds of moves. When he and his friend played, Mark thought of the moves he had practiced. Mark won the game with his friend.

Positive Outcome: Others

Nancy was learning to play a new game with one of her friends. It was a game which her mother bought her, and Nancy had never played it before. So the day before, Nancy talked to her older sister, who knew how to play the game really well. "Here are some good moves which will help you win," she said to Nancy. Nancy tried some of the moves when she played with her friend. Nancy won the game with her friend.

Positive Outcome: Luck

Mark was learning how to play a new game with one of his friends. It was a game which his mother bought him, and Mark had never played it before. Mark and his friend read the rules, and then they started playing. They rolled the dice to see how many spaces to move. Somehow Mark kept rolling the right number to go to all the good spaces, while his

friend kept having to go to all the bad spaces. Mark won the game with his friend.

Negative Outcome: Effort

Nancy was learning how to play a new game with one of her friends. It was a game which her mother bought her, and Nancy had never played it before. Nancy didn't take time to read the rules carefully and learn how to play well. She didn't try to find out what the good moves were. When she played the game with her friend, Nancy made some bad moves that made her fall far behind. Nancy lost the game with her friend.

Negative Outcome: Others

Mark was learning how to play a new game with one of his friends. It was a game which his mother bought him, and Mark had never played it before. The day before, Mark had talked to his older brother, who knew how to play the game really well. Mark's brother told him some moves to make which he said would help Mark win the game. But when Mark tried some of the moves, he fell far behind his friend. Mark lost the game with his friend.

Negative Outcome: Luck

Nancy was learning how to play a new game with one of her friends. It was a game which her mother bought her, and Nancy had never played it before. Nancy and her friend read the rules, and then they started playing. They rolled the dice to see how many spaces to move. Somehow her friend kept rolling the right number to go to all the good spaces, while Nancy kept having to go to all the bad spaces. Nancy lost the game with her friend.

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