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In Building a Script for an Emotion, Do Preschoolers Add Its Cause Before Its Behavior Consequence?

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Abstract

An emotion concept is a script in which an emotion event is an ordered sequence of subevents from situational cause through bodily changes to behavioral consequence. As children build a script for each emotion, in what order do they add each subevent? Preschoolers (N = 108, three to five years), were asked to name the protagonist's emotion in stories consisting solely of either a cause or a consequence of one of six emotions. More children correctly inferred happiness, fear, sadness, and disgust from their causes than from their consequences, but more correctly inferred anger from its consequence than from its cause. (No significant difference was found for surprise.) Subevents are added to scripts in a different order for different emotions.

Keywords: emotion, causes; consequences; labeling

Introduction

Like adults, children must navigate the emotional waters of their social world. They must anticipate how someone will respond emotionally to an event, identify that emotion, predict the emotion's consequences, and respond appropriately. One tool for such tasks is a set of cognitive structures known as scripts. A script for an emotion specifies its typical antecedents, nonverbal expressions, phenomenological experience, bodily changes, behavioral consequences, and verbal label (such as *fear, anger, grief*, or *happiness*) (Fehr & Russell, 1984). Adults know, for example, that in the prototypical case called *fear*, danger leads to freezing, an agitated mind, a frightened face, pounding heart, sweating palms, and flight. Children must acquire this knowledge.

Our broad aim is to describe the nature and development of children's scripts for different emotions. This aim thus complements studies on how socialization practices, preschool curriculum, cognitive development, and the like impact the child's growing understanding of emotion.

The scripts of the youngest children are difficult to study, but appear to be broad and simple: one for positive (feels good) emotions, and the other for negative (feels bad) (Widen & Russell, 2008). The contents of these two early scripts are not well known, but we propose that these two scripts are gradually differentiated throughout childhood

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until the full set of culturally specific scripts are achieved in adulthood (Widen & Russell, 2008). Other differentiation accounts have been proposed, often focused on children's differentiation of their own emotional experience (e.g., Borke, 1971, 1973; Bridges, 1930; Deutsch, 1974; Fischer, 1980; Lewis, 1998). On our account, as children gradually add new features to their early scripts, these early scripts subdivide, with newer scripts narrower and more adult-like. For example, 'feels bad' may become differentiated into two scripts by the addition of behavioral consequences: 'feels bad and runs away' versus 'feels bad and hits and yells.' As children gain experience and develop cognitively and linguistically, they add features, thereby differentiating within a current script to form several, more fine-grained new ones.

Of course, the features of the child's initial scripts and the order in which new features are added might be different than those we just offered as examples. The broad perspective outlined so far leaves as an empirical question the specific features that start the process of script formation and the order in which additional features propel differentiation. There are many possibilities. A cause (danger, loss, frustration) or a behavioral consequence (fleeing, crying, hitting), or an emotion label (*scared, sad, angry*), or a facial expression (smile, pout, scowl), might be the initial feature for a new specific emotion script.

We propose that the child continues to add features to the script one at a time. One source of evidence for this proposal—and a means of exploring it—is the study of the features children use to identify specific emotions (Balconi & Carrera, 2007; Camras & Allison, 1985; Markham & Adams, 1992; Reichenbach & Masters, 1983; Russell, 1990; Russell & Widen, 2002; Smith & Walden, 1999; Widen & Russell, 2002, 2004, in press a, in press b). Only after a feature has been added to a script can that feature allow a child to identify that emotion. For example, are children of a given age more likely to identify fear by witnessing a dangerous situation or by witnessing the behavioral response of flight? By seeing a prototypical facial expression of fear or by hearing the word *scared*?

Prior research on such questions has already produced interesting results. In some studies, for example, facial expressions were compared with brief stories containing a typical cause and behavioral consequence for the emotion (Balconi & Carrera, 2007; Reichenbach & Masters, 1983; Smith & Walden, 1999; Widen & Russell, 2002, 2004, 2010, in press-a). Children were presented with either a face or a story and were asked to identify the emotion. Surprisingly, in seven studies, children (three years and older) were more likely to name the emotion correctly from stories than from facial expressions (Balconi & Carrera, 2007; Reichenbach & Masters, 1983; Smith & Walden, 1999; Widen & Russell, 2002, 2004, 2010, in press-a). (Only one study found the reverse, that children—two- to three-year-olds—were more likely to label the faces correctly than the stories; Widen & Russell, in press-a, study 1.) In these studies, causes and consequences were combined as one feature of the script, leaving open the question of which of these two is the feature allowing the child to identify the emotion and, by inference, enters the script earlier. That is, does a child initially understand that fear is something that results from danger or something that produces flight?

The ability of different features to lead to the identification of an emotion is not only an important issue in its own right, but it also aids in studying how scripts are built. Thus, whether or not different features allow identification of an emotion at different ages provides a clue to the order in which those features are added to the script for that emotion. Our focus in the present study is the order in which causes and behavioral consequences are added to scripts for what have been called basic emotions.

To our knowledge, only two studies contrasted causes with consequences (Russell, 1990; Surbey, 1979, as cited in Trabasso, Stein, & Johnson, 1981). In both studies, children were given an emotion label (e.g., *happy, sad, angry, scared, surprised*), and asked to imagine, in one condition, a cause (what made the person feel that way?), or, in the other condition, a consequence (what happened next?), of that emotion. Given the label, children (three- and four-year-olds in Surbey's study and four- and five-year-olds in Russell's), imagined a cause more readily than a consequence. That is, the label *scared* more reliably evoked knowledge that the protagonist faced danger than knowledge that the protagonist would flee. These studies raise various issues: (1) Is the power of cause general across emotions? (In the Surbey and Russell studies, although this effect was significant overall, it was reliable only for fear.); (2) Younger children were not well represented; and (3) Asking children to tell stories is a demanding response task. It is not clear if this cause (vs. consequence) superiority effect holds for all emotions, for a greater range of ages, or with a less demanding task. Exploring these issues was the specific aim of the present study.

The present study also provided an opportunity to explore a secondary issue. Would children's erroneous labels follow the pattern predicted by Widen and Russell's (2003, in press-a) model of the growth of emotion understanding? According to this model, children use the labels they had acquired earlier (e.g., *happy*, *sad*, *angry*) more frequently than those they had acquired later (e.g., *scared*, *surprised*, *disgusted*). Another prediction is that children's 'incorrect'[1] responses are more likely to be of the same valence than of the opposite valence (e.g., calling the 'fear face' *angry* or *sad* rather than happy). These predictions had been confirmed in studies of children's labeling of facial expressions, but have not been tested in studies of their labeling of other emotion subevents.

Overview of the Study

The current study is the first to investigate the cause superiority effect in preschoolers (three to five years), with the less productively demanding task of labeling the emotion as the dependent variable. After getting to know a child, the experimenter presented the child with 12 brief stories about a protagonist named Danny. The story described either an antecedent situational cause or a behavioral consequence—an overt behavior resulting from the emotion excluding the facial expression, which we treat as a separate feature of the script—for one of six emotions (happiness, sadness, anger, fear, surprise, disgust). (Stories are listed in Table 1.) After each story, the child was asked, 'How does Danny feel?' Children then provided a label of their own choosing. Producing a single label is less demanding than is telling a story. Three-year-olds are capable of producing freely chosen labels (e.g., Denham & Couchoud, 1990; Widen & Russell, 2003). Thus, we included three-year-olds in our sample and also included an emotion (disgust) not included in Russell's (1990) or Surbey's (1979, as cited in Trabasso et al., 1981) studies.

Method

Participants

Participants were 108 children (three to five years) enrolled in preschools in the Greater Boston area. All children were proficient in English. The mean age of the younger group

Table 1. Twelve Emotion Stories

	Story type	
Emotion	Cause	Consequence
Happy	One day, it was Danny's birthday. His friends came to his birthday party. They gave him some nice presents.	One day, while Danny was in his yard, something happened that made him feel a certain way. It made Danny jump up and down and clap his hands.
Sad	One day, Danny went to feed his pet gold fish. But it was not swimming. It was not even in the fish tank. Danny's fish had died.	One day, Danny walked slowly over to a chair and sat down. Tears came to his eyes. He didn't want to talk to anyone.
Angry	One day, Danny built a block tower. But then another boy came and knocked Danny's tower down on purpose.	One day, while Danny was at school, something happened that made him feel a certain way. It made Danny yell and hit another kid. He clenched his fist and stomped his feet. He yelled really loud.
Scared	One night, Danny was sleeping in his bed. Then something woke him up. Danny's room was dark and he was all alone. Something was moving in Danny's closet: He thought it was a monster.	One day, while Danny was at the park, something happened to Danny that made him feel a certain way. It made Danny scream. He ran away as fast as he could. Danny kept looking back to see if he was being followed.
Surprised	One day, Danny came home, and he saw something he had never seen before: His mom's hair was pink.	One day, Danny came home, something happened that made him feel a certain way. This had never happened before. Danny just stared and tried to figure out what had happened.
Disgusted	One day, Danny took a big bite of an apple. It tasted awful. It was rotten inside.	One day, while Danny was in the kitchen, something happened that made him feel a certain way. It made Danny want to wash. He wanted to get it off of himself as fast as he could. He didn't want to touch that stuff.

(N = 54) was 46 months (*SD* = 5.04 months, range: 36–54 months), of the older group (N = 54), 62 months (*SD* = 4.56 months, range: 53–71 months). In each age group, 27 were boys, 27 girls. The sample was representative of the ethnic composition of the area: 71.3 percent were White, 15.7 percent Asian, 4.6 percent Hispanic, .9 percent of mixed ethnicity, and 1.8 percent other (5.6 percent did not report). Mean education level of the children's parents (assessed on a scale from 1 = some high school to 6 = doctorate) was 4.7 (*SD* = 1.0): between a four-year college degree and a Master's degree.

Procedure

Children were tested individually in a quiet area of their childcare facility. The experimenter began by spending time playing and chatting until the child seemed comfortable. Three tasks followed in the following order. Completion of the three tasks took approximately 10 minutes.

Priming. In order to prime the child's emotion vocabulary, the experimenter and child had a conversation in which the words *happy*, *sad*, *mad*, *scared*, *surprised*, and *disgusted* occurred. This priming procedure gave the child an opportunity to become more comfortable with the experimenter, and made it more likely that the relevant emotion labels were more accessible. The experimenter began, 'First we are going to talk about feelings. Feelings are like when you feel happy or sad. Do you ever feel happy?' 'Scared is a feeling. Have you ever been scared?' And so on. The experimenter did not discuss *when* or *why* these emotions might occur. After each question, the child was given an opportunity to respond. If the child spontaneously offered an example of when someone had felt a particular emotion, the experimenter listened but did not comment or encourage further explanation. Every effort was made here and throughout the experiment to use a neutral tone of voice when presenting the emotion words.

Animal Labeling Task. The experimenter then asked the child to label three animals (cat, dog, rabbit). This task served as a practice session and comparison task for emotion labeling. The child heard a brief description of the animal (e.g., 'This kind of animal can purr and likes to catch mice'), and was asked, 'What animal is it?' The experimenter then showed a color photograph of the animal. The animals were shown in a different random order for each child.

Emotion Story Labeling Task. Finally, the experimenter introduced the emotion story-labeling task. The task was presented as a game in which the child would hear stories about a boy named Danny. Table 1 gives the 12 emotion stories, one cause and one consequence story for each of six emotions: happiness, sadness, anger, fear, surprise, and disgust.[2] The 12 stories were presented in a separate random order for each child. The first story began, 'Once upon a time, there was a boy named Danny,' and the other stories began, 'One week later . . . '. After each story, the experimenter asked, 'How does Danny feel?'.

At no time did the experimenter use the word *emotion*, provide any emotion label, or otherwise direct the child to use an emotion label. Children's responses were not corrected. All responses were mildly praised (e.g., 'Good answer'; 'You are good at this game.'). If no response was given, the experimenter used various prompts (e.g., first, simply repeating the story, and, second, repeating the story with the child as the protagonist). If the child did not respond after the second prompt, the experimenter

returned to that story after all the other stories had been presented; the story was presented to the child a final time, and he or she was asked how Danny was feeling.

Materials: Stories of Emotional Events

The stories given in Table 1 were created based on prior work in our lab in which children generated causes and consequences for specific emotions (Russell, 1990; Russell & Widen, 2002; Widen & Russell, 2004). Each story was presented with an illustration of the story's setting or main object, but the illustration provided no hint about the relevant emotion.

Scoring

Animal Labeling Task. The labels scored as correct in the cat category were *cat* and, *kitty*; in the dog category, *dog*; in the rabbit category, *rabbit* and *bunny*. Children used no other labels. Children had a total of 324 opportunities to name the animal. They were correct on 100 percent of trials.

Correct as to Discrete Emotion. In responding to the stories, children were allowed to use any label they chose. The scoring key used in this study was drawn from Widen and Russell (2003), who described the development of a scoring key based on ratings of two judges blind to the source of the labels. The labels that occurred in this study and that were scored as correct were as follows. For happiness: *happy, good, excited, glad*. For fear: *scared, frightened*, *afraid, nervous*. For anger: *angry*, *mad*, *grumpy*. For sadness, *sad*, *upset*. For surprise: *surprise, shocked*. For disgust: *disgusted, gross, grossed out, yucky, revolted*. Responses could vary from what was just listed in syntax or by being embedded in a phrase (e.g., *very scared*). These were all the labels children used in the current study that came close to specifying a target emotion.

The children had a total of 1404 opportunities to provide a label. Of these, 56.1 percent (788) were emotion labels scored correct for the story given, 35.6 percent (500) were emotion labels scored incorrect for the story, and 8.3 percent (116) were other responses (e.g., 'bad,' 'funny,' 'strange').

Correct as to Valence. Children's responses were also scored for valence. Responses scored as positive valence were simply those scored correct for the discrete emotion of happiness. Responses scored as negative valence were those scored as correct for fear, anger, sadness, or disgust, plus those 'other' responses judged (by at least two of three judges), as negative (e.g., *bad, crying, dirty, not good, sick*). Because surprise can be either positive or negative, the surprise trial was omitted from valence scoring and from all analyses of valence scores. Of the 1080 opportunities to provide a label (excluding the surprise trials), 1000 (92.6 percent) responses were correct as to valence, 80 (7.4 percent) were incorrect as to valence (e.g., labeling an angry story as *happy* or *surprised* or with an 'other' response that had no valence).

Results

Correct as to Discrete Emotion

In a mixed-design ANOVA (alpha = .05), age (two levels: younger, older) and sex (two levels) were between-subjects factors; story type (two levels: cause, consequence) and

Table 2. Proportion of Children Who Labeled Emotion Stories 'Correctly' as to Specific Emotion

	Age group		
Story	Younger	Older	Mean
Happiness	$.85_{a}$	$.95_{a}$	$.90_{g}$
Sadness	$.85_{a}$	$.87_{ae}$	$.86_{g}$
Fear	$.49_{b}$	$.77_{e}$	$.63_{h}$
Surprise	$.16_{c}$	$.34_{d}$	$.25_{i}$
Disgust	$.11_{c}$	$.20_{c}$	$.16_{i}$
Anger	$.57_{b}$	$.60_{b}$	$.59_{h}$
Mean	.51	.62	

Note: Maximum possible is 1.00. For each emotion listed, there were two stories, one specifying a cause and one specifying a consequence. According to least significant difference (LSD) comparisons, means in the same row that do not share a subscript differ at $p < .005$. Means in the same column that do not share a subscript differ at $p < .02$.

emotion (six levels: happiness, sadness, anger, fear, surprise, disgust) were within-subject factors. The dependent variable was whether or not the child correctly labeled the specific emotion of the story, scored 1 or 0, respectively.

Results for age and emotion are shown in Table 2; they were as expected based on prior research. Performance increased with age, $F_{1, 104} = 12.74$, $p < .001$, partial $\eta^2 = .11$, and varied with emotion $F_{5, 520} = 108.08$, $p < .001$, partial $\eta^2 = .51$. The main effects for age and emotion were qualified by a significant age–emotion interaction, $F_{5, 520} = 2.81$, $p = .02$, partial $\eta^2 = .03$. Although performance improved with age for every emotion, the change was significant only for fear ($p = .001$) and surprise ($p = .02$).

Figure 1 shows results on our central question of whether causes or consequences provided the stronger cue to the emotion's label. Although the main effect for story-type was not significant ($p = .15$), the story type–emotion interaction was, $F_{5, 520} = 22.56$, $p < .001$, partial $\eta^2 = .18$. A difference was found for five of the six emotions. Causes were the stronger cue for happiness ($p = .02$), fear ($p < .001$), disgust ($p = .01$), and, marginally, sadness ($p = .08$). For surprise, there was no significant difference. For anger, this pattern was reversed: consequence was the stronger cue ($p < .001$).

To focus on the level of the individual child, we examined those occasions on which a child was correct on only the cause or the consequence for a given emotion (i.e., we omitted those occasions on which a child was correct on neither or both). For happiness, 15 of 19 (proportion = .79) children so selected were correct for the cause—thus, only 4 of the 19 (.21) were correct for the consequence only. For sadness, 13 of 18 (.72), for fear, 24 of 28 (.86), for surprise, 11 of 16 (.69), and for disgust, 14 of 16 (.88) were correct for the cause only. In contrast, for anger, 5 of 51 (.10) were correct for cause only, and 46 of 51 (.90) were correct for the consequence only. This analysis is consistent with the interpretation that children add one feature before adding another to their script and are largely consistent with one another for a given emotion.

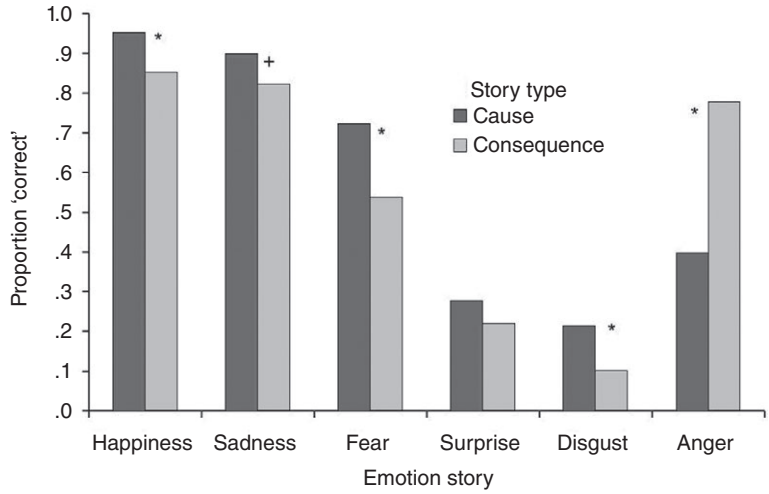

Figure 1. Proportion of Labels 'Correct' as to Specific Emotion Identified from the Cause or the Consequence Story for Each Emotion.
*$p < .02$, + $.05 < p < .10$.

We were interested in whether improvement with age occurred equally for both causes and consequences. It did. The age × story type interaction was not significant, $F_{1,\ 104} = .13$, $p = .72$, partial $\eta^2 = .00$. Mean improvement with age for cause stories (young: .52; older: .63) was significant, as was that for consequence stories (young: .48; older: .60).

Correct as to Valence

The next question was whether children's understanding of the valence of the story paralleled their understanding of the specific emotion implied. We therefore examined children's responses when scored correct or incorrect as to valence. The surprise trial was omitted because surprise can be either positive or negative. In a mixed-design ANOVA (alpha = .05) paralleling that reported earlier, age (two levels: younger, older) and sex (two levels) were between-subjects factors; story type (two levels: cause, consequence) and emotion (five levels: happiness, sadness, anger, fear, disgust) were within-subject factors. The dependent variable was whether or not the response was correct as to valence, scored 1 or 0, respectively.

The main effect for emotion was significant (Table 3), $F_{4,\ 416} = 15.56$, $p < .001$, partial $\eta^2 = .13$. Children used labels of the correct valence at near-ceiling levels for sadness, fear, and anger; these emotions did not differ significantly from each other and each was significantly higher (ps $< .03$) than happiness and disgust; happiness was significantly higher ($p < .001$) than disgust. The main effect for story type was significant, $F_{1,\ 104} = 14.43$, $p < .001$, partial $\eta^2 = .12$: Children's use of labels of the correct valence was higher for the cause stories than for the consequence stories. These two main effects were qualified by the significant story type–emotion interaction (Table 3), $F_{4,\ 416} = 3.26$, $p = .01$, partial $\eta^2 = .03$. The advantage of cause over consequence was significant for happiness ($p = .001$) and disgust ($p < .001$); the same trend was observed for sadness and fear, but not for anger. Although children were

Table 3. Proportion of Children Who Labeled Emotion Stories 'Correctly' as to Valence

	Story type		
Story	Cause	Consequence	Mean
Happiness	$.95_{a}$	$.85_{b}$	$.90_{d}$
Sadness	$.99_{a}$	$.98_{a}$	$.99_{e}$
Fear	$.98_{a}$	$.94_{a}$	$.96_{e}$
Disgust	$.87_{b}$	$.76_{c}$	$.81_{f}$
Anger	$.95_{a}$	$.97_{a}$	$.96_{e}$
Mean	$.95_{d}$	$.90_{e}$	

Note: Maximum possible is 1.00. For each emotion listed, there were two stories, one specifying a cause and one specifying a consequence. According to least significant difference (LSD) comparisons, means in the same row that do not share a subscript differ at $p \leq .001$. Means in the same column that do not share a subscript differ at $p < .02$.

overwhelmingly correct as to valence, their errors on valence did reveal a pattern similar to that found for naming the specific emotion: children were better with causes than consequences, but with a reversal for anger.

Children's 'Errors'

When labeling Danny's emotion, children produced 564 'errors'. Of these, 460 were emotion terms incorrect as to specific emotion and 104 were 'other' responses. Two hypotheses from Widen and Russell's (2003, in press-a) differentiation model can be tested by analyzing errors: (a) When children make 'errors,' they are more likely to use labels for early-emerging categories than later-emerging ones; and (b) Children are more likely to choose a label with correct than incorrect valence.

Widen and Russell's (2003, in press-a) differentiation model predicts that children acquire the emotion labels examined in this study in the following order: first *sad* or *angry*, then *fear*, and finally *disgust*. As a corollary, children of a given age use the earlier-acquired labels more frequently than the later-acquired ones, both for 'correct' and 'incorrect' uses. Table 3 confirmed this hypothesis for 'correct' uses of the emotion label (with a reversal for fear and anger for causes). Table 4 shows an analysis of the 460 emotion terms that were scored incorrect as to specific emotion. For stories about the four negative emotions, the rank order of errors was *sadness, anger*, *fear*, and, least likely, *disgust*.

The next question was the role of valence in children's errors. For this analysis, the surprise and happiness trials were omitted—surprise because surprise can be positive or negative, and happiness because same-valence errors were impossible for happiness in the scoring system used. Thus, this analysis focused on the 377 'errors' to the four negative emotions. The results are shown in Table 5. The major result was that same valence errors were much more frequent than opposite valence errors. Children rarely

Table 4. Frequency of Erroneous Use of Emotion Terms for Negative Emotion Stories

	Emotion term			
Story	Sadness	Anger	Fear	Disgust
Sad	—	20	1	0
Angry	69	—	1	0
Scared	54	26	—	0
Disgusted	40	47	15	—
Total (%)	163 (59.7)	93 (34.1)	17 (6.2)	0 (.0)

Note: 'Errors' in this analysis were the 273 emotion terms scored incorrect as to specific negative emotion category.

Table 5. Frequency (and Proportion of Total) of Non-target Responses for Causes and Consequences of Negative Emotions

	Story type		
Response	Cause	Consequence	Total
Same valence	169 (.45)	148 (.39)	317 (.84)
Opposite valence	9 (.02)	15 (.04)	24 (.06)
Other	14 (.04)	22 (.06)	36 (.10)
Total	192 (.51)	185 (.49)	377 (1.00)

Note: 'Errors' in this analysis were the 377 incorrect responses to the four negative emotions scored as having the same or opposite valence, or as being an 'other' response.

mislabeled a negative story with a positive (opposite valence) label. In comparisons of proportions, for both causes and consequences, the proportion of same valence errors was significantly greater than that of opposite valence errors ($p < .001$) or that of 'other' responses ($p < 001$). Children identify negative emotions from negative causes or from negative behavioral consequences, just not necessarily the same negative emotion that adults identify. There were 805 occasions in which a negative emotion label was applied to a negative emotion. Of these, 60 percent (483) were 'correct' and 40 percent (322) incorrect.

Discussion

When told a brief story and asked how its protagonist felt, the preschool children in our study responded with an emotion label over 90 percent of the time. Although nearly 10 percent of the responses were not emotion labels, even these were, nonetheless, reasonable responses to the question asked. For example, a child sometimes simply responded with valence (Danny felt bad). For surprise, some children responded with

a reasonable but non-emotional label (Danny felt strange or confused). So, the children understood and engaged in the task.

Children were correct on the *valence* of the protagonist's emotion over 90 percent of the time: children knew whether the protagonist felt good or bad. Although understanding of valence did vary somewhat with emotion, children were correct on valence at least 80 percent of the time for each emotion. Even when incorrect as to specific emotion, children were often correct as to valence. Thus, although preschool children have yet to match the adult system for understanding emotion, they do have their own system based on valence.

Our results with valence show that even our youngest children studied have scripts. From other research (Russell, 1990; Surbey, 1979, as cited in Trabasso et al., 1981), we know that preschool children include both causes and consequences in their emotion scripts. Our results confirmed this conclusion and showed a general cause superiority effect, although the difference was small, and not significant for all emotions. Thus, the present results reinforce the idea that at an early age children form two scripts that they use to understand their emotional world. In the 'feels bad' script, something bad happens, the person feels bad, and there is a bad outcome. In the 'feels good' script, something good happens, the person feels good, and there is a good outcome.

Children also showed knowledge of the specific emotion of the stories. In all, 56 percent of their responses were correct as to the specific emotion. Although substantially lower than the figure for valence (93 percent), the proportion correct for specific emotion based as it was on free labeling was impressive. Preschool children clearly have scripts for specific emotions, and the present results help clarify those scripts. We examined only what have been proposed as the most 'basic' emotions, and we tried to use only the most prototypical causes and consequences of those emotions. Nevertheless, the possibility always remains that there are other emotions, causes, and consequences that would demonstrate even greater identification of the specific emotion.

Children were better at naming the correct emotion from causal stories than from consequence stories for all emotions except anger. Indeed, this pattern held within child: For those children who were correct for only the cause or the consequence (but not both), on happiness, sadness, fear, and disgust, 79 percent were correct for the cause; for anger, 90 percent were correct for the consequence. The advantage of causes over consequences is consistent with previous findings (Russell, 1990; Surbey, 1979, as cited in Trabasso et al., 1981). The present results were the first to our knowledge to show that this effect is reliable for happiness, sadness, and disgust, as well as fear. More children had cause as a feature of their scripts than consequence. If we extrapolate to a younger age group, we can speculate that causes enter the child's scripts before a behavior does for most specific emotions.

The apparent exception of anger is important and must be examined further. This exception resonated with the earlier finding by Widen and Russell (2004) that anger was again alone in having behavioral consequence (hitting and yelling), as more powerful than its facial expression or its label as a cue for the child to infer the emotion. By 'more powerful,' we mean that the behavioral consequence elicited more stories about antecedent causes that adult judges identified as specific to anger. Thus, accumulating evidence points to behavioral consequence as the starting point for the script specifically for anger. The behavioral consequence story used here included hitting and yelling—that is, both instrumental and expressive behaviors. It will be interesting to examine whether the expressive or the instrumental component is the more powerful

cue. More generally, it will be interesting to examine vocal, facial, and postural expressions separately from instrumental behaviors for all emotions. Even so, the present result with anger, if verified with further evidence, suggests that scripts may be built in a variety of ways, with no fixed order in which features enter the script.

Findings such as ours are sometimes interpreted as showing that children 'confuse' one emotion with another. For example, children are said to 'confuse' sadness and anger when they label as sad someone adults label as angry, or vice versa. On our interpretation, children's 'confusions' reflect their current level of emotion understanding, and they might not feel confused at all. Broader scripts simply apply to a broader range of events. Children thus use earlier-acquired emotion labels more broadly (and hence more often) than later-acquired ones. Here, when children used labels 'incorrectly', they were more likely to use *sad* and *angry* than *scared* or *disgusted*. This pattern of label use supported the prediction that children assimilate the emotion events they encounter to their few broad emotion categories (see also Widen & Russell, 2010, in press-a).

Our study did not address the influences on script formation. Our results do raise such questions, however. Why, for example, might causes enter a script before behavioral consequences? Why was this order reversed for anger? Answers might be found in children's cognitive or linguistic development, in the ecology of emotion events, in the child's direct observations, or in adult tutoring. For example, some emotions we studied might be more frequent than others in the environment of the children in our sample, leading to more learning opportunities. Causes of emotion may be more distinct than behavioral consequences in the children's environment (e.g., children may cry whether feeling sad, afraid, or angry). Emotion socialization may also play a role (e.g., Eisenberg, Cumberland, & Spinrad, 1998; Halberstadt, Crisp, & Eaton, 1999). The line of research reported here can thus usefully contact research on the effect on emotion understanding due to socialization, preschool curriculum, and cognitive development in general.

The present study examined age groups, and it found good consistency within each group. The concept of an emotion script has been used to describe cultural differences in the understanding of emotion (Russell, 1989). Important work has revealed individual differences in identification of and knowledge about specific emotions. For example, abused children see anger in more facial expressions than do non-abused age mates. Children of depressed mothers see sadness in more faces than do children of non-depressed mothers (Joormann, Gilbert, & Gotlib, 2010; Lopez-Duran, Kuhlman, George, & Kovacs, 2010; Mannie, Bristow, Harmer, & Cowen, 2007). Adolescent girls with conduct disorder do not recognize anger and disgust facial expressions as well as a control group (Fairchild, Stobbe, van Goozen, Calder, & Goodyer, 2010). Girls with eating disorders also have more difficulty recognizing facial expressions of negative emotions than control groups (e.g., Kucharska-Pietura, Nikolaou, Masiak, & Treasure, 2004; Ridout, Thom, & Wallis, 2010; but see Kessler, Schwarze, Filipic, Traue, & von Wietersheim, 2006).

Our study had its limitations. One limitation is that we presented only one cause and one consequence for each emotion. Each had been selected from stories generated by children in prior studies done in our lab (Russell, 1990; Russell & Widen, 2002; Widen & Russell, 2004), and found in pilot studies to be the ones that children understood best, but of course the possibility remains that other causes and consequences might be more powerful. Future research could use more than one cause and consequence for each emotion.

Another limitation is that not all the stories were the same length. We believed that it was more important (1) to keep every story as short as possible while (2) making each story as clear as possible.

A third possible limitation is that only one a male protagonist was used in all the stories. There is some possibility that children respond better to protagonists of the same gender or that their gender stereotypes about boys' vs. girls' emotion may affect their attributions of emotion (Martin, 2000). On a practical level, because of the ages of our sample, we could not add more trials. Therefore, to add protagonist gender, we would have had to increase sample size. We did address this question in a prior study with four- to five-year-olds (Widen & Russell, 2002). Children labeled stories, and, separately, facial expressions of either a boy or a girl—the stories were identical except for identifiers, and the facial expressions were identical except for hair style. Gender and emotion interacted but in a complex way: Boys more frequently labeled the male's disgust face and story as *disgusted* than the female's. Girls more frequently labeled the female's fear face and story as *scared* than the male's. Still, the effects were small. If protagonist gender were a factor in the present study, one might anticipate a participant gender effect, specifically that boys would do better than girls with Danny boy as protagonist. No such effect was found. In several other prior studies, we have used a single protagonist and have not found gender effects in children's attributions of emotions (e.g., if the protagonist is a boy, boys' performance was not higher than girls').

The developmental story suggested by this study begins long before the age of three years. Younger children understand the emotions of others largely as positive or negative. When they use emotion labels, they initially use *happy* and either *sad* or *angry*, the latter two even for cases that adults would interpret as fear or disgust. We can speculate that children then come to differentiate anger from the other negative emotions by the presence of hostile behavior. Other negative emotions are differentiated one from another by causal antecedents, and behaviors are added to those scripts later.

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Notes

1. On our alternative perspective, we do not ascribe to the traditional assumption that non-target responses are 'errors'. We believe that children's non-target responses reveal a great deal about their understanding of emotion categories, and that it is important to analyze all of children's responses on emotion tasks, both 'correct' and 'incorrect'.
2. We included a 13th story as an alternative fear-cause story. Pilot work had found children did well with the fantasy-based fear cause (monster in the closet) given in Table 1, but we were concerned that a story based on fantasy might underestimate what children know about fear. We therefore also included an alternative, reality-based fear cause (a big mean dog chases Danny). In a preliminary analysis, the fantasy-based fear cause story elicited more correct fear labels (.72) than did the reality-based alternative fear cause (.52): $t_{107} = 4.52$, $p < .001$. We therefore omitted the alternative reality fear cause from further analysis.