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Author's Note

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Abstract

This study examined the ability of 3- to 5-year-olds (N = 76; 37 males, 39 females) receiving Head Start services to freely label six emotions (happiness, sadness, anger, fear, disgust, and surprise) using photographs of facial expressions in condition 1 or stories containing an emotion-eliciting event and behavioral consequence in condition 2. The presentation of a story elicited better performance than the presentation of a facial expression for anger, fear, and disgust. After hearing the story, performance significantly improved for participants who initially incorrectly labeled photographs of facial expressions of anger, fear, disgust, and surprise, $F(1, 68) = 119.10$, $p<.001$. The addition of stories to the curriculum of current Head Start emotion knowledge programs may increase program effectiveness.

Emotional Development in Preschoolers Receiving Head Start Services

As children develop, they acquire the ability to identify the emotion portrayed by a particular facial expression and the emotion typically elicited by a certain situation. With adequate emotion knowledge, children are capable of responding to emotional situations in a socially appropriate manner. Children who are able to respond appropriately to social situations due to their emotion knowledge increase their chances of academic and social success (Denham et al., 2003; Raver, 2002; Shields et al., 2001).

While it is apparent that emotion knowledge is correlated with later success, the manner in which children acquire emotion knowledge is unknown. Currently, there exist two main theories explaining emotion knowledge acquisition. The perceptual bedrock theory emphasizes the necessity of facial expressions, while the script theory examines the possibility that different cues may be more helpful for identification based upon the specific emotion.

The process of emotion acquisition can be best understood through research examining the emotion knowledge of children at different age levels. However, procedural difficulties limit the ages of children which can be reliably studied. Researchers hypothesize that infants as young as one month can differentiate between emotions. However, the subjective measures utilized by a majority of the research limit the resulting validity. Due to the subjectivity of measures involving very young children, a majority of the research concerning emotional development focused on emotional development in children between the ages of 2 and 5 years. Since children of these ages can speak and answer questions, researchers are able to collect internally valid data.

Stressors faced by children living in poverty place these children at risk for abnormal emotional development. As a result, a growing body of research has examined emotional development in children receiving Head Start services (programs created for children from low-income families) (Raver, 2002; Shields et al., 2001; Izard, Fine, Schultz, Mostow, Ackerman, & Youngstrom, 2001). Results indicated not only that preventative programs positively affect development, but also that programs designed specifically to facilitate emotional development are effective in increasing emotion knowledge (Izard, Trentacosta, King, & Mostow, 2004).

The present study examined emotional development in children receiving Head Start services. By gathering data specific to the Head Start population, trends in emotional development for this specific group of children were examined. Analyzed results yielded information in support of one of the two major theories and also information explaining which cues were most helpful for children when identifying emotions. This information can then supplement previously implemented programs intended to facilitate emotional development.

Theories of Emotional Development

Researchers agree that between the ages of 2 to 5 years, children acquire the ability to nonverbally recognize the emotions portrayed by common facial expressions and the emotions typically elicited by certain situations. Soon after, children are able to transform these nonverbal responses into verbal labels for emotions (Denham, 1998). However, the manner in which children gain emotional knowledge remains a point of conflict for researchers. In an attempt to explain children's acquisition of emotional

knowledge, two main theories emerged. These two theories are the most current in emotional development and most pertinent to the current research question.

Perceptual bedrock theory. One theory emphasizes the role of facial expressions in emotion development. This theory is based upon the view of emotions as biologically given response modules which correspond with inherent or even innate emotional facial expressions (Izard, 1978). In early infancy, children begin to perceive changes in face, voice, and posture in the emotional displays of others (Field & Walden, 1982). Once this perceptual ability is acquired, infants are able to differentiate between emotional expressions. Differentiation then facilitates the recognition and labeling of basic facial expressions (Bowlby, 1969, 1988; Denham, 1998; Izard, 1971; Harris, 1989).

By the time a child reaches the preschool years (ages 3 to 5 years) he or she is often able to label the facial expressions of the basic emotions (happiness, sadness, anger, and fear) with above chance accuracy (Denham & Couchoud, 1990; Harrigan, 1984; Markham & Adams, 1992; Russell & Widen, 2002; Widen & Russell, 2003). Researchers theororize that the ability to label facial expressions is necessary for further emotional development and serves as the "perceptual bedrock" for all later understanding of emotion (Denham, 1998). Specifically, once a child can appropriately recognize and label a facial expression, he or she can then associate additional emotion information with the appropriate facial expression. Additional emotion information includes the cause, consequence, and appropriate label for the particular emotion (Denham, 1998). In summary, this theory proposes that children's knowledge of emotion develops out of their ability to recognize the emotional meaning of facial expressions.

Some of the most compelling evidence for the perceptual bedrock theory resulted from studies in which researchers presented two groups of children with different sources of emotion information (Denham & Couchoud, 1990; Widen & Russell, in press). Such studies presented one group of children with facial expressions of emotion and the other group with emotional situations, and then asked the children to identify the emotion being presented. Significant effects for the source of information indicated that children presented with facial expressions were better able to identify the relevant emotions than their counterparts who were presented with emotional situations (Denham & Couchoud, 1990; Widen & Russell, in press).

Facial expression identification may not only be easier than situation identification, but also more helpful for children when labeling emotions. Hoffner and Badzinski (1989) presented children with a facial expression that displayed one emotion and a behavioral story that described another emotion. Children were then asked to examine the conflicting emotion cues and determine which emotion was being portrayed. An overwhelming 89% of 3- to 5-year-olds responded with the emotion presented by the facial expression. Thus, Hoffner and Badzinski (1989) concluded that 3- to 5-year-old children rely more heavily on facial expressions than on behavioral stories to identify emotions.

Instances in which an advantage of faces over stories occurs serve as evidence of a facial superiority effect (Denham & Couchoud, 1990; Widen & Russell, in press). The facial superiority effect is a prediction of the perceptual bedrock theory and proposes that in all instances, facial expressions of emotion are more helpful than emotion stories for

preschoolers when identifying emotions and also that facial expressions produce more correct responses than emotion stories.

In an attempt to provide further evidence for the perceptual bedrock theory, Camras and Allison (1985) presented preschool children with stories concerning a fictitious character and asked the preschoolers to identify the emotion being presented. Dependent upon condition, participants were asked to respond either by choosing an appropriate emotion label or by choosing the photograph depicting the corresponding facial expression. Results showed no support for the face superiority effect proposed by the perceptual bedrock theory. In fact, the opposite was found. When asked to identify emotions based on various emotion cues, the children presented with emotion labels performed significantly better than the children presented with a photograph of a facial expression.

Widen and Russell (2004) provided further criticism of the perceptual bedrock model in their study which reversed the methods used by Camras and Allison (1985). In their study, Widen and Russell presented children with facial expressions, behavioral consequences, and emotion labels. Children were then asked to attribute possible causes to each of these aspects of emotion. If the perceptual bedrock theory were valid, significantly more correct responses would be produced by the children presented with facial expressions than the children in other situations. However, a higher percentage of correct responses were obtained from children in the behavioral consequence and label conditions than in the facial expression condition. These results provided evidence of a label superiority effect and a behavioral consequence superiority effect. These effects

indicated that both labels and behavioral consequences were stronger cues to the overall cause of emotion.

Script theory. In light of Camras and Allison's findings (1985), as well as similar evidence, researchers hypothesized an alternate theory of emotional knowledge development (Widen & Russell, 2004). Researchers who define the development of emotion in terms of cognitive processes which act upon an undifferentiated feeling state support this theory (Gross & Ballif, 1991). As children develop cognitively, they are able to experience different emotions, and begin to develop emotion scripts to identify differences in the previously undifferentiated feeling state. Emotion scripts include information pertaining to the cause, physiology, behavior, facial expression, subjective experience, and label of the emotion (Widen & Russell, 2004). With further development, children learn the associations between these aspects of an emotion and develop scripts of a prototypical emotion (Bullock & Russell, 1986).

Script development may begin with an emotion label, a facial expression, or a behavioral story. For each emotion, the particular aspect with which script development begins is dependent upon the salience of each of its features. For emotions in which the facial expression is most salient, the script may begin with a facial expression which is in turn linked to its cause. For emotions in which the behavioral story is most salient, the script may begin with behavior which is then linked to facial expression. For emotions in which the emotion label is most salient, the script may begin with an emotion label which is then linked to a facial expression or behavioral story (Widen & Russell, 2004). A review of the relevant literature allows for speculations to be made concerning the script development of each particular emotion.

A label superiority effect was found for fear and disgust (Camras & Allison, 1985; Russell & Widen, 2002; Russell, 1990). From this information, researchers have hypothesized that the scripts for fear and disgust begin with the use of the labels *scared* and *disgusted* which children later link with the corresponding causes (Widen & Russell, 2004).

In studies which reported evidence of a small case of a face superiority effect, results were most significant for happy and sad (Denham & Couchoud, 1990). Also, evidence showed that understanding of happy and sad develops first (Denham, 1998). From this evidence, researchers have predicted that the scripts for happy and sad begin with the recognition of the facial expression which then becomes linked to the label and the behavioral consequence.

When they presented children with behavioral consequences, facial expressions, and emotion labels of emotion, Widen and Russell (2004) found a behavioral consequence superiority effect for anger. Children most often correctly identified the cause of anger when it was presented in the form of a behavioral consequence. This evidence has suggested that the script for anger beings with knowledge of the behavioral consequence.

Little research has been conducted concerning the emotion surprise, thus making it difficult to propose the cue which initiates the formation of the script. However, since researchers consider surprise to be an emotion which is less basic and innate than happiness and sadness, researchers have hypothesized that the script for surprise begins with the label or the emotional situation (Denham, 1998; Widen & Russell, in press).

Emotional Competence and Its Relation to Social Competence

In order for children to interact in a socially appropriate manner and form positive relationships with others, it is necessary for them to possess emotional competence (Parke, 1994; Saarni, 1990). Emotional competence, as stated by Saarni (1990) refers to the ability of children to "respond emotionally, yet simultaneously and strategically apply their knowledge about emotions and their expression to relationships with others, so that they can negotiate interpersonal exchanges and regulate their emotional experiences" (p. 116). By the time children reach preschool, they have acquired many of the skills necessary for emotional competence (Dunn, 1994). These skills are grouped into three major categories of emotional competence: emotional expressiveness, emotion knowledge, and emotion regulation (Denham et al., 2003). Emotional expressiveness relates to the child's ability to convey emotions to others through appropriate facial expressions. Emotion knowledge includes the ability of a child to appropriately identify the emotion being portrayed by a facial expression or the emotion typically elicited by a certain situation. Emotion regulation consists of processes responsible for monitoring, evaluating, and modifying emotional reactions in order to achieve a desired outcome in social situations (Thompson, 1994).

All three aspects of emotional competence enable an individual to interact in a socially acceptable manner. In order to form friendships, interact in social situations, and achieve desired goals, children must possess emotional expressiveness, emotion knowledge, and emotion regulation. Thus, it is not surprising that emotional competence has been found to be highly correlated with social competence (Denham et al., 2003).

Even though an abundance of research has been conducted examining all aspects of emotional competence and their correlations with social competence, due to the nature of this study, only those studies that specifically concern emotion knowledge are discussed. When researchers examined emotion knowledge and social competence, a significant causal link was found (Denham et al., 2003; Edwards, Manstead, & MacDonald, 1984). Emotion knowledge at ages 3 to 4 years coincided with present social competence, and to social competence in kindergarten (Denham et al., 2003). Emotion knowledge in the form of appropriate facial expression and emotional situation identification may be particularly helpful to social competence as it provides preschoolers with information necessary in critical peer situations, including instances of group entry and conflict resolution (Denham et al., 2003).

Results of proper development of emotion knowledge. Research has indicated a strong correlation between emotion knowledge in low-income Head Start children and social and academic competence in third grade (Izard et al., 2001). Being able to identify the emotions of other children provides the child with the information necessary to respond in a prosocial manner. Thus, preschoolers who are more adept at understanding the emotions of others are more likely to show adaptive behaviors in school, and benefit socially and academically (Shields et al., 2001).

The peer interactions of children who possess emotion knowledge are often seen as more positive and rewarding to others (Denham et al., 1990). As a result, children who are more adept at understanding emotion-eliciting situations and emotional expressions are seen as more likeable overall. Further, as measured by a likability

aggregate, children with greater emotion knowledge were viewed as more popular by peers and teachers (Denham, McKinley, Couchoud, & Holt, 1990).

Children with a firm foundation of social and emotional skills are likely to succeed not only socially, but also academically (Wentzel & Asher, 1995). The same prosocial and adaptive skills necessary for positive peer interaction affect classroom achievement, creating a link between a child's emotional and social skills and early academic standing (Wentzel & Asher, 1995).

For children, the transition to preschool is often difficult and crucial to later success in school. However, with proper emotion knowledge, children may be able to smoothly transition to preschool. A study examining the transition in the Head Start population found a positive correlation between early school adjustment and emotion knowledge (Shields et al., 2001). Head Start children who made a smooth adjustment were better able to identify emotional expressions and situations that typically elicited various emotional responses (Shields et al., 2001).

Emotion knowledge helps in the transition to preschool, but also in other classroom instances. By behaving in an emotionally prosocial manner, socially-emotionally competent children can build strong relationships with teachers (Ladd, Birch, & Buhs, 1999). Additionally, prosocial students possess the skills necessary to maximize their educational experience. Students who behave prosocially receive more positive feedback from teachers, and interact with peers in classroom situations which allow them to learn from one another (Raver, 2002).

Results of disturbances in the development of emotion knowledge. Children with a poor understanding of emotions were at risk for greater difficulties in interactions with

same-aged peers and similarly, subsequent withdrawal from the peer groups (Shultz, Izard, Ackerman, & Youngstrom, 2001). With a lower aptitude for analyzing and understanding emotional stimuli, children often responded inappropriately to their peers. Children lacking appropriate emotional knowledge often misinterpret situations by making inaccurate or hostile attributions of others' intentions (Crick & Dodge, 1994; Dodge, Murphy, & Buchsbaum, 1984). Due to these flawed attributions, the child responds in an inappropriate manner, often involving the use of aggression (Dodge & Feldman, 1990). As a result, peers begin to dislike these children and reject them from social groups, leading these children to become socially withdrawn (Schultz, Izard, Ackerman, & Youngstrom, 2001).

Social withdrawal as a result of aggressive behavior due to lack of emotion information has serious academic implications. Children rejected by their classmates during the preschool years are more likely to achieve less academically, to be held back, to drop out of school, and to commit criminal juvenile offenses (Jimerson, Egeland, Sroufe, & Carlson, 2000; Kuperschmidt & Coie, 1990; Miller-Johnson et al., 1999; Parker & Asher, 1987; Raver, 2002; Vitaro, Laroque, Janosz, & Tremblay, 2001).

In contrast to prosocial children, children with lower social-emotional competence due to inadequate emotion knowledge forego many of the aspects of schooling which facilitate academic success. First, a lack of emotion knowledge in children adversely affected teacher-child rapport and resulted in a child's isolation from the teacher (Izard et al., 2001). Children lacking social-emotional competence often acted out in the classroom, and as a result, were provided with less positive feedback from teachers (Arnold et al., 1999; McEvoy & Welker, 2000; Shores & Wehby, 1999). Additionally,

teachers expected less academically from children with low emotion knowledge (Izard et al., 2001). Research indicated a correlation between these negative student-teacher relationships and a child's later academic difficulty (Hamre & Pianta, 2001; Raver, 2002).

Second, children lacking the emotional knowledge necessary for proper peer interaction often miss the possible positive effects of group interaction. Children with low social-emotional competence are less likely than their socially-affluent peers to be invited to work together in a group on a project or assignment, and thus were less likely to be involved in opportunities which would allow them to learn from their peers (Berndt & Keefe, 1995; Ladd et al., 1999; Raver, 2002).

Finally, preschoolers who lacked emotion knowledge often experienced a negative academic environment. A lack of emotion knowledge inhibited children from forming strong peer relationships at school, and led to social rejection and subsequent peer withdrawal (Berndt & Keefe, 1995; Raver, 2002). Poor peer relationships affected a child's morale, concentration and motivation (Izard et al., 2001). Students who lacked the motivation to perform well academically possessed less motivation to attend school, thus resulting in lower attendance rates (Birch & Ladd, 1997; Murray & Greenberg, 2000).

Risk Factors for Low Social-Emotional Competence

Since social-emotional competence is crucial for proper development, the factors which place children at risk for poor social-emotional competence warrant examination. Various behavior and academic problems are associated with economic disadvantage (McLoyd, 1998). Numerous indicators of academic achievement including achievement

test scores, grade retention, course failure, placement in special education, high school graduation rate, high dropout rate, and completed years of schooling indicated that on average, poor and low-SES children performed significantly less well than non-poor and middle-class children (Dodge, Petit, & Bates, 1994). Additionally, poverty adversely affected children's cognitive and verbal skills, placing poor children at greater risk for anti-social behavior and social withdrawal (Ackerman, Brown, & Izard, 2003).

In order to determine exactly what aspects of life in low-income households were linked to lower social-emotional competence, recent studies examined various components of home life individually. Studies produced evidence of a correlation between family instability, parenting styles, household conflict, and negative emotionality and child adjustment (Ackerman et al., 1999; Ackerman, Brown, & Izard, 2003; McLoyd, 1998). Synthesis of findings suggested the idea of "cumulative risk" (Raver, 2002) as the main environmental influence on children's emotional development. Cumulative risk refers to the idea that it is not a single factor, but the combination of the aforementioned risk factors which best predicts a child's emotional development. Further, risk for low social-emotional competence increased as the number of risk factors the child faced increased (Raver, 2002).

It is important to note that while the multiple stressors faced by children living in poverty place them at risk for lower social-emotional competence, many of these children are developing well emotionally. Thus, these children should not be stigmatized or viewed from a deficit-oriented perspective (Raver, 2002). Nevertheless, taking into account the abundance of research linking poverty to low social-emotional competence, it is worthwhile to consider options which may lessen the affects of risk factors faced by

children living in low-income households (Ackerman, Kogos, Youngstrom, Schoff, & Izard, 1999; Ackerman, Brown & Izard, 2003).

Prevention Programs

Due to the abundance of research which identified children receiving Head Start services as at-risk for low social-emotional competence, programs intended to facilitate emotional development were implemented with some success. An initial evaluation of an adaptation of Providing Alternate Thinking Strategies (PATHS) for Head Start showed that implementation of the program was positively correlated with significant increases in children's emotion knowledge and positive prosocial behavior (Domitrovich, Cortes, & Greenberg, 2002). The PATHS program was designed to facilitate self-control, emotional awareness, and interpersonal problem-solving skills in elementary school-aged children. Additionally, the Emotions Course (EC) program created by Izard and colleagues significantly increased children's performance on two tests of emotion knowledge (Izard, Trentacosta, King, & Mostow, 2004). The success of these studies showed that it is possible to create a program which could potentially increase a child's chances of proper social-emotional development despite risk factors.

In a recent study, Izard and colleagues created the EC to facilitate the development of emotion understanding, regulation, and utilization in children receiving Head Start services (Izard, Trentacosta, King, & Mostow, 2004). The Emotions Course consisted of 22 lessons focusing on the four emotions: happiness, sadness, anger, and fear (Izard et al., 2004). Children were tested on three measures of emotion knowledge prior to and following participation in the Emotions Course. Children who participated in the EC scored significantly higher on the post-test (Izard et al., 2004). The Emotions

Course showed that the supplementation of programs designed to facilitate emotional development in the Head Start curriculum can be effective.

Present Study

In order to expand upon the previously implemented program, this study examined emotion knowledge of two additional emotions, surprise and disgust. Because these emotions are acquired later than other emotions, little research has been conducted concerning surprise and disgust relative to other emotions. For these reasons, this study included surprise and disgust with the hopes of examining the early stages of development of these emotions.

In order to create the most successful prevention program concentrating on emotion knowledge, it is necessary to understand the process by which children acquire emotion knowledge and the information which is most helpful for them when identifying emotions. Due to the necessity of a basic understanding of emotion theory for the creation of a successful prevention program, this study was designed in order to provide additional support for either the script theory or the perceptual bedrock theory. Knowledge concerning the information children find most useful when identifying emotions allows researchers to effectively structure the presentation of this information during instruction.

The ultimate goal of this study was to provide information which can supplement previously implemented programs intended to facilitate the development emotion knowledge in children receiving Head Start services. Based on a review of the literature, it was predicted that the results would provide information in support of the script theory. Additionally, by examining a child's knowledge of six different emotions after an initial

presentation of emotion information, and following the presentation of additional information, this study allowed researchers to observe which type of information was most helpful when identifying a specific emotion. One of the predictions of this study was that information seen as useful by the child would differ depending on the emotion.

Method

Participants

A total of 76 children (M= 51.91 months, SD= 7.92; 37 males, 39 females) participated in the experiment. Following data collection, an analysis of descriptive statistics indicated that the median age of participants was 52 months. In order to account for age-related differences in emotion knowledge, participants were then divided into two age groups: 38-52 months and 53-65 months. There were 19 boys and 17 girls in the resulting younger age group (38-52 months), and 18 boys and 22 girls in the resulting older age group (53-65 months). All participants were enrolled in the Heartland Head Start program, and were proficient in English.

Three children were excluded from the study due to language barriers which prevented the children from presenting appropriate emotion labels during the priming portion of the study.

Materials

Photographs of facial expressions. Two sets of seven 5 in. x 7 in. glossy black-and-white photographs portraying clear, prototypical examples of facial expressions of emotion (happiness, fear, anger, disgust, surprise, and sadness) and neutral were used (see Figure 1). Photographs were intended to portray a facial expression of a single emotion near maximum intensity. Dr. Linda Camras provided two sets of photographs;

one set posed by a 9-year-old girl, and one set posed by a 9-year-old boy (Camras, Grow, & Ribordy, 1983).

Stories of emotional events. Six stories of stereotypical emotion-eliciting events were created based on the works of previous researchers (Widen & Russell, 2004). All stories included three major components: setting, emotion-eliciting action, and behavioral response. Stories were constructed in such a way as to prevent personal tastes from producing a response inconsistent with the relevant emotion category (see Table 1).

Procedure

Each child was randomly assigned to either the facial expression condition or the story condition as well as priming procedures (occurring before as well as within the conditions). While facial expressions and stories were presented in both conditions, conditions were named based on which stimulus was presented first. The order in which children were presented with the two conditions was counterbalanced across participants.

The experimenter spent time playing and talking with the child until the child appeared comfortable with the experimenter. After the child was comfortably interacting with the experimenter, the experimenter asked the child for the names of two playmates (X and Y for our purposes). The experimenter then began the priming portion of the procedure by creating a conversation that incorporated the emotion words "happy," "sad," "angry," "surprised," "disgusted," and "scared." Priming procedures were adopted from Widen and Russell (2003), and were included to rule out unavailability of emotion labels as a cause for an incorrect response. The experimenter then asked the child questions concerning the playmates and their portrayal of emotions (e.g., "Does X ever feel sad?"). Questions presented for each emotion appear in Table 1. If the child

responded "yes," the experimenter continued to the next question. If the child appeared confused or responded "no," the experimenter went into further detail concerning the specific emotion by presenting an event which would typically elicit the appropriate emotion. The emotion eliciting events used for a particular emotion were the same for each child and appear in Table 1. If the child responded appropriately, the experimenter continued to the next emotion. If the child responded incorrectly, the experimenter corrected the child but did not introduce further levels of priming. The experimenter did not comment or encourage further explanation for any child's response, and used a neutral tone of voice throughout the priming procedure.

Following priming, children were presented with either the facial expression condition or the story condition. This initial presentation of information was identified as Time 1. The experimenter presented stories and faces concerning a boy named "Dan" to male participants, and stories and faces concerning a girl named "Laura" to female participants. Gender was matched to facilitate the child's ability to identify with the subject. Unlike any previous study, this study presented children with supplemental information following an incorrect response. The responses which occurred following the presentation of supplemental emotion information were coded as occurring at Time 2. However, all procedures for presentation of facial expressions and stories were similar to those used by Russell and Widen (2003).

Facial expression condition. In the facial expression condition, the experimenter introduced the task by saying:

> I brought some pictures of my friend Dan (Laura). Would you like to see them? Okay, here is a picture of Dan (Laura) [showing a neutral expression]. I have an idea. Would you like to play a game? In this game, Dan (Laura) is going to show us how he/she feels sometimes (adapted from Widen & Russell, 2003).

The presentation of the neutral face was implemented as a control for the incorrect responses as a result of unfamiliarity with the model (Widen & Russell, 2002).

The experimenter then presented the child with one of the six facial expressions (order randomized across participants) by placing the picture on the desk in front of the child. When presenting the first face, the experimenter said, "One day, Dan (Laura) felt like this [pointing to the face]." When presenting subsequent faces, the experimenter said, "Another day, Dan (Laura) felt like this [pointing to the face]." After presenting each picture, the experimenter asked the child, "How do you think Dan (Laura) feels in this picture?" The experimenter then allowed 30 seconds for the child to formulate a response. If no response was given, the experimenter once again asked, "How do you think Dan (Laura) feels in this picture?" If after the experimenter attempted to gain a response from the child two times and the child still did not respond, the response was marked as incorrect. The experimenter answered by a neutral "good" to any response including an emotion label (regardless of whether or not it was correct), without correction or praise. If the child's response was coded as correct, the experimenter continued to the next photograph. If the child produced an incorrect response, the experimenter provided additional information relating to the emotion in the form of a story (see Table 2). The stories included a description of the setting, emotion-eliciting event, and behavioral consequences concerning the protagonist previously presented in the photographs. The experimenter introduced the stories as she said, "Here's a story about when Dan (Laura) made this face." The experimenter then presented the story and asked, "How do you think Dan (Laura) was feeling?" Experimenters allowed 30 seconds for the child to form a response. If following 30 seconds the child had not responded, the

experimenter repeated the question. If following this 30 second allotment the child did not provide an answer, the response was marked as incorrect. The experimenter did not correct any responses, and responded to each emotion label response with a neutral "good." The experimenter then presented the next photograph.

Story condition. In the story condition, the experimenter introduced the task by saying:

> I'm going to tell you some stories about some things that happened to my friend Dan (Laura). Here is a picture of Dan (Laura) [showing a neutral expression]. When I'm done telling the story, you get to tell me all about how you think Dan (Laura) feels. Does that sound like fun? Okay, now remember, listen very carefully, because when I'm done, you get to tell me all about how Dan (Laura) feels (adapted from Widen & Russell, 2003).

The presentation of the neutral face was implemented in the introduction to this procedure to control for effects generated from labeling unfamiliar faces.

The experimenter then presented the child with one of the six stories in random order (Table 2). Stories included a description of the setting, emotion eliciting event, and behavioral consequences, and all ended with the question, "How was Dan (Laura) feeling?" Following the presentation of the story, 30 seconds were allowed for the child to respond. If the child did not respond in this time, the experimenter repeated the question, "How was Dan (Laura) feeling?" The child was once again allowed 30 seconds. If within this time, the child still did not produce a response, the response was coded as incorrect. Any response including an emotion label (regardless of whether or not it was correct) was answered by a neutral "good" from the experimenter, without correction or praise. If the child produced a correct response, the experimenter continued to the next story. If the child produced an incorrect emotion label, no response, or an unrelated response, the experimenter provided additional information pertaining to the

relevant emotion in the form of a photographed prototypical facial expression for that emotion. The model in the photograph was given the same name as the protagonist in the stories (Dan or Laura depending on the child's gender). The experimenter stated: "This is a picture of the face Dan (Laura) made on (insert descriptive characteristics of the particular day, e.g., his/her birthday)." After presenting the child with the photograph, the experimenter asked, "How do you think Dan (Laura) was feeling?" The experimenter allowed the child 30 seconds to respond before asking the question once again. If no response was made in the second thirty seconds, the response was coded as incorrect. The experimenter neither corrected nor praised the responses, and responded in a neutral tone to each answer with the word "good." The experimenter then presented the next story.

The experimenter presented neither the word "emotion" nor any sort of emotion label at any time during the experiment. All efforts were made to use a neutral tone of voice and minimize the experimenter's facial expressions during the experiment.

Following the completion of the session, each child listened to a short happy story. Researchers presented the story in order to lessen any sort of mild discomfort experienced from hearing a "sad," "angry," or "scared," story or seeing the "sad," "angry," or "scared" faces. Each child also received a sticker of his or her choice for participating.

Scoring

Before the procedure began, two raters formulated possible responses which would be later accepted as correct. Responses marked correct for the happy category included "happy" and "excited"; for fear, "afraid" and "scared"; for disgust, "disgusted,"

"icky," "yucky," and "gross"; for anger, "angry," "mad," and "cross"; for sad, "sad"; for surprise, "surprised." During the session, researchers marked responses as correct only if they correlated with previously formulated possible responses, and varied only with syntax or by inclusion in a phrase (e.g., "really happy," "totally grossed out"). The experimenter marked all other responses including "I don't know" and a lack of response as incorrect.

Results

For purposes of this analysis, Time 1 refers to the initial presentation of either the face or story cue to emotion dependent on condition. If the child responded incorrectly, additional information was presented in the form of a story for those in the face-first condition and in the form of a face for those in the story-first condition. Participants were then given a second opportunity to respond. Time 2 refers to this second response.

An independent-samples *t* test evaluated the first hypothesis that the story was significantly more helpful than the face for children in initial emotion identification at Time 1. The test was significant for the emotions anger, $t(36) = -4.16$, $p < .001$, fear, $t(72.88) = -6.52$, $p < .001$, and disgust, $t(54.74) = -6.79$, $p < .001$. Means and standard deviations are presented in Table 3. When presented with information for the emotion anger, children in the story-first condition produced significantly more correct responses than children in the face-first condition. When presented with information concerning fear, significantly more children in the story first condition correctly responded than in the face-first condition. Additionally, the story cue was more helpful than the face cue for disgust. The t-test was not significant for surprise, $t(74) = -1.43$, $p = .34$.

A repeated measures ANOVA (alpha = .05) examined whether the presentation of additional information resulted in an increase in the number of correct responses produced by children. Age (2 levels: 38-52 months, 53-65 months), gender (2 levels), and condition (2 levels: face first, story first) were between-subjects factors. Emotion (4 levels: anger, fear, surprise, disgust) was the within-subjects factor. Response accuracy served as the dependent variable (0 = incorrect, 1 = correct).

There was a main effect for emotion, Wilks' Lambda = .12, $F(3, 66) = 160.69$, $p<.001$ multivariate eta squared = .88. This effect was consistent with previous research which indicated that the story was significantly more helpful for anger, fear, and disgust, but not surprise, happy, or sad (Widen & Russell, 2004).

A significant main effect for time indicated that the number of correct responses significantly increased with the presentation of additional information, Wilks's Lambda = .33 $F(1, 68) = 135.97$, $p <.001$, multivariate eta squared =.67. In addition, there was a significant interaction effect for time x condition, Wilks's Lambda =.36, $F(1, 68) = 119.10$, $p<.001$. This effect was expected based on the superiority of stories over faces as valid cues to emotion identification. Since stories were more helpful than faces, it was consistent that children in the face first condition would significantly improve when presented with additional information in the form of a story. Similarly, it was expected that children in the story first condition would not benefit from the presentation of additional emotion information in the form of a face because the results did not indicate that faces were more helpful than stories.

A significant interaction effect for emotion x condition provided further support for the idea that the story is more helpful for some emotions (anger, fear, and disgust) and

the face for others (happiness and sadness), Wilks's Lambda = .87, $F(3, 66) = 3.44$, $p < .05$, multivariate eta squared = .14. Similarly, a significant time x emotion interaction effect indicated that the effectiveness of the presentation of additional information was related to the particular emotion, Wilks's Lambda =.65, $F(3, 66) = 11.70$, $p < .001$, multivariate eta squared = .35

Correct responses significantly increased with age, $F(1, 72) = 41.79$, $p < .001$, multivariate eta squared = .38. A significant interaction effect of time x emotion x age indicated that, for specific emotions, the importance of various emotion cues shifted over time, Wilks's Lambda = .70, $F(3, 66) = 9.65$, $p < .001$, multivariate eta squared = .31.

Significant interaction effects also occurred for time x emotion x condition, (Wilks's Lambda =.71, $F(3, 66) = 9.01$, $p < .001$, multivariate eta squared = .29) and for time x emotion x age x condition (Wilks's Lambda = .71, $F(3, 66) = 9.18$, $p < .001$, multivariate eta squred = .29). There were no significant main or interaction effects for gender.

An independent-samples *t* test was conducted for the emotions anger, fear, surprise, and disgust in each condition to examine age-related differences in mean correct responses. Means and standard deviations are presented in Table 3. There was a significant difference between the mean correct responses for anger of the younger age group (N = 19) and the mean correct responses for anger of the older age group (N = 18) for the face-first condition at Time 1, $t(18) = -5.56$, $p < .001$ (see Figure 4). There was a significant difference between the mean correct responses for fear of the younger age group (N = 19) and the mean correct responses for fear of the older age group (N = 18) for the face-first condition at Time 1, $t(23.53) = -2.60$, $p < .05$ (see Figure 5). There was a

significant difference between the mean correct responses for surprise of the younger age group (N = 17) and the mean correct responses for surprise of the older age group (N = 22) for the story-first condition at Time 1, $t(21) = -2.81$, $p<.05$ (see Figure 6). In each instance, mean correct responses produced by older children were significantly higher than mean correct responses produced by younger children. There were no significant age-related differences for disgust (see Figure 7).

A one-way analysis of variance was conducted to evaluate the relationship between total number of correct responses and condition at Time 2. The main effect of condition was not significant. This analysis indicated that regardless of condition, approximately equal numbers of children responded correctly after being presented with both cues. Therefore, order of emotion information presentation did not affect response.

Discussion

This study was conducted in order to provide support for one of the two major theories of emotion development, either the perceptual bedrock theory or the script theory. In this study, preschool children labeled emotions based on facial expressions or stories. Using a different methodology, the results replicated the findings of Russell and Widen (2004) which indicated a behavior superiority effect for anger, fear, and disgust. This evidence of a behavior superiority effect challenges the assumption of the perceptual bedrock theory which describes facial expressions as vital components of the emotion knowledge development of anger, fear, and disgust for 3- to 5-year olds.

A behavior superiority effect was evident for anger, fear, and disgust. Children performed significantly better when presented with an emotion's eliciting event and behavioral consequence than when presented with its facial expression. Therefore,

stories were more helpful cues for emotion identification than facial expressions for anger, fear, and disgust.

There were no instances in which a face superiority effect was evident. In all cases in which significant differences occurred, stories were more helpful than faces in emotion identification. This evidence was not consistent with the hypothesis that results for happiness and sadness would indicate a face superiority effect. However, since all children appropriately identified happy and sad regardless of cue, a ceiling effect eliminated the possibility of distinguishing between a face superiority effect and a behavior superiority effect for these emotions.

Due to a ceiling effect, this study lacks conclusive data concerning the development of emotion knowledge for happy and sad. While conclusions concerning the development of happiness and sadness are beyond the scope of this study, numerous studies have indicated evidence of a face superiority effect for happiness and sadness (Denham & Couchoud, 1990; Denham, 1998; Widen & Russell, 2004). Even though the results of the study do not provide evidence in support of a facial superiority effect for happiness and sadness, the results do not provide reason to discount the possibility of a face superiority effect for these emotions.

The results also provided support for the hypothesis that additional emotion information aided children who incorrectly identified emotions. However, these results were significant for children in the face-first condition only. Children who incorrectly identified a facial expression of an emotion benefited from the subsequent presentation of a story containing the emotion-eliciting event and behavioral consequence concerning that emotion. In instances in which the child incorrectly identified the emotion depicted

in the story, however, the subsequent presentation of the facial expression of that emotion was not effective in eliciting a correct response. In summary, if a child is struggling to identify a person who is portraying an angry facial expression as upset, it may be helpful for the child to hear a story about why the person is feeling this way or to observe the behavioral responses he or she is exhibiting. This information provides further support for the script theory by indicating that a child may possess the ability to identify an emotion even if he or she can not appropriately identify a facial expression of an emotion.

Due to the nature of the hypotheses, an interaction effect for the variables time, emotion, condition, and age was expected. Various significant interaction effects between these variables indicated several important conclusions. The effectiveness of the presentation of additional information was related to the particular emotion. Presenting a story describing the emotion-eliciting event and behavioral consequence for the emotion surprise was not helpful for children who incorrectly identified the surprised face. This finding was expected because emotion knowledge concerning surprise appeared to develop much later than the fifth birthday (Widen & Russell, in press; Denham, 1998).

An interaction effect for the between-subjects variables (age, condition, emotion, and time) indicated evidence of a shift on cue reliance over time. The helpfulness of the subsequent presentation of the story was related to the age of the child. In instances in which emotion knowledge concerning the relevant emotion is only beginning to form, the presentation of additional information is more helpful. However, as a child develops more complete emotion knowledge for a specific emotion, he or she may begin to rely less heavily on certain emotion cues. As a result, these cues become less helpful than they previously were during the beginning stages of emotion knowledge development.

These results are consistent with the script theory of development which predicts that emotion knowledge begins with a particular emotion cue. As the child develops, he or she then begins to associate this particularly powerful cue to emotion with other aspects of emotion knowledge. Thus, as the child approaches complete understanding of an emotion, the particular cue with which script development began may become less vital for appropriate emotion identification.

As expected, performance significantly increased with age. When presented with both emotional cues, all of the younger participants (38-52 months) correctly identified happy, sad, and angry. Fear, surprise, and disgust were not as easily identified, and older children (53-65 months) provided more correct responses than the younger children (38-52 months) when presented with these emotions.

The order in which children begin to identify emotions, as reported by this study, appears to be consistent with the literature (Gross & Ballif, 1991). Even the youngest participants (38 months) correctly identified happy and sad faces and stories describing happy and sad events and behaviors. All participants correctly recognized anger based on a story, making it possible to conclude that children can identify anger by three years of age. However, not all participants appropriately identified the angry face. Therefore, the ability to identify anger based on a facial expression may not emerge until age five. A majority of the participants over age four correctly identified fear, disgust, and surprise. More children identified fear than disgust, and the number of children correctly identifying surprise was the lowest of any emotion. Based on the results of this study, the knowledge of fear appears to develop around age four, closely followed by disgust, then ultimately, surprise.

Since a behavior superiority effect was found for three emotions, and a face superiority effect was not present for any of the emotions presented, the results strongly support the script theory. For anger, fear, and disgust, children can correctly identify the emotions depicted in stories more easily than they can appropriately label facial expressions of emotions. An interpretation of the results according to the script theory indicates that the emotion scripts for anger, fear, and disgust begin with knowledge concerning an emotion-eliciting event and behavioral consequence. After they acquire this information, children then link facial expressions to these emotions. These findings are consistent with previous research indicating that behavioral consequences elicited more correct causes of an emotion than facial expressions for anger, fear, and disgust (Widen & Russell, 2004). Results do not indicate either a face superiority effect or a behavior superiority effect for the emotion surprise. Consistent with results obtained by Russell and Widen (2002), the lack of an effect for either cue may suggest that the development of the script for surprise begins with a different emotional cue (such as a label) or at a later age.

The results of this study interpreted in conjunction with the findings of Hoffner and Badzinski (1989) provide deeper insight into the process of script development. While conclusions concerning the development of happiness and sadness are beyond the scope of this study, numerous studies indicated evidence of a face superiority effect for happiness and sadness (Denham & Couchoud, 1990; Denham, 1998; Widen & Russell, 2005). In addition, children develop this understanding at a very young age (Izard, 1971; Hoffner & Badzinski, 1989; Denham, 1998). Next, children identify anger, fear, and

disgust. Behavior superiority effects have been repeatedly reported for these more difficult emotions.

Researchers have hypothesized that script development is dependent upon the salience of various cues for each emotion. This salience may be related to age. This interaction between age and cue importance has been supported by the results of this study and previous research conducted by Hoffner and Badzinski (1989). Hoffner and Badzinski (1989) reported developmental trends which indicated a shift from reliance on a facial expression to reliance on other emotion cues such as consequences and behaviors as a child ages. Therefore, the emotion script for happy and sad may begin with faces because the age at which children begin to identify these emotions, they are able to identify strong facial expressions (Izard, 1971; Denham, 1998). It appears that the emotion scripts for anger, fear, and disgust begin with stories. While facial expressions can be manipulated to present prototypical facial expressions, the same emotion may be elicited by a variety of different situations (Barden, Zelko, Duncan, & Masters, 1980; Hoffner & Badzinski, 1989). Therefore, a child must possess more complex inferential processing skills in order to appropriately identify the emotion elicited by various situations. As a result, in instances in which facial expressions are less useful cues to emotion identification than stories, the age at which a child develops emotion knowledge for a particular emotion is dependent on the child's development of inferential processing skills. If this hypothesis is accurate, children learn to understand anger directly following sadness because the situations which typically elicit anger are fairly consistent.

This hypothesis can also be used to explain the low number of participants who correctly identified surprise. When children incorrectly identified an emotion, the

researcher noted which emotion label the child substituted. In the case of the emotion surprise, children's responses were split approximately equally between positive and negative emotions. When presented with a picture or story depicting surprise, 46% of children responded with sad or angry. The other 54% of participants responded with happy or silly. These split results indicated that it is difficult for children to comprehend the many positive and negative situations which may elicit surprise. The comprehension of this difficult concept likely requires complex thinking. Thus, it is expected that emotion knowledge concerning surprise emerges last.

In addition to providing support for one of the theories of emotional development, this study aimed to produce information which could enhance emotion knowledge programs in Head Start classrooms. Currently, many Head Start programs use programs similar to the empirically-validated Emotions Course created by Izard and colleagues (2004) in order to facilitate the development of emotion knowledge. Based on principles of the perceptual bedrock theory, the Emotions Course teaches children the emotions happy, sad, angry, and scared by pairing these emotion labels with prototypical facial expressions of the emotion. Even though this program significantly increased emotion knowledge, it may be possible to create a more effective program by integrating the results of this study. Since stories appear to be more helpful than faces in the identification of anger, fear, and disgust, it may be easier for children to learn these emotions when presented with a story in addition to the facial expression. Therefore, an introduction of emotion-eliciting event and behavioral consequence stories for anger, fear, and disgust into current curriculum may make emotion knowledge development programs more effective. Even though stories were more helpful, it is not necessary to

eliminate the use of facial expressions for anger, fear, and disgust in order to make the program more effective. Results indicated that the presentation of stories following faces elicited approximately the same number of correct responses as presenting the story alone. Therefore, stories can be utilized in a supplemental manner, as additional information for children who respond incorrectly when presented with emotional facial expressions. Considering the results of the present study, this integration would likely increase the effectiveness of the program without requiring major format changes in the curriculum. A possible direction for future research would be to study the effectiveness of programs which utilize stories and faces to teach emotions.

Results indicated ceiling effects for happiness and sadness. Therefore, it is not possible to provide empirical support for either of the hypotheses of emotion development concerning happiness and sadness. In order to obtain results in support of either the perceptual bedrock theory or the script theory, researchers should investigate a younger population.

An additional methodological and conceptual limitation of the study relates to the use of black and white photographs of prototypical facial expressions. The photographs used in this study have been used by a number of researchers investigating emotional knowledge, and are consistent with the stipulations of Ekman's Facial Action Coding System. In order to ensure internal validity, the resulting images portray intense, prototypical emotional facial expressions. However, little evidence exists in support of the notion that children normally encounter facial expressions similar to those depicted in the black and white photographs. It is more likely that children regularly encounter milder displays of emotion which include other body-language cues and only a portion of

the facial components depicted in prototypical expressions (Carroll & Russell, 1996; Russell & Widen, 2002). Thus, the presentation of a prototypical facial expression may be a more powerful cue to emotion than those generally encountered. Future research investigating emotion knowledge as a predictor of social-emotional competence should consider ecologically valid assessment techniques.

In conclusion, these results question the necessity of facial expression identification prior to the acquisition of further emotion knowledge and emphasize the role of emotion-eliciting event and behavioral consequence stories in emotion identification. Significant behavior superiority effects provide further support for the script theory of emotion knowledge development and suggest possible avenues of improvement for previously implemented classroom programs intended to facilitate the development of emotion knowledge in children receiving Head Start services.

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Table 1

Questions Used to Prime Each Emotion

Emotion	Priming Questions
Happiness	Does X ever feel happy?
	How would X feel if he/she got a very special present?
Sadness	Does X ever feel sad?
	How would X feel if his/her pet fish that he/she really loved, died?
Anger	Does X ever feel angry?
	How would X feel if his/her friend was being mean to him/her and took his/her toy and would not give it back?
Fear	Does X ever feel scared?
	How would X feel if he/she got lost and did not know how to get home?
Surprise	Does X ever feel surprised?
	How would X feel if he/she came home from school and there was a giant elephant in his/her driveway?
Disgust	Does X ever feel disgusted?
	How would X feel if the garbage can fell over and spilled trash on him/her?

Table 2

Stories Presented for Each Emotion

Emotion	Story
Happiness	One day Dan/Laura got to have a party. Dan/Laura had wanted to have a party for a very long time. All of his/her friends came to the party. They got to eat ice cream and play fun games. Dan/Laura laughed with his/her friends. How was Dan/Laura feeling?
Sadness	Last week, Dan/Laura found out that his/her favorite toy in the whole world was missing. He/she looked everywhere for it, but could not find it. Dan/Laura started to cry. Dan/Laura slowly walked over to the couch and sat down. Dan/Laura did not want to do anything. Dan/Laura just wanted to find his/her lost toy. How was Dan/Laura feeling?
Anger	One day while Dan/Laura was playing in the sand box, he/she built a huge castle. Dan/Laura spent a very long time building the castle. The castle was very tall and very pretty. But then a kid came over and touched the castle. Dan/Laura asked the kid to be careful, but the kid knocked it over anyway. Dan/Laura wanted to yell at the kid. Dan/Laura stomped his/her feet and clenched his/her fists. How was Dan/Laura feeling?

Table 2 (continued)

Emotion	Story
Fear	Last week, Dan/Laura was in his/her bed. It was very dark and Dan/Laura was all alone. Then, there was a loud crash. Dan/Laura did not know what it was that had made the noise. Dan/Laura screamed. Dan/Laura wanted his/her mom and dad to come into the room. How was Dan/Laura feeling?
Surprise	It was Dan's/Laura's birthday, and Dan's/Laura's friends decided to do something special. When the friends knew that Dan/Laura was coming, they hid behind the couch. When Dan/Laura opened the door, all of his/her friends popped out from behind the couch. Dan/Laura stopped and stood completely still. Dan/Laura did not know what was going on. Dan's/Laura's heart was beating very fast. How was Dan/Laura feeling?
Disgust	One day Dan/Laura was at a restaurant eating dinner with his/her family. Dan/Laura got a grilled cheese sandwich. The sandwich looked very yummy. Dan/Laura took a big bite. But then, Dan/Laura saw a slimy bug in his/her sandwich. Dan/Laura spit it out as fast as he/she could. Dan/Laura did not want to touch the sandwich. How was Dan/Laura feeling?

Table 3

Mean Number of Participants Correctly Identifying Emotions as a Function of Emotion Cue

	Emotion Cue			
	Face		Story	
Emotion	Time 1	Time 2	Time 1	Time 2
Happiness				
Younger [a]				
M	1.00	--	1.00	--
SD	.00	--	.00	--
Older [b]				
M	1.00	--	1.00	--
SD	.00	--	.00	--
Total [c]				
M	1.00	--	1.00	--
SD	.00	--	.00	--
Sadness				
Younger				
M	1.00	--	1.00	--
SD	.00	--	.00	--

Table 3 (continued)

	Emotion Cue			
	Face		Story	
Emotion	Time 1	Time 2	Time 1	Time 2
Sadness				
Older				
M	1.00	--	1.00	--
SD	.00	--	.00	--
Total				
M	1.00	--	1.00	--
SD	.00	--	.00	--
Anger				
Younger				
M	.37	1.00	1.00	--
SD	.50	.00	.00	--
Older				
M	1.00	--	1.00	--
SD	.00	--	.00	--

Table 3 (continued)

	Emotion Cue			
	Face		Story	
Emotion	Time 1	Time 2	Time 1	Time 2
Anger				
Total				
M	.68	1.00	1.00	--
SD	.47	.00	.00	--
Fear				
Younger				
M	.05	.79	.71	.71
SD	.23	.42	.47	.49
Older				
M	.39	1.00	.91	1.00
SD	.50	.00	.29	.00
Total				
M	.22	.89	.89	.89
SD	.42	.31	.39	.37

Table 3 (continued)

	Emotion Cue			
	Face		Story	
Emotion	Time 1	Time 2	Time 1	Time 2
Disgust				
Younger				
M	.00	.58	.47	.47
SD	.00	.51	.51	.51
Older				
M	.11	.83	.77	.86
SD	.32	.38	.43	.35
Disgust				
Total				
M	.05	.70	.64	.69
SD	.23	.46	.49	.48
Surprise				
Younger				
M	.00	.05	.00	.00
SD	.00	.23	.00	.00

Table 3 (continued)

	Emotion Cue			
	Face		Story	
Emotion	Time 1	Time 2	Time 1	Time 2
Surprise				
Older				
M	.11	.44	.27	.27
SD	.32	.51	.46	.46
Total				
M	.05	.24	.15	.15
SD	.23	.43	.37	.37

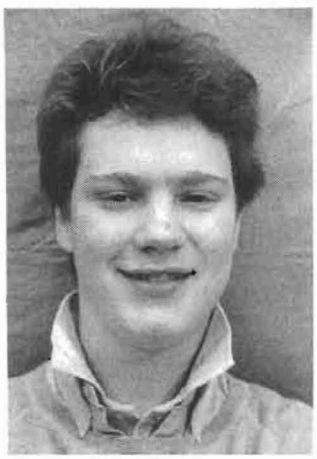
Note. [a] $n = 19$ in the face-first condition, $n = 17$ in the story-first condition. [b] $n = 18$ in the face-first condition, $n = 22$ in the story-first condition. [c] $n = 37$ in the face-first condition, $n = 39$ in the story-first condition. All participants in both age groups provided correct responses for happiness and sadness at Time 1. All older participants provided correct responses for anger at Time 1. All younger participants in the story-first condition provided correct responses for anger at Time 1.

Figure Caption

Figure 1. Images of prototypical facial displays of emotional expressions provided by Dr. Linda Camras.

Male Neutral Facial Expression

Female Neutral Facial Expression

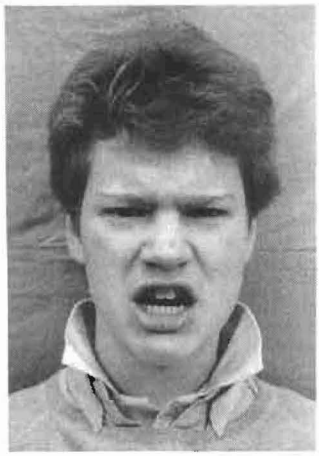


Male Facial Expression of Happiness

Female Facial Expression of Happiness

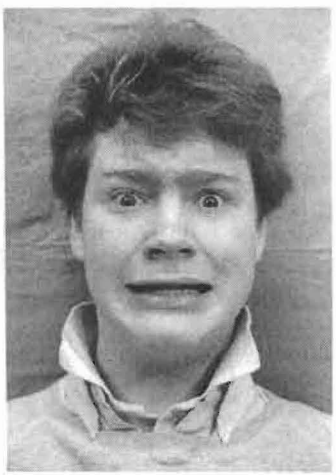
Male Facial Expression of Sadness

Female Facial Expression of Sadness



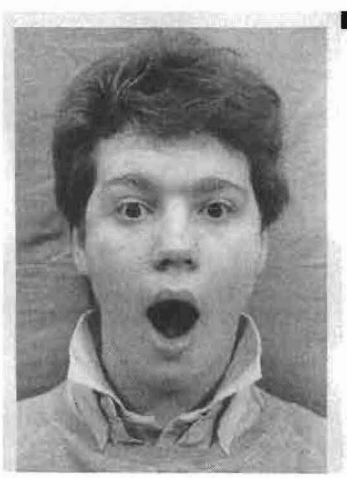
Male Facial Expression of Anger

Female Facial Expression of Anger



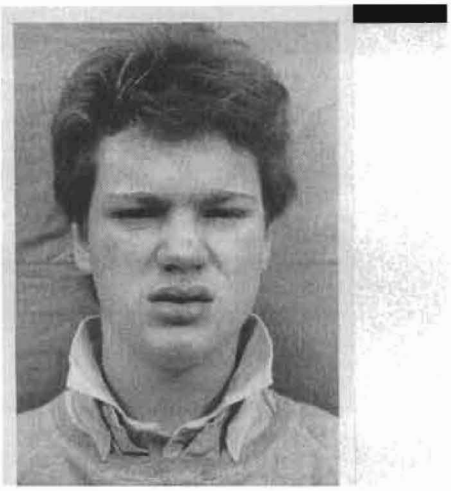
Male Facial Expression of Fear

Female Facial Expression of Fear



Male Facial Expression of Surprise

Female Facial Expression of Surprise



Male Facial Expression of Disgust

Female Facial Expression of Disgust

Figure Caption

Figure 2. Mean correct responses for happiness, sadness, anger, fear, surprise, and disgust at Time 1 as a function of condition.

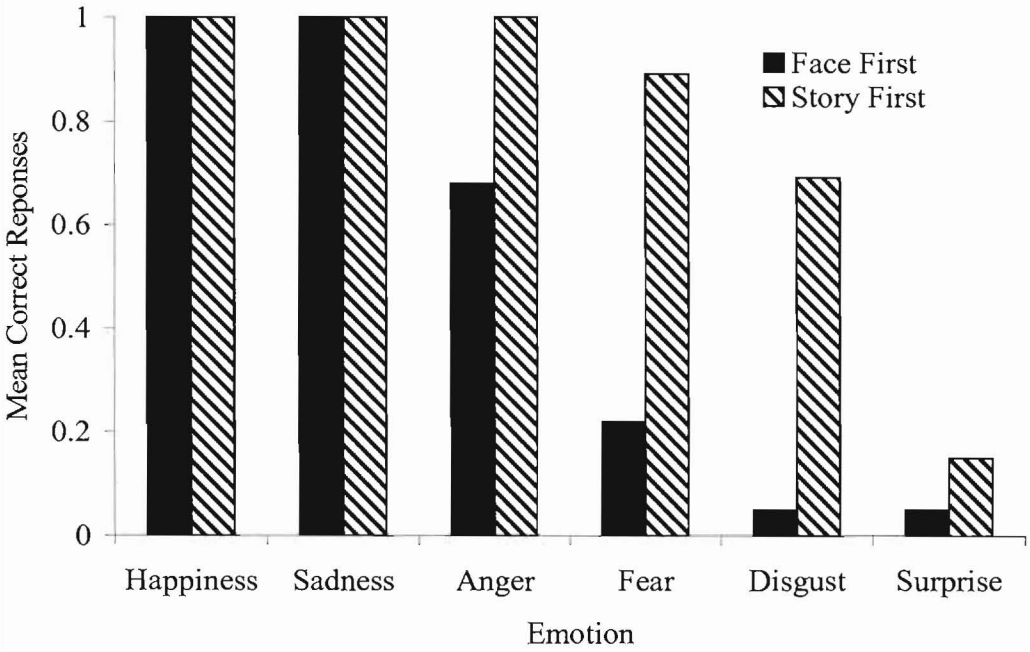

1
0.8
0.6
0.4
0.2
0
Mean Correct Reponses
Face First
Story First
Happiness
Sadness
Anger
Fear
Disgust
Surprise
Emotion

Figure Caption

Figure 3. Mean correct responses for happiness, sadness, anger, fear, disgust, and surprise in the face-first condition as a function of time.

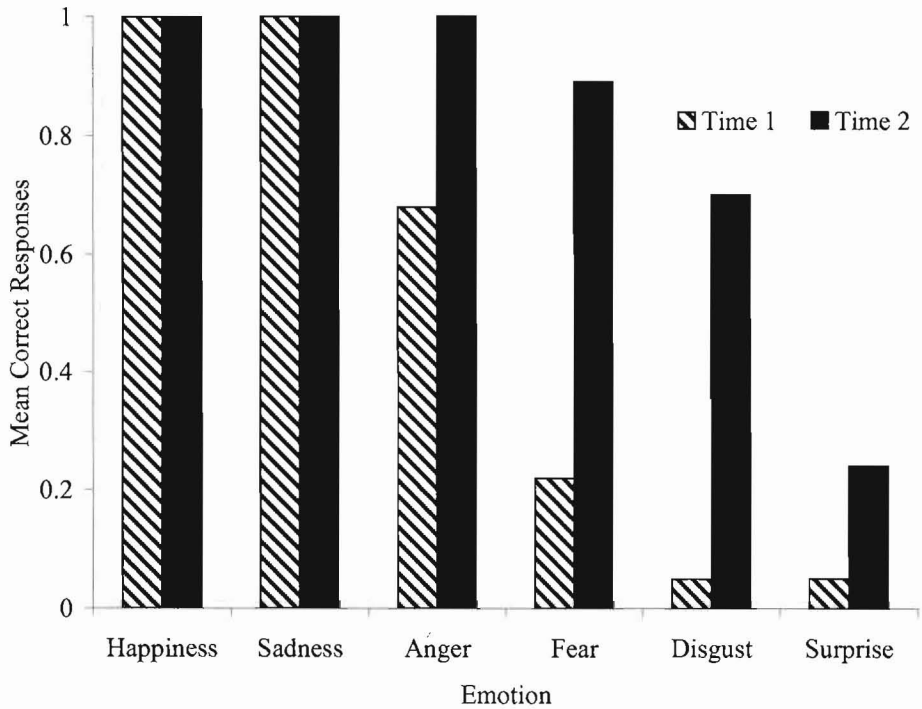

1
0.8
0.6
0.4
0.2
0
Mean Correct Responses
Time 1
Time 2
Happiness
Sadness
Anger
Fear
Disgust
Surprise
Emotion

Figure Caption

Figure 4. Mean correct responses for anger at Time 1 as a function of age and condition. There was a significant difference between the mean correct responses for anger of the younger age group (N = 19) and the mean correct responses for anger of the older age group (N = 18) for the face-first condition at Time 1, $t(18) = -5.56$, $p<.001$. Means and standard deviations for the information displayed in this figure are presented in Table 3.

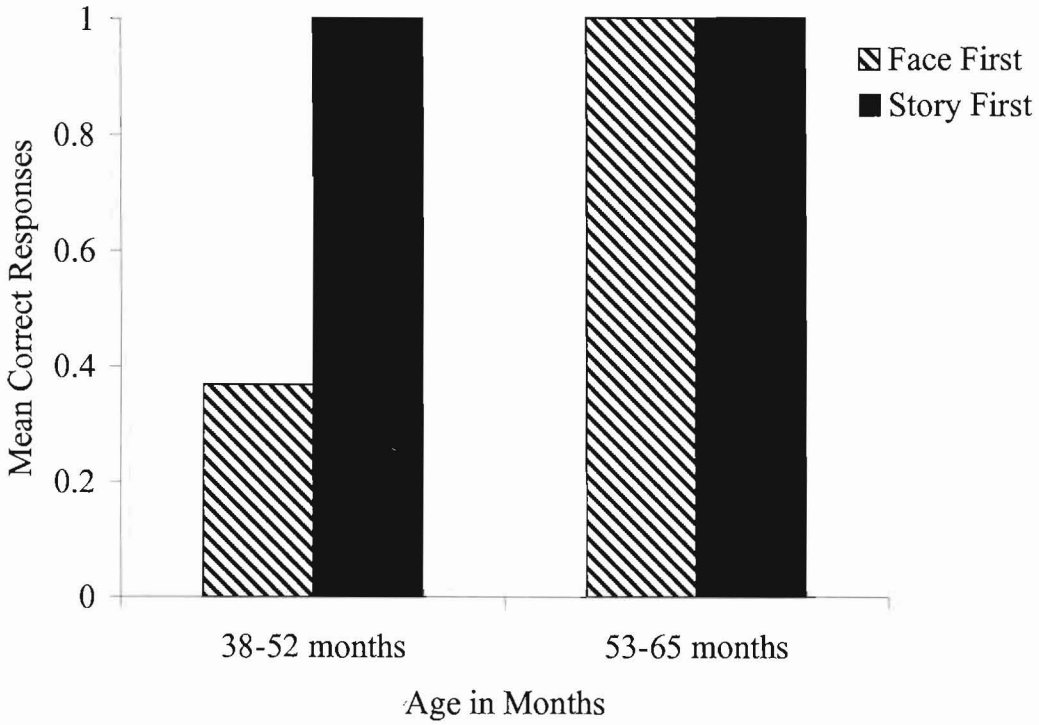

1
0.8
0.6
0.4
0.2
0
Mean Correct Responses
Face First
Story First
38-52 months
53-65 months
Age in Months

Figure Caption

Figure 5. Mean correct responses for fear at Time 1 as a function of age and condition. There was a significant difference between the mean correct responses for fear of the younger age group (N = 19) and the mean correct responses for fear of the older age group (N = 18) for the face-first condition at Time 1, $t(23.53) = -2.60$, $p<.05$. Means and standard deviations for the information displayed in this figure are presented in Table 3.

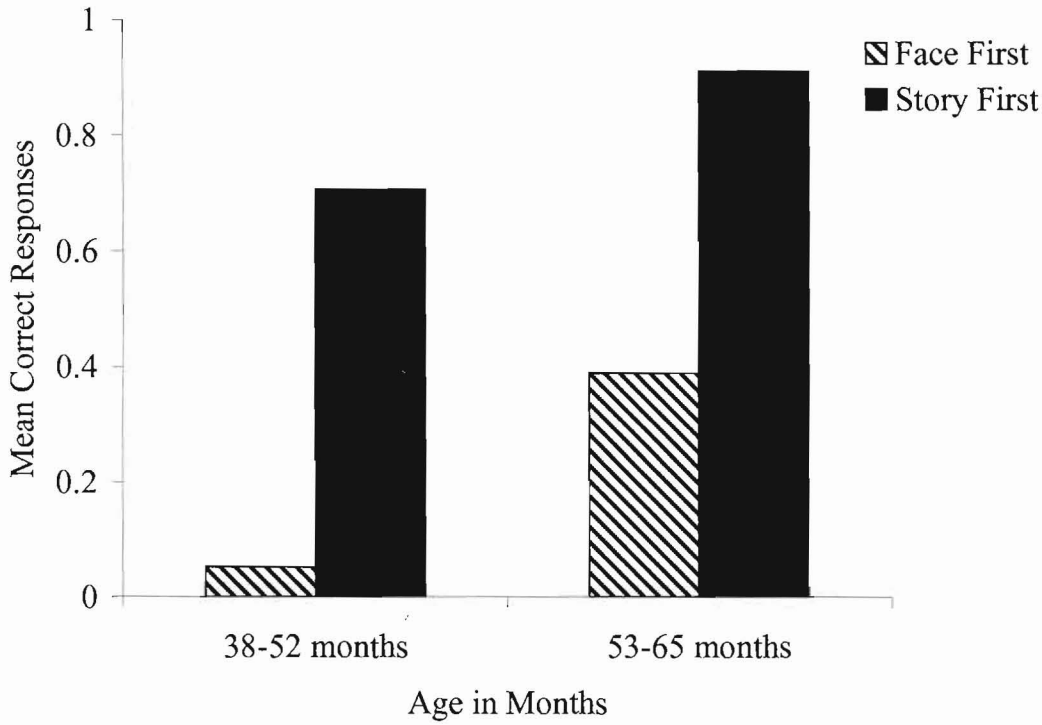

1
0.8
0.6
0.4
0.2
0
Mean Correct Responses
Face First
Story First
38-52 months
53-65 months
Age in Months

Figure Caption

Figure 6. Mean correct responses for surprise at Time 1 as a function of age and condition. There was a significant difference between the mean correct responses for surprise of the younger age group (N = 17) and the mean correct responses for surprise of the older age group (N = 22) for the story-first condition at Time 1, $t(21) = -2.81$, $p<.05$. Means and standard deviations for the information displayed in this figure are presented in Table 3.

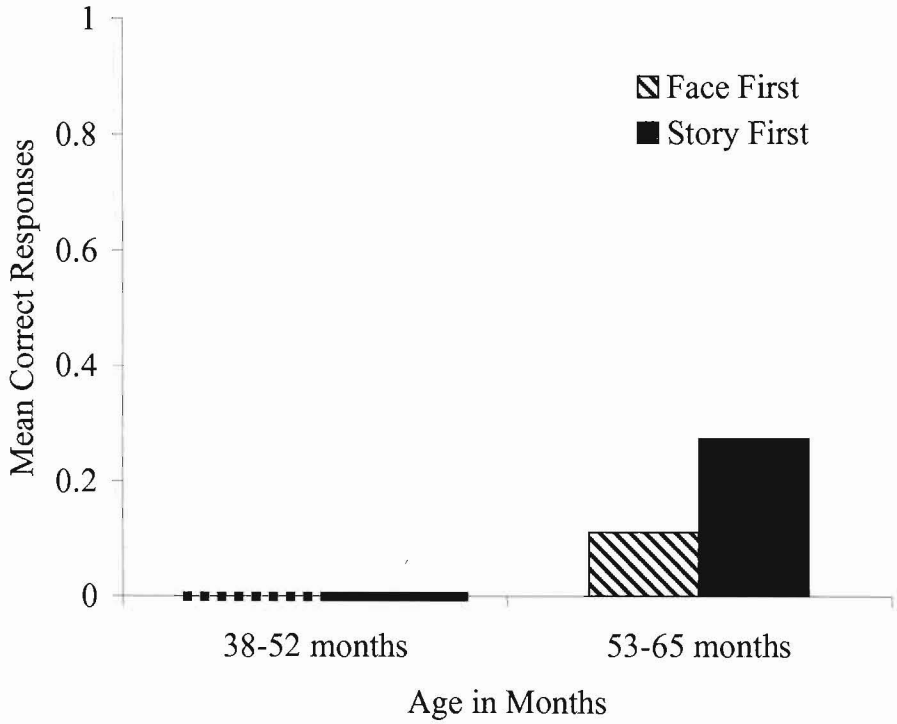
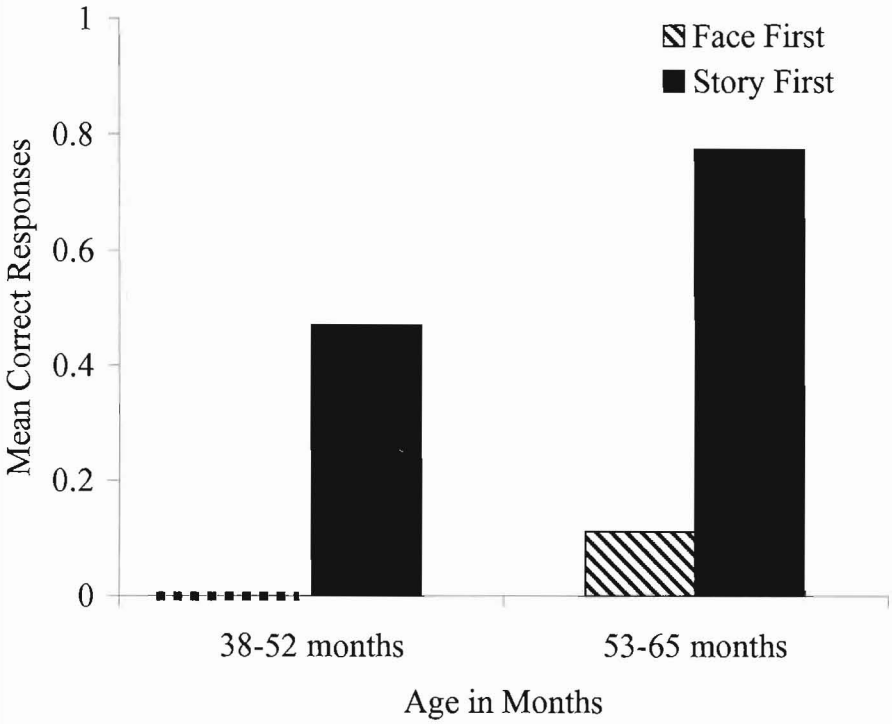

1
0.8
0.6
0.4
0.2
0
Mean Correct Responses
Face First
Story First
38-52 months
53-65 months
Age in Months

Figure Caption

Figure 7. Mean correct responses for disgust at Time 1 as a function of age and condition. Means and standard deviations for the information displayed in this figure are presented in Table 3.


1
0.8
0.6
0.4
0.2
0
Mean Correct Responses
Face First
Story First
38-52 months
53-65 months
Age in Months