Abstract
In any social interaction, a child witnesses a variety of cues to emotions. The current study compared children’s (N=120; preschool to Gr.3) understanding of facial expressions vs. emotional situations (stories) for 4 basic-level emotions (anger, fear, surprise, disgust) and 4 social emotions (embarrassment, shame, compassion, contempt). Children were asked to label the emotion in each stimulus. Performance was higher for situations than for faces for both basic-level and social emotions, with the exception of surprise. In addition, children’s performance increased more quickly for emotion situation than for faces for compassion, embarrassment, disgust, and shame. These results support prior findings of a Face Inferiority Effect with preschoolers and basic-level emotions, and extend them to older children and social emotions.

Introduction
In a child’s social world, there are many emotional events. The child must learn to identify the cues to emotion in order to identify each emotion.

• The first purpose of the current study was to compare children’s understanding of facial expressions to their understanding of emotional situations, presented as brief stories describing the emotion’s causes and behavioral consequences.

• The majority of research comparing children’s understanding of facial expressions vs. other aspects of their emotion scripts has focused on preschoolers and basic-level emotions.

• This research has found a Face Inferiority Effect: Preschoolers’ performance is higher given labels (Russell, 1990; Russell & Widen, 2002a, 200b, Widen & Russell, 2004) or emotion situations (Camras & Allison, 1985; Widen & Russell, 2002, 2004) vs. facial expressions.
The second purpose of the current study was to compare children's understanding of basic-level emotions (anger, fear, surprise, disgust) to their understanding of more social emotions (embarrassment, shame, compassion, contempt).

Children understand basic-level emotions (e.g., anger, fear) earlier than they understand social emotions (e.g., embarrassment, shame) (e.g., Harris, Olthof, Meerum Terwogt, & Hardman, 1987; Reichenbach & Masters, 1983; Russell & Paris, 1994).

But these studies have not compared children’s understanding of faces and situations for social emotions.

One reason prior research has not compared faces and situations for social emotions was a lack of standardized and tested facial expressions for social emotions.

This difficulty has been overcome in the current study for contempt, embarrassment, shame, and compassion: Facial expressions for these emotions were developed and shown to be cross-culturally recognized in the US and India (Haidt & Keltner, 1999).

The Study

The current study compared 120 children’s (preschool to Gr.3) understanding of facial expressions vs. emotional situations (stories) for 4 basic-level emotions (anger, fear, surprise, disgust) and 4 social emotions (embarrassment, shame, compassion, contempt). Children were asked to label the emotion in each stimulus.

Would faces or emotional situations be stronger cues for the social emotions? Would the Face Inferiority Effect replicate for these emotions?

In what order would children acquire the social emotions relative to the more frequently studied basic-level emotions?

Method

Participants. Participants were 120 children enrolled in preschools and after school-care programs in the Greater Boston area. All children were proficient in English. There were forty 4-year-olds (20 girls, 20 boys; 48 to 69 months, mean = 58.9 months), forty 6-year-olds (20 girls, 20 boys; 62 to 86 months, mean = 72.6 months), and forty 8-year-olds (20 girls, 20 boys; 81 to 130 months, mean = 99.3 months).
Materials

Photographs of Facial Expressions. Nine prototypical facial expressions were computer generated based on those depicted and described in Haidt and Keltner (1999): happiness, anger, fear, surprise, disgust, compassion, embarrassment, shame, and contempt.

Stories of Emotional Events. The happiness (birthday party), anger (someone cutting in line), fear (chased by a dog), surprise (protagonist’s mom unexpectedly dyes hair pink), and disgust (biting a rotten apple) stories describing stereotypical emotion-eliciting events and their behavioral consequences were created based on prior work in our lab in which children generated causes and consequences for specific emotions (Russell, 1990; Russell & Widen, 2002b). The compassion (witnessing another child hurt themselves and offering help), embarrassment (spilling grape juice on white dress), shame (destroying sister’s teddy bear), and contempt (dislike for a teacher’s pet) stories were created in our lab and refined through piloting.

Procedure

On the initial visit to the child-care facility, the experimenter spent time playing with the children until they seemed comfortable with the experimenter. On a subsequent visit, the experimenter invited the child to play a game with her. This ‘game’ lasted on average less than 10 minutes and consisted of three phases. The first phase was a priming session – a brief conversation in which the each of the target emotion labels was mentioned. In the second and third phases, the child was asked to label the protagonist’s emotional facial expression or story. The happy trial included both the facial expression and the story, and served as a gate-keeping trial: children had to label this trial as happy to be included in the sample. The child was randomly assigned to either the face-first or the story-first condition. There were eight emotion trials in each mode of presentation, one for each emotion, presented in various random orders.

Scoring

The participants were allowed to use any label they chose. The scoring key used in this study was drawn from Widen and Russell (2003), who describe the development of a scoring key based on ratings of two judges blind to the source of the labels.

The children had a total of 2040 opportunities to provide a label. Of these, 901 were the target emotion labels the given stimulus, 1021 were a nontarget emotion labels for the stimulus, and 118 were uncodable or nonresponses (e.g., “I dunno,” silence).

Results

- One of our primary purposes in this study was to investigate the relative power of the two cues to emotion: stories and faces.
- Which one would prove to be the stronger cue to children’s understanding of social emotions (compassion, embarrassment, shame, contempt)?
- We were also interested to see when children’s understanding of these social emotions would emerge relative to the more frequently studied basic-level emotions (anger, fear, surprise, disgust).
In a repeated measures ANOVA (alpha = .05), age group (3 levels: preschool, Kindergarten and Gr.1, Gr.2 and Gr.3), and gender (2 levels) were between-subjects factors; mode of presentation (2 levels: story, face) and emotion (8 levels: anger, fear, surprise, disgust, compassion, embarrassment, shame, contempt) were within-subject factors. The dependent variable was the response the child made to each emotion stimulus: target responses were scored 1; nontarget responses and nonresponses were scored 0.

Some effects were standard: Performance increased with age, \( F(2, 114) = 40.68, p < .001 \): 8-year-olds’ (.55) performance was significantly higher \( p < .001 \) than the two younger groups’, and 6-year-olds’ (.37) performance was in turn significantly \( p = .01 \) higher than 4-year-olds’ (.30). Performance varied with emotion, \( F(7, 798) = 140.73, p < .001 \). The rank order of children’s performance for each emotion (from highest to lowest) was (Figure 1): anger, fear, surprise, compassion, embarrassment, disgust, shame, contempt. Thus, some of the social emotions were better recognized than disgust – which is traditionally considered an early-emerging basic-level emotion. Both of these main effects are qualified by interactions, which are described below.

Figure 1: Children’s performance was significantly higher in the story mode (.49) than in the face (.32) mode, \( F(1, 114) = 87.74, p < .001 \). Indeed, this effect held in the significant mode x emotion interaction, \( F(7, 714) = 28.74, p < .001 \), for 5 of the 8 emotions (fear, disgust, compassion,
embarrassment, shame); for surprise the overall pattern was reversed. This advantage for stories supports the Face Inferiority Effect for basic-level and extends it to social emotions.

**Figure 2:** Children’s performance increased more rapidly with age in the story mode than in the face mode, \(F(2, 114) = 17.32, p < .001\). In the story mode, the increase in performance was significant between each age group \((p < .04)\). In the face mode, increase in performance was more gradual and the difference between age groups was significant only between the youngest and the oldest group \((p = .001)\). At each age, the advantage for the story mode was observed \((p < .02)\).

**Figure 3A:** The age x mode interaction was qualified by the significant age x mode x emotion interaction, \(F(14, 714) = 3.18, p < .001\). 4-year-olds’ performance was significantly higher \((p \leq .05)\) on the fear, compassion, embarrassment, and disgust stories than on the corresponding faces; their performance was significantly higher \((p < .001)\) on the surprise face than on the corresponding story.

**Figure 3B:** The 6-year-olds followed the same pattern: Their performance was significantly higher \((p < .02)\) on the compassion, embarrassment, disgust, and shame stories than on the corresponding faces; their performance was significantly higher \((p = .02)\) on the surprise face than on the corresponding story. Performance on the stories increased more quickly than on the faces, though their performance was significantly higher than the 4-year-olds’ only for shame \((p = .02)\).

**Figure 3C:** The 8-year-olds also followed the same pattern: Their performance was significantly higher \((p < .03)\) on the fear, compassion, embarrassment, disgust, and shame stories than on the corresponding faces; their performance was significantly higher \((p < .001)\) on the surprise face than on the corresponding story. 8-year-olds’ performance on the stories again
increased more quickly than on the faces; this increase was significant for fear, surprise, compassion, embarrassment, and disgust \( (p < .005) \) compared to the 6-year-olds, and also for contempt compared to the 4-year-olds \( (p = .04) \).

For the faces, performance increased with age significantly only for surprise and shame: The 8-year-olds’ performance on the surprise face was significantly higher \( (p = .01) \) than the 4-year-olds’; and their performance on the shame face was significantly higher \( (p = .01) \) than the 4-year-olds.

The advantage of the surprise face over the surprise story decreased with age: The difference between modes was significant \( (p < .001) \) for both the 4-year-olds (Figure 3A) and the 6-year-olds (Figure 3b), but the difference between modes was only marginally significant \( (p = .051) \) for the 8-year-olds (Figure 3C).

In summary, children’s understanding of emotion, and particularly of the social emotions tested here, increased with age, but this increase was observed primarily in the story mode.

**Discussion**

This is the first study to investigate children’s (4 to 10 years) understanding of social emotions using tested and cross-culturally recognized facial expressions of social emotions: compassion, embarrassment, shame, and contempt.

- We compared children’s understanding of these facial expressions to stories.
- We compared children’s understanding of social emotions to more frequently studied basic-level emotions (anger, fear, surprise, disgust).

The current study supported the Face Inferiority Effect: Children’s performance was higher for situations than for faces.

- At all ages, more children correctly labeled situations for both basic-level and social emotions than they did the corresponding faces.
- The one exception was for surprise, on which this overall pattern was reversed.

Children acquired some social emotions before disgust, one of the basic-level emotions.

- It has long been assumed it is easier for children to learn about instances at the basic level of a hierarchy than instances at the sub- or superordinate levels (Rosch, 1978).
- Our finding for disgust raises questions about its status as a “basic-level emotion.”
- Children’s difficulty labeling disgust in the current study joins with prior studies in finding that children do not readily associate disgust stimuli with disgust (e.g., Bullock

- Disgust is not an emotion concept that children acquire early or easily (see also Widen & Russell, submitted).

- The results of the current study also point to the importance of studying emotions beyond those at the basic-level, and also of including a wide age-range in studies of children’s understanding of emotion.

References


