Full Face or Prominent Feature: How Do Preschoolers Categorize Facial Expressions of Emotion?

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Abstract

The current study demonstrates that, when asked to attribute emotions to facial expressions, preschoolers use the feature of toothiness (exposed teeth) to categorize facial expressions. Three- and 4-year-olds (N = 60) selected from an array of 10 faces (two each of happiness, sadness, anger, fear, and disgust, either with teeth exposed, or without) all those that displayed the target emotion. Toothiness affected children’s categorizations for happiness, sadness, and anger. Preschoolers use toothiness to attribute emotion to facial expressions, but not indiscriminately.

Introduction

Research on children’s understanding of facial expressions typically assumes that children use the full expression. Such studies typically present full expressions (without any concern regarding the specific features displayed) to test children’s emotion understanding. Evidence from the face recognition literature shows that, by the age of 4 years, children process faces configurally (e.g., de Heering, Hourbouys, Rossion, 2007) – that is, on the basis of the whole face rather than on the basis of individual features.

But how do children of the same age process emotional facial expressions? There is little research on this question.

• Five- to 11-year-olds processed emotional facial expressions configurally (Durand et al., 2007), but this study focused only on children’s “correct” responses.
• When all of children’s responses (both “correct” and “incorrect”) were considered, there was a hint that preschoolers interpreted facial expressions based on toothiness, at least for happiness (Widen & Russell, 2003): Preschoolers labeled both the happiness and toothy fear expressions as happy (for examples of these expressions see Figure 1).

• Thus it may be that children’s use of featural information is evident in their “errors” rather than in their “correct” responses.

The Study

Young preschoolers (N=60, 3-4 years) were asked to find all the people who felt a particular emotion in an array of 10 faces: one toothy and one nontoothy of happiness, sadness, anger, fear, and disgust.
• There were five trials: Happy, sad, angry, disgusted, and scared.

We predicted that children would include the target faces on each trial, but that their inclusions of nontarget faces would be influenced by the toothiness of the nontarget (“incorrect”) expressions:
• High arousal categories (happiness, anger, fear, disgust) would be more likely to include toothy nontarget faces.
• Low arousal categories (sadness) would be more likely to incur toothy nontarget faces.

Results

In a mixed design ANOVA (alpha = .05), the emotion-trial x facial-expression x toothiness interaction was also significant, F(4, 224) = 6.09, p < .001.
• For three emotion trials, there were significant effects involving toothiness: happy trial (Figure 2), sad trial (Figure 3), and anger trial (Figure 4).
• For the two other emotion trials, disgusted and fear, although there were differences in the proportions of nontarget faces included in each trial, these proportions did not vary by toothiness and will not be discussed further here.

Discussion

Toothiness did affect children’s emotion attributions to facial expressions for three categories.
• For the Happy and Sad Trials, children selected both the toothy and nontoothy target faces.
• For the Happy Trial, they also selected the toothy fear face, supporting a prior finding using a different method (labeling; Widen & Russell, 2003).
• For the Sad Trial, they also selected the nontoothy fear and anger faces.
• These inclusions supported the prediction that children would select nontarget toothy faces on high arousal trials (happy) and nontarget nontoothy faces on low arousal trials (sad).
• For the Angry Trial, children selected the toothy anger face more frequently than the nontoothy anger face. This effect was not predicted, but conforms to the high arousal-toothy pattern.
• Inclusion of the disgust faces in the anger category is a common finding (e.g., Camras & Allison, 1985; Gosselin & Laroque, 2000; Harrigan, 1984; Widen & Russell, 2008a, 2008b).

This study also demonstrates that facial expressions do not display discrete categories of emotion.
• On each of the five trials, children saw the same 10 facial expressions, but attributed different emotions to several of them on different trials.
• For example, the “fear faces” were selected for scared, happy, and sad.

References


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Figure 1. An example of the toothy happiness facial expression and the toothy fear facial expression (Ekman & Friesan, 1976).

Figure 2. As expected, children selected both of the happy faces.

• They were also significantly more likely to select the toothy than the nontoothy fear face (p = .007).

Figure 3. As expected, children selected both of the sad faces.

• They were also significantly more likely to select the toothy than the nontoothy fear face (p = .001).
• And the nontoothy than the toothy fear face (p = .02).

Figure 4. Unexpectedly, children selected significantly more toothy than nontoothy anger faces (p < .001).
• They were as likely to select both of the disgust faces as they were to select the toothy anger face.

Proportion Included

Toothiness

Happiness Sadness Disgust Anger Fear

Toothiness

Happiness Sadness Disgust Anger Fear

Toothiness