



Full length article

Categorical perception along the happy–angry and happy–sad continua in the first year of life



Vivian Lee*, Jenna L. Cheal, M.D. Rutherford

Department of Psychology, Neuroscience, and Behaviour, 1280 Main Street West, Psychology Building–Rm219, McMaster, Hamilton, ON, Canada L8S4L8

ARTICLE INFO

Article history:

Received 23 September 2014
Received in revised form 10 April 2015
Accepted 12 April 2015

Keywords:

Categorical perception
Emotion perception
Faces
Categorization

ABSTRACT

The current study investigated 6-, 9- and 12-month old infants' ability to categorically perceive facial emotional expressions depicting faces from two continua: happy–sad and happy–angry. In a between-subject design, infants were tested on their ability to discriminate faces that were between-category (across the category boundary) or within-category (within emotion category). Results suggest that 9- and 12 month-olds can discriminate between but not within categories, for the happy–angry continuum. Infants could not discriminate between cross-boundary facial expressions in the happy–sad continuum at any age. We suggest a functional account; categorical perception may develop in conjunction with the emotion's relevance to the infant.

© 2015 Elsevier Inc. All rights reserved.

1. Introduction

The ability to perceive and recognize facial expressions is an important aspect of early social development for preverbal infants because facial expressions play a central role in social interactions. In particular, people can infer the thoughts, feelings and intentions of others by observing facial expressions. In turn, this information allows children to begin predicting the behaviour of others. This is important because recognizing facial emotional expressions, and understanding the meaning of these expressions, guides the infant's own behaviour. Previous research in this area has mainly focused on infants' ability to discriminate and categorize facial emotional expressions, and categorical perception of emotions will also be the focus of the current experiments.

From birth infants' look preferentially at faces (Maurer, 1985), suggesting that faces are privileged visual objects, attracting infants' attention. Previous research has suggested that the ability to discriminate and categorize facial emotional expressions emerges during infancy, but results have been inconsistent. For example, studies have found that 3-month-olds can discriminate smiling from frowning faces (Barrera & Maurer, 1981), 4-month-olds look longer at happy faces than at angry or neutral faces (LaBarbera, Izard, Vietze, & Parisi, 1976), 5-month-olds smile more at happy than at sad faces (D'Entremont & Muir, 1999; Caron, Caron, & MacLean, 1988), 5-month-olds can categorize smiling faces of various intensities, across individuals, and differentiate them from fear faces (Bornstein & Arterberry, 2003), and 4- to 6-month old infants look longer at angry and surprise faces, rather than at fearful faces (Serrano, Iglesias, & Loeches, 1992). In contrast, other studies have found that 7-months-old infants can only discriminate a happy face from an angry face when accompanied by vocalizations (Caron et al., 1988). Seven-month-old infants could discriminate happy from fearful faces, but only if first habituated to

* Corresponding author.

E-mail address: leev9@mcmaster.ca (V. Lee).

happy faces and not visa versa (Nelson, Morse, & Leavitt, 1979). These divergent findings seem to derive from differences in methodology (Bornstein & Arterberry, 2003), regardless, the general consensus is that infants as young as 6-months of age are capable of discriminating and categorizing positive from negative emotions. Given these divergent findings, however, one of the goals of the current experiment will be to clarify these findings by using more conservative methodology and novel stimuli.

1.1. *Categorical perception*

Categorical perception is a perceptual mechanism in which discrete categories are perceived, even though a stimulus set may differ gradually, with no abrupt physical differences across the perceived category boundary. Previous research has demonstrated that categorical perception occurs across domains such as in speech sounds (Liberman, Harris, Hoffman & Griffith, 1957). It is also evident in the perception of basic emotional facial expressions categorically in adults (Calder, Young, Perrett, Etcoff, & Rowland, 1996; Etcoff & Magee, 1992). Categorical perception is functional because it allows for quick identification of stimuli and the formation of appropriate responses in possibly ambiguous situations. Further, categorical perception allows attention to focus towards meaningful differences, rather than meaningless differences, in facial stimuli such as changes in facial features between different emotional expressions. At the same time, differences within a single emotional expression are ignored. This is important because given the vast amount of changes in facial expressions; it would be beneficial for a mechanism that makes identification and classification of important social information efficient.

In a typical categorical perception experiment participants complete two tasks: an identification task and a discrimination task. In the identification task, participants are asked to identify faces as belonging to one category or another. In the discrimination task, participants are asked to make discriminations between and within categories. Higher accuracy across the category boundary than within category is characteristic of categorical perception. When the boundary identified by the identification task can be used to predict maximum discriminability then perception is said to be categorical.

Evidence for categorical perception of emotional facial expressions in infants and children has been limited. Leppänen, Richmond, Vogel-Farley, Moulson, and Nelson (2009) found that in a visual preference task with happy and sad expressions, infants showed increased looking time to the between category pairings but not to within category pairings. Seven-month-old infants show evidence of categorical perception along the happy–fear continuum, but only when habituated to a happy face rather than to the fear face (Kotsoni, de Haan, & Johnson, 2001). Ludemann and Nelson (1988) used mild and intense versions of happy, fear, and surprise faces, but found that infants' ability to discriminate and categorize depended on the expression shown during habituation. Further work is needed to provide clarification in terms of the developmental trajectory of categorical perception. That is, it is yet unclear whether categorical perception develops concurrently for different basic facial emotions and whether the age is a factor that impacts the emergence of categorical perception.

It is plausible that categorical perception develops at separate ages for different emotions, based on when the expression becomes relevant in guiding an infant's behaviour. For example, an adaptive behavioural response might be required when a fear or angry face is present, so infants might develop perceptual expertise for these negative emotions earlier than, for example, sad or disgusted faces. Specifically, categorical perception might be a mechanism that develops much earlier for threat-related emotions compared to positive emotions. Adaptive behavioural responses to these threat emotions may be important when infants are becoming mobile, since the ability to quickly detect anger or fear within their caregiver's facial expression would be imperative to their safety. Infants are known to use their caregivers facial expressions to guide their own behaviours (e.g. Sorce, Emde, Campos, & Klinnert, 1985).

1.2. *The current study*

The current study was designed to advance our understanding of the development of categorical perception beyond the previous literature. First, the experiments described here use infant-controlled habituation trials a relatively conservative methodology. This will address limitations in previous studies where a lack of dishabituation to a novel expression could be attributed to insufficient opportunities for encoding the stimulus. Second, the current experiment will use a closed mouthed model from the novel stimuli set (e.g. NimStim) and use digital morphing technology to systematically create equally spaced intermediates to form a continuum. Finally, 6-month-old, 9-month-old, and 12-month-old infants will be tested on their ability to discriminate facial emotional expressions across boundaries and within categories, for a happy–sad or a happy–angry continuum.

In Experiment 1, infants will be tested on whether they dishabituated to, and thus discriminate, facial expressions across a category boundary. In Experiment 2, infants will be tested on whether they dishabituate to faces within the same category. In a between-subjects design, Experiment 1 will include both a happy–sad and a happy–angry continuum conditions, so a comparison can be made across ages and facial emotions. Experiment 2, as a contrast condition to Experiment 1, only included faces within the happy and angry categories.

Download English Version:

<https://daneshyari.com/en/article/7273308>

Download Persian Version:

<https://daneshyari.com/article/7273308>

[Daneshyari.com](https://daneshyari.com)