



An examination of referential and affect specificity with five emotions in infancy



Nicole G. Martin*, Lindey Maza, Savannah J. McGrath, Amber E. Phelps

Kennesaw State University, Kennesaw, GA 30144, United States

ARTICLE INFO

Article history:

Received 13 September 2013

Received in revised form 24 January 2014

Accepted 8 April 2014

Keywords:

Affect specificity
Referential specificity
Social referencing

ABSTRACT

Referential specificity and affect specificity were examined in 12- to 14-month-olds ($n = 20$), and 16- to 18-month-olds ($n = 20$). Infants were presented with a televised social referencing paradigm involving an actress who emoted a simple descriptive message to one of two objects appearing on the video. The actress altered her affective message using a neutral baseline first, followed by 5 discrete emotions (anger, fear, sadness, happiness, surprise). Infants were given 30 s to interact with the objects after watching the affective episode. Older infants demonstrated referential and affect specificity, as evidenced by their differential treatment of the target and distracter toy in response to messages of anger, fear, surprise, and happiness. In contrast, the younger infants did not show evidence of either referential or affect specificity, as evidenced by the lack of differentiation in their treatment of the target and distracter toy in response to positive and negative emotional messages across all emotional episodes.

Published by Elsevier Inc.

1. Introduction

New experiences, uncertain events, and ambiguous situations can be confusing to an infant. To make sense of this information, infants look to their parents and other familiar people for guidance, interpretation, and clarification. Individuals' emotional responses help guide infant behavior (Klinnert, Emde, Butterfield, & Campos, 1986). Affective social referencing refers to the seeking out of supportive information and the use of this information to guide reactions toward uncertain and novel objects, people, and situations (Campos & Stenberg, 1981; Feinman, 1982, 1985; Hornik & Gunnar, 1988; Klinnert, Campos, Sorce, Emde, & Svejda, 1983).

In order to study social referencing in infants, early researchers presented infants with unfamiliar and ambiguous scenarios (Rosen, Adamson, & Bakeman, 1992). These paradigms included novel situations, including noisy objects (Klinnert, 1984; Walden & Ogan, 1988), strangers (Feinman & Lewis, 1983), visual cliffs (Sorce, Emde, Campos, & Klinnert, 1985), and live animals (Gunnar & Stone, 1984; Hornik & Gunnar, 1988). It was assumed that uncertainty was an essential component to activate infants' need to seek out clarity and interpretation. Adults provided infants with affective messages, in hopes that infants would use this information to guide their behavior toward the ambiguous objects or events. Typically, studies included a positive emotion (usually happiness) and a negative emotion (usually fear) to evaluate whether infants could use the affective messages correctly to guide their behavior. For some studies, a neutral message served as a baseline for behavioral comparison (Hornik, Risenhoover, & Gunnar, 1987; Klinnert, 1984; Mumme & Fernald, 2003). Coding of infant

* Corresponding author. Tel.: +1 770 794 7762.

E-mail addresses: nmarti40@kennesaw.edu, beautifulswimmers1@gmail.com (N.G. Martin).

behavior included calculating the amount of time infants looked at the objects, emoter, and parent (Striano, Vaish, & Benigno, 2006; Vaish & Striano, 2004; Vaish & Woodward, 2010), time touching objects (Hertenstein & Campos, 2004; Kim, Walden, & Knipps, 2010), latency to touch (Hertenstein & Campos, 2004; Walden & Ogan, 1988), and emotional expressions by infants (Buss & Kiel, 2004; Hertenstein & Campos, 2004; Kim & Kwak, 2011; Martin, Witherington, & Edwards, 2008). Results indicated that between 12 and 18 months of age, infants approached and interacted with stimuli signaled with positive messages, and looked longer, hesitated before touching, and avoided objects if the messages were negative (Gunnar & Stone, 1984; Hornik et al., 1987; Klinnert, 1984; Sorce et al., 1985; Walden & Ogan, 1988; Zaratany & Lamb, 1985).

Researchers questioned whether 1-year-old infants actually understood that an affective message delivered by an adult referred to a specific object, or whether infants generalized affective messages to a mood or atmosphere within the room. Understanding that the affective message signaled by another person is matched to a specific object is referred to as referential specificity (Moses et al., 2001). The following three responses are considered components of referential specificity: (a) linking the emotional message to a specific object, (b) understanding that the emoter is actively choosing which object is receiving the message, and (c) realizing that the emoter's cues can be used to guide behavior. If any of these responses were absent, researchers assumed infants generalized the emotional message to other objects or people in the room. This was referred to as the mood modification hypothesis (Feinman & Lewis, 1983; Feinman, 1982; Klinnert et al., 1983).

To determine if infants were linking affect to the entire testing scenario, researchers used distracter objects within the testing paradigms (Hornik et al., 1987; Martin et al., 2008). If infants socially referenced and displayed referential specificity, only behavior toward the targeted object would change (Hornik et al., 1987; Stenberg & Hagekull, 1997). If infants interpreted the situation using mood modification, behavior would generalize to both objects. Stenberg and Hagekull (1997) argued that the only way to test whether social referencing or mood modification “best fits the function of affective communication in infancy” (p. 210), one must test whether the infant's behavior changes toward the referent object/situation in response to the affective message.

Some studies found that 12-month-old infants could correctly attribute an affective message to the targeted object (Hornik et al., 1987; Moses et al., 2001; Stenberg & Hagekull, 1997; Walden & Ogan, 1988). Others suggested that younger infants use mood modification (Barresi & Moore, 1996; Hertenstein & Campos, 2004; Martin et al., 2008; Zaratany & Lamb, 1985). Studies examining developmental progression suggested that infants over 14 months of age used referential specificity and not mood modification (Martin et al., 2008; Repacholi, 1998). Therefore, referential specificity seems to be developmentally more sophisticated than mood modification as the former provides infants with more specific knowledge about their world through the medium of emotions.

One assumption of the social referencing literature is that infants understand the signal of specific emotional messages. Affect specificity refers to an infant's ability to make qualitative distinctions among emotions (Saarni, Campos, Camras, & Witherington, 2006). In order to react appropriately to an emotional message, infants must develop some understanding of the meaning behind each emotion and use it to guide their behavior. Hertenstein and Campos (2004) refer to this as emotional imputation. The first assumption of emotional imputation is that infants can both recognize and discriminate between specific emotional expressions. The second assumption is that infants know how to use the emotional signal presented to them.

Most social referencing studies presented infants with one positive (usually happiness) and one negative emotion (usually fear) (e.g., Hornik et al., 1987; Moses, Baldwin, Rosicky, & Tidball, 2001; Mumme, Fernald, & Herrera, 1996). This created a problem in interpretation of the results, as infants might only be responding to the valence of the emotion, and not the meaning of the emotion itself. While the foundational studies clearly showed that positive messages corresponded with increased interaction with objects and events and negative emotions inhibited play (Gunnar & Stone, 1984; Hirshberg & Svejda, 1990; Hornik et al., 1987; Klinnert et al., 1986; Klinnert, 1984; Moses et al., 2001; Mumme et al., 1996; Soken & Pick, 1992; Walden & Ogan, 1988; Zaratany & Lamb, 1985), it remained unclear whether infant response to valence could be richly interpreted as true emotional understanding. Very few social referencing studies included other emotions, such as anger (Martin et al., 2008; Sorce et al., 1985), sadness (Martin et al., 2008; Sorce et al., 1985), surprise, as well as neutral baselines (Hornik et al., 1987; Klinnert, 1984; Mumme & Fernald, 2003), and few studies used all within one testing paradigm.

Although there is a substantial body of research demonstrating the ability to distinguish and respond between valences, few studies have attempted to investigate infants' ability to distinguish within valences. Social referencing studies that included multiple within-valence emotions provide some evidence for affect specificity. Sorce et al. (1985) asked mothers to signal joy, sadness, anger, and fear toward 12-month-old infants waiting at the other end of the visual cliff. Most of the infants in the study avoided crossing the visual cliff when signaled with fear and anger. However, one-third of the infants crossed when signaled with sadness. Some infants may have crossed in a search for comfort from the parent, signaled by sadness. Other measures which were not present, such as how long infants hesitated before crossing, coding of facial expressions and vocalizations, might have indicated contrasting reactions in response to within valence emotions (anger and fear). Similar explorations of within-valence comparisons found no differences in play behavior in 13- to 15-month-olds' reactions to a doll given an emotional message of fear or sadness. Infants treated the negatively valenced emotions the same (Bingham, Campos, & Emde, 1987). The authors concluded that the infants were not old enough to distinguish and react distinctly to the different emotional signals. However, it is possible that the infants could distinguish between emotions but responded to all in a similar way.

Our previous study of affect specificity (Martin et al., 2008) presented infants with neutral, fearful, and sad signals from an actress on screen. The focus of the research was to contrast infants' response to two emotions of the same valence (fear

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