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Effects of adults' contingent responding on infants' behavior in ambiguous situations

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ABSTRACT

We examined the effect of adults' contingency in responding to infants' behavior in an ambiguous situation in two experiments. In Experiment 1, forty-four 12-month-old infants were exposed to an ambiguous toy. An unfamiliar adult responded either contingently or non-contingently to the infant's bids and then presented the toy and provided positive information. During toy presentation, infants in the non-contingent condition looked less at the experimenter than infants in the contingent condition. In a concluding free-play situation infants in the non-contingent condition played less and tended to touch the toy less. In Experiment 2 (forty-four 12-month-old infants), the parent either responded promptly or with a delay each time the infant made contact initiatives and then presented an ambiguous toy and delivered the positive information. The infants in the non-contingent condition tended to look less at the parent during toy presentation and also tended to play less with the toy during the concluding free-play situation. The findings show that adults' contingency in responding influences infants' behavior in ambiguous situations.

1. Introduction

Adult responsiveness, that is, to respond adequately and appropriately to the infant's behavior during everyday exchanges, has been linked to several positive outcomes for young children (Ainsworth, Bell, & Stayton, 1974; Bigelow & Power, 2014; Carpenter, Nagell, & Tomasello, 1998; Gros-Louis, West, & King, 2014; Masur, Flynn, & Eichorst, 2005; Tamis-LeMonda, Bornstein, & Baumwell, 2001). Respond contingently without a delay to infants' signaling has been found to be especially important in many different domains of infant and child development (e.g., Bornstein & Tamis-LeMonda, 1997; Tamis-LeMonda & Bornstein, 2002; Tamis-LeMonda, Kuchirko, & Tafuro, 2013). For example, both verbal and vocal contingent responding are related to an increase in infants' vocalizations and infants' later language development (e.g., Dunst, Gorman, & Hamby, 2010; Rollins, 2003; Tamis-LeMonda, Kuchirko, & Song, 2014). Further, the mother's contingent responsiveness can modulate infants' vocal protests (e.g., Gewirtz & Pelaez-Nogueras, 1993). Contingent non-vocal responses have also been shown to facilitate infants' vocalizations (e.g., phonological features of babbling; Goldstein, King, & West, 2003), and contingent maternal touch during face-to-face interaction has been found to increase the duration of eye contact in young infants (Pelaez-Nogueras et al., 1996). Moreover, contingent responding by the parent to child bids are related to greater child compliance (Schueler & Prinz, 2013). When the mothers verbally responded to their children's verbalizations during a play situation (a model building task), Shueler and Prinz found that 3–6 year-old children were carrying out the parents' directives to a higher degree than if the parental responses had been delivered non-contingently upon the child's speech.

Adults' contingent responsiveness has also been related to infant social referencing behavior in ambiguous situations (Stenberg, 2017; Striano, Henning, & Vaish, 2006). During circumstances of ambiguity, when infants don't know what to do and how to feel,

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they often use other persons as information resources (i.e., social referencing; e.g., Feinman & Lewis, 1983). By observing how another person present in the situation reacts to the object or event that is eliciting uncertainty (information seeking), and by using the vocal and gestural expressions of that person, the infant evaluates the situation and modulates behavior in accordance with the information (behavior regulation; e.g., Feinman, Roberts, Hsieh, Sawyer, & Swanson, 1992). Hence, both information seeking and behavior regulation constitute a social referencing process (e.g., Walden & Kim, 2005). When an adult has reacted positively towards a novel object, e.g., with smiles, positive utterances (Stenberg & Hagekull, 1997), infants have shown approach behaviors towards the object, while adult's negative reactions led to avoidance behaviors (e.g., Stenberg & Hagekull, 1997; Walden & Baxter, 1989).

Striano et al. (2006) examined selective looking by 12- and 13-month-old infants to a temporally contingent adult. During a novel situation (the activation of a mechanical toy dog) the infants looked more at the experimenter who, in a previous play situation, had responded more contingently to the infants' looks than to the experimenter who previously had responded non-contingently. From the results the authors speculated that adults' contingency in responding may influence which person infants chose to look at for information in novel situations. In two experiments we (Stenberg, 2017) examined if unfamiliar and familiar adults' contingent/non-contingent responding influenced 12-month-old infants' information-seeking behavior, as well as infant behavior regulation. Contingency in responding to infant's looks was manipulated during an initial situation when the infant was playing with two adults. During that situation, one adult always responded immediately to infant contact initiatives (contingent responding), while the other adult responded with a delay (non-contingent responding). In a subsequent situation when social referencing was examined, the contingent or non-contingent adult presented an ambiguous toy while providing positive information. When the adults were unfamiliar (experimenters), the infants in the contingent condition looked more often at the adult during toy presentation (information seeking) and, in a concluding free-play situation, regulated behavior in accordance with the information provided by the adult (i.e., played with the toy) more than the infants in the non-contingent condition.

Whether the parent had acted contingently to infants' signaling did not seem to have a bearing on infants' tendency to seek information, nor on infants' tendency to trust in information provided by the parent. When the ambiguous toy was presented, the infants in both the contingent and the non-contingent conditions looked as much at the parent, and in the concluding free-play situation played equally with the toy. Hains and Muir (1996) have suggested that due to infants' prior history of interactions with their mothers, infants may be prepared for episodes of non-contingent as well as contingent responding. Due to such experiences, infants may not expect the parent to always respond contingently when the infant looks at her or him. Hence, if the parent responds non-contingently every now and then, infant behavior need not be affected.

There was one important difference between groups, however. When the ambiguous toy was presented, the infants in the non-contingent group looked more quickly at the parent than the infants in the contingent group. During the initial play situation in which contingency in adults' responding was manipulated, both adults were constantly looking at the infant. When the infant looked at the contingent adult, the adult immediately responded with an utterance, but when the infant looked at the non-contingent adult, that adult did not respond but continued looking. In order to provide non-contingent responses to the infant, the non-contingent adult always repeated the contingent adult's utterances with a two second delay (see also Striano et al., 2006, for the description of a similar experimental design). Thus, the delay was not in relation to the infant's looks toward the non-contingent adult, but rather in relation to the contingent adult's utterances. Even though infants may not have expectations regarding unfamiliar adults' behavior, infants may have expectations regarding the parent's responsiveness. As discussed by Hains and Muir (1996), due to experiences during infant-parent interactions, infants may have learned that the parent does not always respond contingently when the infant looks at her or him. However, 12-month-old infants may not have experienced that the parent just keeps looking at the infant when the infant tries to make contact. Such a behavior may seem a bit unusual. Findings from studies using the still-face procedure (including an interaction phase, a still-face phase, and then an interaction phase) have reported that the parent's unresponsiveness during the still-face phase influences infants' behavior (e.g., Adamson & Frick, 2003). Not until the parent becomes responsive again, after being unresponsive and just looking at the infant during the still-face phase, do infants increase in gazing at the parent (Mesman, van IJzendoorn & Bakermans-Kranenburg, 2009). In the Stenberg (2017) study, the non-contingent adult not only kept looking at the infant but also repeated the contingent adult's utterances. To always repeat exactly what another person has just said could seem as a strange way of behaving. Or, infants may perceive such a behavior as a game; one adult who echoes every word of another adult. Thus, the unusual behavior of the parent may explain why the infants in the non-contingent group looked at the parent more quickly than the infants in the contingent group.

There are therefore still questions to answer concerning infants' sensitivity to adults' contingency in responding. In the present two experiments we aimed to further examine the impact of variations in adults' contingent and non-contingent responding on infants' social referencing behavior by using an alternative experimental design: a situation in which the non-contingent adult always responds, but with a delay, every time the infant looks at him or her. This design should more closely resemble what actually transpires during everyday adult-infant interactions. We aimed to increase the ecological quality of the experiments by manipulating the contingency in responding that to more closely mirror the everyday situations 12-month-olds are exposed to.

In two separate experiments adults' contingency in responding to infant signals was manipulated during an initial play situation. During that situation the infant was playing with some toys while the participating adult was busy using her or his mobile phone (the experimenter in Experiment 1, the parent in Experiment 2). Contingent responding was the adult stopping usage of the mobile phone and immediately responding each time the infant was looking at the adult. Non-contingent responding was defined as continued use of the mobile phone when the infant looked toward the adult and then, after a few second delay, respond to the infant's initiatives at communicating. Therefore in both the contingent and the non-contingent conditions the infants were exposed to one adult who always responded to the infant's social bids, however more or less contingently.