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Brief Report

Interacting effect of two social factors on 18-month-old infants' imitative behavior: Communicative cues and demonstrator presence

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ABSTRACT

Certain aspects of a demonstration have been shown to influence infants' interpretation of an observational situation and result in selective imitation. Studying social factors that trigger selective imitation may improve our understanding of how infants encode certain situations. However, only a few studies have investigated the possible interactions among these factors. In our study, 18-month-old infants ($N = 54$) observed an adult demonstrator retrieve a toy from under an opaque ("baited") container by manipulating another transparent empty one. Infants were assigned to one of four conditions representing all combinations of two social factors: ostensive communication during demonstration (Communicative vs. Non-communicative) and presence of the demonstrator during reenactment (D-present vs. D-not present). Results suggest that infants' choice behavior was formed in two steps: during the demonstration and during the test phase. Furthermore, an interaction between the effects of the two levels was observed. Communication during the demonstration triggered imitative learning. Infants tended to copy the observed manipulation to learn the communicatively assigned way to reach the goal. This choice behavior was not influenced later by the presence or absence of the demonstrator. The non-communicative demonstration, however, did not elicit a particular learning mechanism.

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Therefore, in this situation, infants' choice behavior was affected by the demonstrator's presence or absence. Infants developed an individual solution and chose the baited container in the D-not present condition, indicative of emulation. In the D-present situation, they were more likely to reproduce the observed manipulation, which can be interpreted as a tendency to communicate with or conform to the demonstrator.

Introduction

Studying the context-dependent emergence of imitation (or selective imitation [Hilbrink, Sakkalou, Ellis-Davies, Fowler, & Gattis, 2013; Király, Csibra, & Gergely, 2013]) in human infants can help us to understand and differentiate possible encoding and choice-making processes behind imitation (Keupp, Behne, Zachow, Kasbohm, & Rakoczy, 2015; Over & Carpenter, 2012).

The effect of single factors on infant imitation has been studied extensively over the past few years. The following have been shown to have a facilitatory effect on infants' imitative behavior: belonging to the same social group (Buttelmann, Zmyj, Daum, & Carpenter, 2013), familiarization with the demonstrator (Learmonth, Lamberth, & Rovee-Collier, 2005; Shimpi, Akhtar, & Moore, 2013), and transient features of the social context such as relational affiliation or friendly behavior of the demonstrator as opposed to an "aloof" person (Nielsen, 2006).

It has also been shown that ostensive communicative cues, such as eye contact and verbal attention getting that signal the demonstrator's communicative intent, may also play a major role in promoting imitative behavior (Király et al., 2013). This finding is in line with the findings obtained in earlier experiments (Brugger, Lariviere, Mumme, & Bushnell, 2007; Nielsen, 2006), where infants were more likely to imitate actions after having seen the demonstration in a communicative context than in a non-communicative context. Moreover, evidence suggests that in the presence of communicative cues infants tend to interpret an action demonstration as a generally accepted way to perform the observed behavior and, therefore, tend to imitate even unusual and inefficient actions (Brugger et al., 2007). Accordingly, Csibra and Gergely (2009) proposed that communicative demonstrations trigger generalized or normative learning, where the observer considers the entire demonstration to be customary ("the way we do this") and reenacts the observed demonstration in a non-selective manner. This account, however, does not take into consideration the presence or absence of the demonstrator during reenactment.

Only few studies have investigated the possible effects of the presence of the demonstrator during reenactment. Király (2009) found that 1 week after the observation of a successful tool use, a higher percentage of 14-month-old infants imitated the observed action when the demonstrator was present during the reenactment than when she was absent. This suggests that the demonstrator could act as a reminder cue and/or a knowledgeable communicative partner to trigger imitative behavior. In a study by Nielsen and Blank (2011), 4- and 5-year-old children observed two female experimenters performing the same means-action; one of them performed only the necessary steps to reach the goal, whereas the other one integrated some irrelevant steps. Children copied the irrelevant steps only when the demonstrator who performed them was present during the test. These results indicate that children, when imitating a previously observed action, are specifically sensitive to the presence of the particular person from whom the knowledge was obtained. The authors interpreted this demonstrator-selective imitation as children's motivation to promote their shared experience and to build rapport with the demonstrator.

Importantly, the two aforementioned factors affect different stages of the learning process: the communicative cues during demonstration and the presence of the demonstrator during reenactment. Therefore, it stands to reason that these factors affect children's tendency to imitate interacting with