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The role of social interaction and pedagogical cues for eliciting and reducing overimitation in preschoolers



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ABSTRACT

The tendency to imitate causally irrelevant actions is termed overimitation. Here we investigated (a) whether communication of a model performing irrelevant actions is necessary to elicit overimitation in preschoolers and (b) whether communication of another model performing an efficient action modulates the subsequent reduction of overimitation. In the study, 5-year-olds imitated irrelevant actions both when they were modeled by a communicative and pedagogical experimenter and when they were modeled by a non-communicative and non-pedagogical experimenter. However, children stopped using the previously learned irrelevant actions only when they were subsequently shown the more efficient way to achieve the goal by a pedagogical experimenter. Thus, communication leads preschoolers to adapt their imitative behavior but does not seem to affect overimitation in the first place. Results are discussed with regard to the importance of communication for the transmission of cultural knowledge during development.

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Introduction

Imitation is a powerful mechanism that allows humans to learn novel actions from others (Meltzoff, 1988). In contrast to emulation, which is accomplished by copying the end state of an action without performing the observed action steps, imitation entails copying the action sequence itself (Whiten, McGuigan, Marshall-Pescini, & Hopper, 2009). Although in many situations imitation is a quick and efficient learning tool, in other situations copying the exact actions observed in others is quite inefficient. For instance, in a study by Horner and Whiten (2005), the experimenter performed relevant actions as well as irrelevant actions while demonstrating how to retrieve a reward from a puzzle box to wild-born chimpanzees. When the box was opaque, chimpanzees imitated both kinds of actions. When the box was transparent, thereby revealing that irrelevant actions had no effect, chimpanzees employed a more efficient strategy of emulation and omitted the irrelevant actions.

In contrast to chimpanzees, human children and adults tend to faithfully imitate actions that are not the most efficient way to accomplish a certain aim (Flynn & Smith, 2012; Horner & Whiten, 2005; McGuigan, Makinson, & Whiten, 2011). The imitation of causally goal-irrelevant actions has been termed overimitation (Lyons, Young, & Keil, 2007). The phenomenon is usually studied by showing participants, most often preschoolers, how to retrieve a reward from a novel, causally transparent container by using one or more irrelevant actions and one relevant action. After observing the model, participants typically reproduce both the causally relevant and irrelevant actions, thereby adopting an inefficient strategy. Crucially, this strategy is not spontaneously performed when participants operate the container without observing a model first (Lyons, Damrosch, Lin, Macris, & Keil, 2011; Lyons et al., 2007).

There is currently much debate about why overimitation occurs. Lyons et al. (2007) argued that children automatically encode observed actions as causally relevant and, therefore, reproduce them. This process has been dubbed *automatic causal encoding* (ACE). The ACE claim is based on the observation that children overimitate even if they are explicitly encouraged to omit any unnecessary actions and even when performing the irrelevant actions ultimately endangers receiving a reward (Lyons et al., 2011). Others have argued that social norm learning and/or the desire to affiliate with the experimenter underlie the phenomenon of overimitation (Kenward, Karlsson, & Persson, 2011; Keupp, Behne, & Rakoczy, 2013; Nielsen & Blank, 2011). Kenward (2012) had 3- and 5-year-olds observe an experimenter perform relevant actions as well as unnecessary actions in the presence of a puppet. Most children protested, some of them using normative language, when the puppet subsequently performed the task but omitted the unnecessary actions.

Neither norm learning, nor social affiliation, nor the ACE hypothesis can be ruled out at the moment. Regardless of which of these accounts holds true, some have suggested that overimitation results from children expecting others to teach them how something is done (Gergely & Csibra, 2006). Because the primary goal of the current study was not to distinguish among norm learning, social affiliation, and the ACE hypothesis, “how something is done” may henceforth refer to social norms as well as causal necessities and functional properties of artifacts.

According to the theory of natural pedagogy, humans have evolved mechanisms to transmit generic knowledge through communication (Csibra & Gergely, 2011). This generic knowledge is supposed to be shared by all members of a social group and may entail, for instance, knowledge about the functions of tools as well as cultural norms and rituals that are often cognitively opaque (Kiraly, Csibra, & Gergely, 2013). According to this theory, the (usually adult) teacher addresses the child in pedagogical interactions using certain ostensive cues such as eye contact, calling the learner’s name, and speaking in a child-directed manner. These ostensive signals prompt the expectation in learners that they are about to be taught relevant and generic information that can be generalized across situations and other individuals. Several studies have demonstrated infants’ and children’s sensitivity to these ostensive signals and the effects of communication on early learning (e.g., Gergely, Egyed, & Kiraly, 2007; Topal, Gergely, Miklosi, Erdohegyi, & Csibra, 2008).

Corroborating the theory of natural pedagogy, some empirical evidence shows that social interaction and communicative cues increase imitative behavior in infants (Brugger, Lariviere, Mumme, & Bushnell, 2007; Kiraly et al., 2013; Nielsen, 2006). In a study by Kiraly et al. (2013), 14-month-olds

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