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Over-imitation is not automatic: Context sensitivity in children's overimitation and action interpretation of causally irrelevant actions

Stefanie Keupp [a,b,*], Tanya Behne [a,b], Joanna Zachow [a], Alina Kasbohm [a], Hannes Rakoczy [a,b]

[a] Department of Biological Developmental Psychology, University of Göttingen, D-37073 Göttingen, Germany
[b] Courant Research Centre, Evolution of Social Behavior, D-37077 Göttingen, Germany

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A B S T R A C T

Recent research has documented the robust tendency of children to "over-imitate," that is, to copy causally irrelevant action elements in goal-directed action sequences. Different explanations for over-imitation have been proposed. Causal accounts claim that children mistakenly perceive such action elements as causally relevant and, therefore, imitate them. Affiliation accounts claim that children over-imitate to affiliate with the model. Normative accounts claim that children conceive of causally irrelevant actions as essential parts of an overarching conventional activity. These different accounts generally hold the same predictions regarding children's imitative response. However, it is possible to distinguish between them when one considers additional parameters. The normative account predicts wide-ranging flexibility with regard to action interpretation and the occurrence of over-imitation. First, it predicts spontaneous protest against norm violators who omit the causally irrelevant actions. Second, children should perform the causally irrelevant actions less frequently, and criticize others less frequently for omitting them, when the actions take place in a different context from the one of the initial demonstration. Such flexibility is not predicted by causal accounts and is predicted for only a limited range of contexts by affiliation accounts. Study 1 investigated children's own imitative response and found less over-imitation when children acted in a different context from

* Corresponding author at: Department of Biological Developmental Psychology, University of Göttingen, D-37073 Göttingen, Germany.
E-mail address: stefanie.keupp@psych.uni-goettingen.de (S. Keupp).

when they acted in the same context as the initial demonstration. In Study 2, children criticized a puppet less frequently for omitting irrelevant actions when the puppet acted in a different context. The results support the notion that over-imitation is not an automatic and inflexible phenomenon.

Introduction

"Over-imitation"—that is, the faithful reproduction of causally irrelevant actions in goal-directed action sequences—has received extensive interest in recent developmental and comparative research on action understanding and imitation (e.g., Flynn & Smith, 2012; Horner & Whiten, 2005; Lyons, Young, & Keil, 2007; McGuigan, Whiten, Flynn, & Horner, 2007; Nielsen & Tomaselli, 2010). From this research, we know that over-imitation develops and increases over the preschool years (Hilbrink, Sakkalou, Ellis-Davies, Fowler, & Gattis, 2013; Marsh, Ropar, & Hamilton, 2014; McGuigan, Makinson, & Whiten, 2011; Nielsen, 2006) and seems to be absent in other great apes (Horner & Whiten, 2005; Nagell, Olguin, & Tomasello, 1993; Nielsen & Susianto, 2010).

Why do children over-imitate? Three broad types of accounts have been proposed to explain over-imitation. First, the automatic causal encoding account suggests that over-imitation stems from an automatic tendency to encode all elements of an action demonstrated by a model as causally relevant (Lyons, Damrosch, Lin, Macris, & Keil, 2011; Lyons & Keil, 2013; Lyons et al., 2007). As an example, think of an action sequence comprising two action elements, A (tapping on a box) and B (flipping a switch), and an effect, E (box opens), such that only B is causally responsible for E. According to the automatic causal encoding account, children confronted with the intentional demonstration of this action sequence would be confused and consider A and B together as causally relevant and, thus, reproduce them accordingly. Second, affiliation accounts see the main reason for over-imitation in a social motivation to affiliate or identify with the model, or to avoid ostracism, by copying as faithfully as possible (Nielsen & Blank, 2011; Over & Carpenter, 2009, 2012). That is, confronted with the A–B action sequence with effect E, children would sometimes perform A not because they consider it necessary for bringing about E but rather because they want to affiliate with someone else, typically the model who had previously performed A himself or herself. Finally, rational normative action interpretation accounts have suggested that over-imitation is based on children's flexible and rational action interpretation. Children, according to these accounts, do understand that causally irrelevant action elements are, in fact, causally irrelevant, but under certain circumstances they view these elements as conventionally (not causally) essential parts of bigger activities (Herrmann, Legare, Harris, & Whitehouse, 2013; Kenward, 2012; Keupp, Behne, & Rakoczy, 2013). That is, confronted with the A–B action sequence with effect E, children can engage in flexible hierarchical action parsing, individuation, and interpretation; they see each action element, and they see the causal connection B → E. In addition, under some conditions, they see the whole sequence as constituting a bigger conventional action comprising A, B, and E. In these conditions—for example, when the action sequence has been introduced with a focus on the specific means of behavior and not just the ends (Keupp et al., 2013), with a specific label, or with a "ritual" rather than purely instrumental stance (Herrmann et al., 2013) (see below)—children will over-imitate,[1] acting on the assumption that the task is to

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[1] Importantly, the account does not claim that these are the only conditions under which children over-imitate. The account leaves room, of course, for cases where children do not see A–B–E as somehow conventionally connected but rather have some other reason for performing A—for example, to please someone else who likes to see A (as the affiliation account claims). This makes the relation between the rational normative action interpretation account and the affiliation account quite complex. The accounts are surely not strongly mutually exclusive, and the latter might actually be just a special case of the former (or the former might be an extension of the latter)—a special instance of a rational action interpretation account claiming that children engage in rational action parsing and interpretation but that restricts itself to postulating only one specific motivation for over-imitation, namely affiliation.