Journal of Experimental Child Psychology 118 (2014) 119–126

Contents lists available at ScienceDirect

Journal of Experimental Child Psychology

journal homepage: www.elsevier.com/locate/jecp

Brief Report

Child-directed action promotes 2-year-olds' imitation ☆

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ARTICLE INFO

Article history:
Received 16 April 2013
Revised 6 August 2013
Available online 27 September 2013

Keywords:
Imitation
Infant-directed action
Learning
Intention
Social cognition
Toddlers

ABSTRACT

Children are voracious learners and adults are ubiquitous teachers. This project investigated whether the special infant-directed action modifications parents use when teaching their children (called "motionese" by Brand et al., *Developmental Science*, 2002, Vol. 5, pp. 72–83) improves 2-year-olds' imitation. Children saw an adult perform a series of acts on four novel objects using either an infant-directed style (including larger range of motion and enhanced boundary marking) or an adult-directed style. Children's imitation of the acts was higher in the infant-directed condition relative to the adult-directed condition, and both types of demonstration increased imitation relative to baseline (no demonstration). We propose that motionese provides information about actions, objects, and intentionality, thereby enhancing toddlers' observational learning.

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Introduction

A young child watching her parents do something as mundane as cleaning the kitchen is privy to thousands of years of accumulated knowledge, including examples of tool use (sweeping with a broom) and subtle action techniques (a wrist twist to disassemble a blender). Although opportunities to witness such behaviors are abundant, learning from and copying these examples is likely more challenging than it may first appear. For instance, children need to distinguish the intentional (e.g., sweeping) from the incidental (e.g., sneezing) and the means (e.g., right-to-left motion) from the ends

☆ The authors would like to thank the participating families and our undergraduate research assistants for their help completing this research.

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0022-0965/$ - see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.jecp.2013.08.005

(e.g., dirt removal). Evidence from nonhuman animals and children with autism illustrate the difficulties in navigating these challenges (e.g., Rogers & Williams, 2006; Whiten, Horner, Litchfield, & Marshall-Pescini, 2004). Nevertheless, young children are proficient imitators (Barr, Dowden, & Hayne, 1996; Meltzoff, 1988). The current project investigated whether parental teaching, in the form of "motionese" or "infant-directed action" (Brand, Baldwin, & Ashburn, 2002; Rohlfing, Fritsch, Wrede, & Jungmann, 2006), contributes to children's success at imitating novel actions.

In their endeavor to understand others' actions on objects, children are not typically expected to learn through mere observation. Rather, parents provide support for social learning (Bjorklund, Causey, & Periss, 2010). Teaching—behavior enacted seemingly for the sole purpose of educating another (Caro & Hauser, 1992)—is common. In fact, both adults and children are known to tutor less knowledgeable others (Csibra & Gergely, 2005, 2011; Flynn, 2010). Although there is debate about what counts as teaching across cultures and across species (Caro & Hauser, 1992), there is no question that children in the Western industrialized world are exposed to massive amounts of instruction from infancy through their school years. Particularly when defined to include nonverbal redirecting and opportunity provisioning, teaching appears to be a human universal (Caro & Hauser, 1992).

In fact, when teaching about novel objects to 6- to 13-month-old infants as opposed to adults, a particular suite of embellished behavior emerges that has been called motionese or infant-directed action (Brand et al., 2002; Rohlfing et al., 2006). These behaviors incorporate some previously studied features, such as eye gaze and emotional expressiveness (Chong, Werker, Russell, & Carroll, 2003; Hains & Muir, 1996), but also involve a variety of other modifications. These include closer proximity to a child versus an adult partner, greater enthusiasm, a larger range of motion, simplified action sequences, greater repetitiveness, and higher interactiveness, including more and longer gazes to infants' faces and more turn taking. Extensions to this work have also found evidence of longer pauses in infant-directed action compared with adult-directed action (Rohlfing et al., 2006) and a unique coordination of speech and action in demonstrations for children (Meyer, Hard, Brand, McGarvey, & Baldwin, 2011; Schillingmann, Wrede, & Rohlfing, 2009).

An important question about motionese is whether it is effective as a teaching behavior. Although it is possible that this medley of cues could be distracting or frustrating relative to the straightforward adult-directed action style, we believe it is more likely that these cues function to provide a richer learning experience than a standard demonstration. If so, then motionese would fit within a suite of behavioral adjustments for children, including infant-directed speech (e.g., Kemler-Nelson, Hirsh-Pasek, Jusczyk, & Cassidy, 1989; Kuhl et al., 1997), facial expressions (Chong et al., 2003), singing (Trehub & Trainor, 1998), and gestures (Iverson, Capirci, Longobardi, & Caselli, 1999; Masataka, 1996), some of which have been shown to have pedagogical functions (e.g., Thiessen, Hill, & Saffran, 2005).

To the extent that motionese is an effective teaching tool, it is important to discover how it functions. One possibility is that motionese may improve learning by triggering a pedagogical stance. Csibra and Gergely (2005) propose that humans have an evolutionary adaptation such that when presenting new information, adults create and children respond to a pedagogical context. According to this account, children are sensitive to cues from adults that highlight new and important information; children are more likely to imitate acts that are marked as intentional and demonstrated *for* them. For example, if infants simply *witness* an adult bend over and touch a lamp with the head in order to illuminate it (as in Meltzoff, 1988), rather than having the adult specifically *show* them after making eye contact, infants are less likely to imitate it (Kiraly, Csibra, & Gergely, 2004, as cited in Gergely & Csibra, 2006). Motionese includes cues that have been proposed to establish a pedagogical context, such as making eye contact before a demonstration (Senju & Csibra, 2008). If motionese is important for establishing a pedagogical context alone, we would expect similar levels of imitation in infant-directed demonstrations relative to adult-directed demonstrations as long as both are presented in an intentional pedagogical fashion.

A related possibility is that the motionese behavioral modifications (e.g., large motions, increased eye contact) draw or retain children's attention to the demonstrations. Given young children's fledgling attentional control (Ruff & Rothbart, 1996), a system of exaggerated behaviors throughout a demonstration could arguably be important for the sheer purpose of keeping young children engaged with the activity. In support of this possibility, motionese has been shown to preferentially attract children's attention, where 6- to 13-month-olds looked longer at infant-directed versus adult-directed

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