

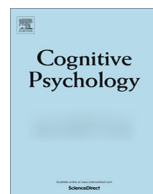


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Infants understand deceptive intentions to implant false beliefs about identity: New evidence for early mentalistic reasoning

Rose M. Scott^{a,*}, Joshua C. Richman^b, Renée Baillargeon^b

^a Psychological Sciences, University of California Merced, 5200 North Lake Road, Merced, CA 95343, United States

^b Psychology, University of Illinois, 603 E. Daniel St., Champaign, IL 61820, United States

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ABSTRACT

Are infants capable of representing false beliefs, as the mentalistic account of early psychological reasoning suggests, or are they incapable of doing so, as the minimalist account suggests? The present research sought to shed light on this debate by testing the minimalist claim that a signature limit of early psychological reasoning is a specific inability to understand false beliefs about identity: because of their limited representational capabilities, infants should be unable to make sense of situations where an agent mistakes one object for another, visually identical object. To evaluate this claim, three experiments examined whether 17-month-olds could reason about the actions of a deceptive agent who sought to implant in another agent a false belief about the identity of an object. In each experiment, a thief attempted to secretly steal a desirable rattling toy during its owner's absence by substituting a less desirable silent toy. Infants realized that this substitution could be effective only if the silent toy was visually identical to the rattling toy (Experiment 1) and the owner did not routinely shake her toy when she returned (Experiment 2). When these conditions were met, infants expected the owner to be deceived and to mistake the silent toy for the rattling toy she had left behind (Experiment 3). Together, these results cast doubt on the minimalist claim that infants cannot represent false beliefs about identity. More generally, these results indicate that infants in the 2nd year of life can reason not only about the actions of agents who *hold* false beliefs, but also about the actions of agents who seek to *implant* false beliefs, thus providing new support for the

* Corresponding author.

E-mail address: rscott@ucmerced.edu (R.M. Scott).

mentalistic claim that an abstract capacity to reason about false beliefs emerges early in human development.

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1. Introduction

Adults routinely interpret others' actions in terms of underlying mental states, and developmental researchers have long been interested in determining when and how this ability develops. Over the past two decades, numerous reports have presented evidence that infants can attribute to agents motivational states (e.g., goals and dispositions), epistemic states (e.g., knowledge and ignorance), and counterfactual states (e.g., false beliefs and pretense) (for reviews, see Baillargeon, Scott, & Bian, *in press*; Baillargeon et al., 2015). These findings have led many investigators to adopt a *mentalistic* account, which assumes that infants are equipped with a psychological-reasoning system that provides them with a skeletal causal framework for representing and learning about agents' mental states (e.g., Barrett et al., 2013; Buttelmann, Carpenter, & Tomasello, 2009; Carruthers, 2013; Kovács, Téglás, & Endress, 2010; Luo, 2011; Onishi & Baillargeon, 2005; Scott, Baillargeon, Song, & Leslie, 2010; Scott, Roby, & Smith, *in press*; Southgate, Senju, & Csibra, 2007; Surian, Caldi, & Sperber, 2007).

Recently, however, a number of researchers have offered an alternative, *minimalist* account of these prior findings, which particularly affects claims concerning infants' ability to attribute counterfactual states (e.g., Apperly & Butterfill, 2009; Butterfill & Apperly, 2013; Low, Drummond, Walmsley, & Wang, 2014; Low & Watts, 2013). This account assumes that two distinct systems underlie human psychological reasoning. The (conscious, nonautomatic, slow, flexible) *late-developing* system emerges around age 4 as a result of linguistic, executive-function, and metarepresentational advances; this advanced system is capable of representing false beliefs and other counterfactual states, and it enables correct responses in traditional false-belief tasks (e.g., Baron-Cohen, Leslie, & Frith, 1985; Wellman & Bartsch, 1988; Wellman, Cross, & Watson, 2001; Wimmer & Perner, 1983). The (unconscious, automatic, fast, inflexible) *early-developing* system is already present in infancy; although it cannot represent false beliefs and other counterfactual states, it can track simpler, belief-like states that are sufficient to allow infants to succeed at non-traditional false-belief tasks (e.g., Buttelmann et al., 2009; Onishi & Baillargeon, 2005; Scott et al., 2010; Southgate et al., 2007).

Is the mentalistic or the minimalist account of early false-belief understanding correct? In the following sections, we begin by discussing two key aspects of the minimalist account. First, we explain how the early-developing system, which is incapable of representing false beliefs, can nevertheless correctly predict the actions of an agent who holds a false belief about the *location* or *properties* of an object. Next, we describe some of the signature limits of the early-developing system, which include an inability to handle situations where an agent holds a false beliefs about the *identity* of an object. According to the minimalist account, "mistakes about the identities of objects can be used to distinguish minimal from full-blown theory-of-mind cognition" (Butterfill & Apperly, 2013, p. 622); only the late-developing system has the representational capability to correctly predict the actions of an agent who mistakes one object for another. We then review previous evidence that infants can reason about false beliefs about identity, which proponents of the minimalist account argue is open to an alternative interpretation that implicates only the early-developing system. Finally, we introduce the present research, which sought to provide a new test of the minimalist account of early false-belief understanding. Instead of examining whether infants could reason about the actions of an agent who *held* a false belief about the identity of an object, here we asked whether infants could reason about the deceptive actions of an agent who *sought to implant in another agent* a false belief about the identity of an object.

We reasoned that positive results in this new deception task would cast doubt on the claim that infants are equipped only with a minimal, early-developing system that is incapable of representing

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