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Brief article

Rich interpretation vs. deflationary accounts in cognitive development: the case of means-end skills in 7-month-old infants

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Abstract

Seven-month-old infants appear to learn means-end skills, such as pushing a button to retrieve a distant toy (*Psychological Review* 104 (1997) 686). The present studies tested whether such apparent means-end behaviors are genuine, or simply the repetition of trained behaviors under conditions of greatest arousal, as suggested by a dynamic systems reinterpretation. When infants were trained to repeat behaviors that did not serve as means to retrieving toys (pushing a button to light a set of distant lights), their button-pushing differed significantly from infants for whom button-pushing served as a means for retrieving toys. Further, infants demonstrated means-end skills with behaviors that they had not been trained to repeat. Implications for early means-end abilities and for debates surrounding the interpretation of infant behavior are discussed.

Keywords: Rich interpretation; Deflationary accounts; Cognitive development

1. Introduction

A basic goal in studying cognitive development is to understand the origins of knowledge. To do so, we must assess what infants know. Researchers have designed numerous methods to test such preverbal populations, as well as non-verbal populations, with some experiments applied successfully to both human infants and monkeys (e.g. Hauser, MacNeilage, & Ware, 1996; Munakata, Santos, Spelke, Hauser, & O'Reilly, 2001; Wynn, 1992; Xu, Carey, & Welch, 1999). However, the interpretation of behavior in

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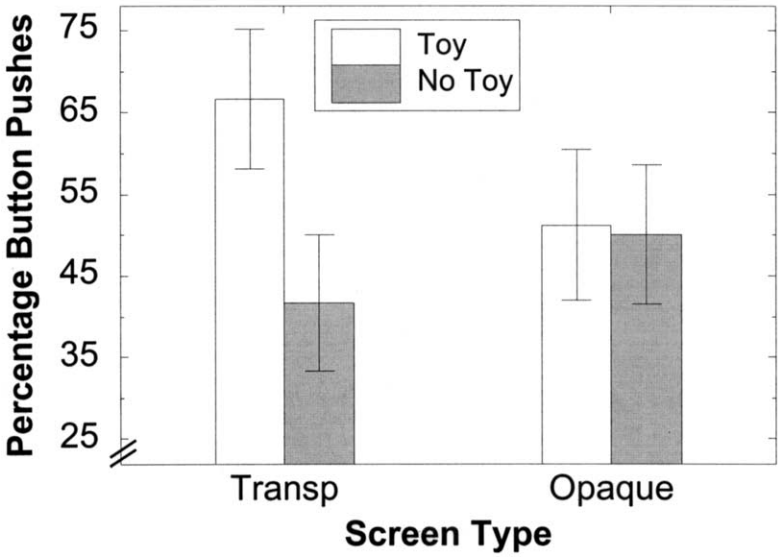

Fig. 1. Button-pushing by screen type and toy presence in Munakata et al. (1997), Experiment 3, in which pushing the button led to the retrieval of toys: infants distinguished Toy and No Toy conditions more in the Transparent condition than in the Opaque condition.

such experiments is controversial. Are researchers mistakenly forming "rich interpretations" (Haith & Benson, 1997) of behavior, casting simple responses in terms of overly complex abilities and cognitive processes, and falling prey in the case of infancy research to the "competent infant" movement (Bates & Elman, 1993)? Or are we underestimating the abilities of preverbal and non-verbal populations in "deflationary accounts" (Scholl & Leslie, 1999), mistakenly casting thoughtful behaviors in terms of simplistic processes?

The present work resolves one variant of this controversy. The studies explore means-end behavior, often defined in the study of infancy as the ability to link action on one object (the means) to its effect on other objects (the ends).[1] Infants appear to use means-end skills to retrieve toys. For example, 7-month-old infants can learn to pull a towel to retrieve a distant toy sitting on the towel, to push a button to make a distant ledge drop such that a toy sitting on the ledge slides to within reach, and to rotate a screen to retrieve a toy from behind it (Munakata, McClelland, Johnson, & Siegler, 1997; Shinskey & Munakata, 2001). Infants carry out these behaviors more often when there is a toy present than when there is not, and they distinguish toy presence and absence in their behaviors more when they can see whether or not there is a toy (behind a transparent screen) than when the area becomes occluded (by an opaque screen) (Fig. 1). This pattern suggests that 7-month-old infants understand that they can use one object (a button) as a means to the end of another object (a toy), but they have some difficulty remembering whether hidden toys are present.

[1] This notion of means-end behavior differs from the information-processing notion of determining the difference between the current and goal states and finding an operator to reduce this difference (Newell & Simon, 1972).