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Early rationality in action perception and production? A theoretical exposition

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ABSTRACT

Within recent years, the question of early rationality in action perception and production has become a topic of great interest in developmental psychology. On the one hand, studies have provided evidence for rational action perception and action imitation even in very young infants. On the other hand, scholars have recently questioned these interpretations and proposed that the ability to rationally evaluate actions is not yet in place in infancy. Others have examined the development of the ability to make rational action choices and have indicated limitations of young children's ability to act rationally. This editorial to the special issue on *Early Rationality in Action Perception and Production?* introduces the reader to the current debate. It elucidates the underlying theoretical assumptions that drive the debate on whether or not young children's action perception and production is rational. Finally, it summarizes the papers and their contributions to the theoretical debate.

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Introduction

Learning how to act and learning how to make sense of others' actions are undeniably two of the most important tasks young children need to master during early development. How are children able to do so? Is their learning about actions supported by sophisticated reasoning about the rationality of each of the possible actions (and thus in itself rational), or is it subserved by rather low-level mechanisms?

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It is well established that newborns are rather helpless beings, missing central abilities to control much of their own behavior. Some studies have suggested that it is not before 5 months of life that they learn to guide their grasping behavior through visual information (von Hofsten, 1980, 1983). More efficient anticipatory action planning abilities seem to develop only during the course of the second year of life (e.g., McCarty, Clifton, & Collard, 1999, 2001). Moreover, researchers have pointed to limitations in young children's ability to make rational, goal-directed action choices (Kenward, Folke, Holmberg, Johansson, & Gredebäck, 2009; Klossek & Dickinson, 2012). Yet, it has also been reported that 1-year-old infants can adjust their initial grasp of an object in relation to their overall goal in the situation (Claxton, Keen, & McCarty, 2003), suggestive of a basic ability to act in a goal-directed fashion already during the first year of life (von Hofsten, 2004).

Concerning action perception, it has been argued that from an early age, children differentiate between animate and inanimate beings (e.g., Jeschonek, Marinovic, Hoehl, Elsner, & Pauen, 2010; Pauen, 2002; Quinn & Eimas, 1998). This categorical distinction is supported by a body of research suggesting that infants interpret the movements of inanimate objects in terms of physical laws, whereas they interpret people and other animate entities in terms of goals and intentions (e.g., Woodward, 1998). This differentiation is at the root of what has been labeled as naive psychology (Poulin-Dubois, Brooker, & Chow, 2009), which ultimately leads to an understanding of others as mental beings (Aschersleben, Hofer, & Jovanovic, 2008; Barresi & Moore, 1996; Perner, 1991; Thoermer, Sodian, Vuori, Perst, & Kristen, 2012).

Action perception and action production are part of social learning and, in particular, of imitation during early childhood. Imitation is highly relevant for social and cognitive development (e.g., Over & Carpenter, 2012; Tomasello, Carpenter, Call, Behne, & Moll, 2005). In imitation, action perception and action production are intertwined because children rely on perceived information about others' behavior to control their own future actions. Thus, studying imitation offers insights into both how young children perceive others' behavior and how they plan their own actions (e.g., Elsner, 2007).

Taken together, this short overview demonstrates that a closer examination of the development and nature of early action production and perception is of central relevance for developmental psychology.

Disagreement on neurocognitive mechanisms

Notwithstanding the general agreement on the relevance of studying the early roots and early development of action perception and production, there is great disagreement in the field when it comes to the underlying neurocognitive mechanisms. The proposed mechanisms are greatly divergent, ranging from low-level sensorimotor mechanisms (cf. Smith & Sheya, 2010; Thelen & Smith, 1994) to relatively high-level cognitive and conceptual ways of processing others' actions (e.g., Gergely & Csibra, 2003). Where does this disagreement come from? What are the underlying theoretical assumptions that drive this debate? It appears that the discussions of the respective lean and rich accounts of young children's action perception and production have evolved around a number of issues.

Phylogenetic and ontogenetic considerations

One line of reasoning suggests that children are confronted with a considerable amount of information. Undeniably, young children observe a lot of different actions and are presented with a lot of objects to act on. For example, they spend a great deal of time observing their caregivers walking around in a room, reaching for and grasping objects as well as performing actions with them, the purpose of which must be largely opaque for the children.

A central argument in this line of reasoning suggests that children must be overwhelmed with all this information. It must be difficult for them to figure out which aspect of an action to focus on. In other words, how can children deal with the vast amount of information? This issue is particularly relevant with respect to cultural learning. It is clear that the success of *Homo sapiens* rests on the cultural transmission of knowledge from one generation to another (e.g., Gould, 1979). Yet, the question that arises is, how is this possible? How do young children regulate which kind of behaviors they imitate?

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