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## Social cognition in simple action coordination: A case for direct perception <sup>☆</sup>

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### ABSTRACT

In this paper we sketch the outlines of an account of the kind of social cognition involved in simple action coordination that is based on direct social perception (DSP) rather than recursive mindreading. While we recognize the viability of a mindreading-based account such as e.g. Michael Tomasello's, we present an alternative DSP account that (i) explains simple action coordination in a less cognitively demanding manner, (ii) is better able to explain flexibility and strategy-switching in coordination and crucially (iii) allows for formal modeling. This account of action coordination is based on the notion of an agent's field of affordances. Coordination ensues, we argue, when, given a shared intention, the actions of and/or affordances for one agent shape the field of affordances for another agent. This a form of *social* perception since in particular perceiving affordances for another person involves seeing that person as an agent. It is a form of *social perception* since it involves perceiving affordances for another person and registering how another person's actions influence one's own perceived field of affordances.

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## 1. Introduction

Up until a decade ago there was a scholarly near-consensus over the idea that understanding others is an inferential process, called 'mindreading', that can be broken down in two parts. First, understanding the behavior of others is held to involve the attribution of mental states—propositional attitudes, usually—that cause observed behavior. Secondly, mental states are held to be not directly observable. There is a lot of disagreement over the nature of mental states and there are different readings of 'unobservability', to be sure (Bohl & Gangopadhyay, 2014). But accepting a version of both points of departure is accepting that understanding others is inescapably inferential: to understand the actions of others we need to go beyond what is perceivable and make inferences about their hidden mental causes. For a long time, the debate on social cognition concentrated on the nature of these inferences; this is what is at stake in the ongoing discussion between theory-theorists and simulationists. Recently, however, some philosophers have challenged this inferential nature of at least some social cognitive processes. On the one hand, phenomenologists question the unobservability of mental states and insist that we can directly perceive e.g. the other's emotions or basic intentions in facial expressions, voice intonations, gestures and bodily postures (e.g. Gallagher, 2004; Gallagher, 2008; Gallagher & Zahavi, 2008; Zahavi, 2005; Zahavi & Parnas, 2003). On the other hand, the idea that understanding others always involves ascribing full-blown mental states has been

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questioned (e.g. Hutto, 2008; Hutto & Myin, 2012; Kiverstein, 2011; Ratcliffe, 2007). Perceiving contextualized behavior is thought, in some cases, to constitute a non-inferential understanding of a basic kind of intentionality that does not involve propositional attitudes (cf. Hutto, Satne, & Satne, 2015). Thus, in different ways, a case has been made for the notion of ‘direct social perception’ (DSP).

DSP is usually associated with the idea that understanding others and successfully interacting with them in daily life are inextricably intertwined (Gallagher, 2003). More traditional (cognitivist) approaches would agree only partially. They would agree that understanding others is a necessary *precondition* for successful social interaction but deny that successful interaction necessarily *equals* proper understanding of the other. In this paper we focus on situations in which understanding others serves the purpose of coordinating actions in simple tasks that require two people to collaborate. Such situations are usually described by philosophers in terms of shared intentions. We shall not concentrate on the nature of shared intentions (see Bratman, 1993, 2014; Gilbert, 1989, 2003; Searle, 1995; Tuomela, 1992, 2007). Rather, we shall focus on the kind of understanding of others that guides joint action coordination: who will do what in order to achieve the shared goal? In order to negotiate the roles played in the pursuit of a common goal, one needs to grasp the intentions in the actions of others so as to determine one’s own actions, either to complement or to influence the other’s actions. This is an extremely common form of social cognition. It is the day-to-day understanding of others involved in jointly tidying up a room, jointly fixing a bike, maneuvering a couch through the house together, or in cooking with a partner. In such activities, settling the ‘who does what’ question is usually driven by a non-verbal understanding of what the other is up to in conjunction with some grasp of how a single task can be executed jointly. The question we are concerned with in this paper is whether such understanding involves inferential ‘mindreading’ or whether it can be conceived of as a form of direct social perception. We shall argue that both options are theoretically feasible but make a case specifically for direct perception.

In his defence of DSP, Gallagher (2008) insists that social perception is *smart perception*, i.e. perception that is informed by previous experience, emotions and relevant situational context. Clearly, the combination of such different sources of information in perceiving people is a complex process, but Gallagher insists this is not mindreading. All that is required is perceiving the other person in a situation in which one is also engaged and having a vast store of experience of social interaction. Given these conditions, intentions and emotions of the other are directly perceived. While highly informative, such accounts of social perception have not been sufficiently fleshed out yet when it comes to the perceptual mechanisms involved in perceiving others in their world-context. Nor do they show how social perception figures in interacting with others in action coordination tasks. We will argue that the notion of affordances is helpful in filling this gap.

More specifically, we shall propose that successful coordination of actions in simple cases of joint agency need not be understood in terms of the ascription of mental states that must be inferred from perceived behavior. Instead, it can be understood in terms of perceiving the actions of one’s cooperation partner and/or her positioning in a shared environment as directly determining one’s own “field of affordances”—the array of action opportunities that one is responsive to. This can be understood as perceiving intentions *in* (rather than ‘behind’) the actions of others or *in* their being poised for action. But ‘perception’ is understood in enactivist terms here. Thus, perceiving intentions in the actions and postures of others *means* perceiving them as co-determining the perceiver’s own possible action-array so as to collaborate efficiently. This is a kind of social cognition in the sense that this involves seeing the other person as an intentional being (rather than a mere physical object). Yet it does not involve the ascription of mental states as hidden causes of action—all intentionality is ‘out in the open’. To further clarify our account we will augment it with a preliminary version of a computational model cast within the framework of Dynamic Field Theory (Erlhagen & Schöner, 2002; Spencer, Perone, & Johnson, 2009). We modify the DFT approach so as to (1) incorporate the notion of a field of affordances and (2) make room for embodied cognitive mechanisms spanning multiple agents. This is important since one of the weaknesses of many DSP proposals is that while criticizing an account of social cognition that can be modeled in meta-representational terms, no alternative style of modeling is proposed.

The paper is set up as follows. In Section 1 we briefly present the notion of simple action coordination and the widely accepted idea, well expressed by Michael Tomasello, that such coordination requires recursive mindreading. In order to facilitate our argument for a DSP account of action coordination we will distinguish two types of coordination in Section 2: distributive and contributive action coordination. Roughly, the former is the kind of coordination that involves roles that can be carried out relatively independently of each other, whereas the latter requires e.g. acting on the same object together as in the cases discussed by Tomasello. Distributive action coordination will figure as a stepping stone in our argument. In Section 3 we will claim that the phenomenon of distributive action coordination can be described in terms of one agent’s ‘field of affordances’ being determined by the other agent’s actions. In Section 4 we shall describe how DFT modeling can capture this type of coordination process, using an already implemented example from robotics. Up till then we will not have made a case for a DSP alternative for Tomasello’s recursive mindreading, which concerns contributive action coordination. In Section 5, however, we will argue that the action-coordination processes described in Section 4 can be scaled up to cover cases of contributive action coordination. Contributive action coordination, we shall argue, can be understood in terms of one agent’s field of affordances being determined by the perceived affordances for the other agent. We give reasons to be hopeful that future DFT modeling will be able to implement this type of process.

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