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Interactive coordination in joint attention¹

Shaun Gallagher

Moss Professor of Excellence in Philosophy

University of Memphis

Research Professor of Philosophy and Cognitive Science

Humanities Division

University of Hertfordshire

Joint attention is located at the intersection of a complex set of capacities that serve our cognitive, emotional and action-oriented relations with others. In one regard, it involves *social cognition*, our ability to understand others, what they intend, and what their actions mean. Here there is a two-way relationship between joint attention and social cognition. On the one hand, certain social cognitive abilities allow us to enter into joint-attentional situations with others; on the other hand, our engagements in joint-attentional situations with others allow us to better understand their intentions and their actions.

One way to think of this two-way relation is to see that, developmentally, joint attention is the bridge between primary intersubjectivity and secondary intersubjectivity (Trevarthan 1978, 1998; Trevarthan and Hubley 1979). Primary intersubjectivity consists in a set of sensory-motor abilities to understand the meaning of another person's movements, gestures, facial expressions, eye direction, and intentional actions, in the context of face-to-face interactions. These are the abilities that we first require in order to enter into joint-attentional situations. In those situations we are then able to further enhance our understanding of others, in secondary intersubjectivity, by seeing how they use things and how the shared world forms a context for their actions.

The concepts of primary and secondary intersubjectivity were first explicated in developmental studies. These are not, however, stages that we go through and that we eventually leave behind. Rather, the various capacities of primary and secondary intersubjectivity, including joint attention, continue to characterize our adult interactions. That is, as adults, we continue to rely on embodied capabilities that facilitate our primary-

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intersubjective understanding of others through our perception of their postures, facial expressions, actions, etc., and our secondary-intersubjective capacities to engage with them in highly contextualized situations (see Gallagher 2005; 2008a&b).²

Not independently of its involvement in social cognition, joint attention also involves our abilities to understand the world through our interactions with others. In this regard, joint attention forms the basis of *participatory sense-making* (De Jaegher and Di Paolo 2007; De Jaegher, Di Paolo and Gallagher, in press; Gallagher 2009), that is, our ability to co-constitute (with others) meaning in different contexts and environments. In joint attention, which developmentally begins to emerge around 9 months of age (Reddy 2008), the world is revealed to me as having certain saliences. For example, not only does the direction of another person's gaze indicate current interest in an object, their facial expression, which may reflect specific emotional content, will have an effect on the way I may come to feel about that object, and may lead to or discourage subsequent action directed towards that object (Bayliss et al. 2006; 2007; Becchio et al. 2008). This kind of phenomenon can be a complex part of joint attention.

The interactive nature of joint attention, with respect to both social cognition and participatory sense-making, depends on a certain kind of intersubjective coordination. In this paper I want to explore the nature of this coordination. I will suggest that rather than being a case of coordinating mental or psychological states, joint attention involves primarily a coordination of movement.

Does joint attention require the psychological coordination of attention?

In joint attention the child coordinates her attention to the object and the adult at the same time as the adult coordinates her attention to the same object and the child (Tomasello 1995, 107).

What is the nature of the coordination required for joint attention (JA)? In those theories where JA is regarded as a precursor to theory of mind (e.g., Baron-Cohen 1991; 1995), it is often described in psychological terms, where the concept of attention is regarded as a mental state. For Baron-Cohen JA involves a form of metarepresentation – an ability to represent or have a rudimentary understanding of the fact that my attention and the attention of

² The *interaction theory* of social cognition, in contrast to theory-of-mind approaches (theory theory or simulation theory) adds communicative and narrative competencies to these embodied abilities to explain the more nuanced and sophisticated practices that characterize our adult understandings. Cultural practices and social roles are also important aspects that support social cognition (see Gallagher and Hutto 2008; Ratcliffe 2007).

the other are directed outward at the same thing. JA ability allows us to mindread behavior “in terms of *volitional mental states* (desire and goal) and to read eye direction in terms of perceptual mental states (e.g., see),” to see that “different people can be experiencing these particular mental states about the same object or event” (Baron-Cohen 1995, p. 51).³ For Bruner, “joint attention involves knowing that another is looking at and experiencing something in the visual world” (1995, p. 7); as such it is a “meeting of minds.”

Tomasello (1995) indicates that “both participants are monitoring the other’s attention to the outside entity,” and that the coordination that takes place in joint attentional interactions is accomplished by a *recursive mindreading* (2008, pp. 189-190, 198), where participants have an understanding “that the other participant has a focus of attention to the same entity as the self” (1995, p. 105-107). Likewise, Baldwin considers that JA involves “the recognition that mental focus on some external thing is shared” (1995, p. 132). Terms like “knowing,” “understanding,” or “mental focus” signify an ideational cognitive process which leads to the following kind of description:

In their minds they make a comparison between their own perceived target and the perceived target of their partner’s focus of attention. We are not able to observe this cognitive process of understanding that takes place in the minds of, respectively, child and parent. In order to find episodes of joint attention we have to look for visible signs of the above-mentioned understanding in the behaviour of child and parent (Ingsholt 2002).

I’ve been citing psychologists so far.⁴ But philosophers often support the view that the coordination involved in JA is a coordination of mental states. Traditionally they explain this psychological coordination in terms of propositional attitudes, or being in certain propositional states, like belief or desire -- states where we mentally recognize something to be the case. With respect to joint attention, the object of such propositional states is the other person’s mental states. Naomi Eilan rehearses this “typical philosophical analysis” referring to an example suggested by Schiffer (1988). You and I are sitting at a table with a candle between us. “A typical philosophical analysis of what must be true of me, say, if this is a case of mutual knowledge will ascribe to me at the very least the belief that you see the candle, the belief that you believe that I see the candle, the belief that you believe that I believe that you see the candle” (Eilan 2005, p. 2). This, Eilan rightly suggests, leads

³ Baron-Cohen views goals and desires as primitive mental states, minimally required to make sense out of animal behavior. He suggests: “If you see an animal moving, be it an amoeba, a mouse, or a British prime minister, all you need to refer to in order to begin to interpret its movement are these two basic mental states” (1995, p. 32).

⁴ See Doherty (2006) for discussion of whether eye gaze is understood mentalistically by children.

to questions about the infinite iterations of beliefs, which she also rightly rejects.

If, as is generally agreed, children of 9-months do not yet have a concept of belief, this is surely the wrong picture. But that does not rule out the idea that they may have an understanding of attention or intention, and that understanding may be a first or precursor aspect of the fuller grasp of a theory of mind. Accordingly, one could still think of attentional states in terms of propositional attitudes. John Campbell summarizes the possibilities:

There are various ways in which propositional states could be involved in coordination. Propositional states might enter into the control of attention itself and they might enter into my recognition of how my attention, or your attention, is being controlled. First, it might be that I know what you are attending to, and that this knowledge is a factor in sustaining my attention on the thing. Secondly, I might intend to attend to whatever you are attending to. And thirdly, it might be that I know that the reason I am attending to the thing is, in part, that you are attending to it. And finally, it might be that I know that the reason you are attending to the thing is, in part, that I am attending to it. (Campbell 2005, 245).

Such accounts suggest that joint attention seemingly involves social cognition of the sort that is called mindreading. I not only have to know that you are attending, but I have to know that you are capable of having such a mental state as attending to something. These theory-of-mind versions of joint attention include “theory theory” (TT) and some simulation theory (ST) accounts.

For TT, I must have a concept of attention, and an explicit or tacit knowledge of a theory that would allow me to understand that you are attending to X. ST requires me to simulate possession of your mental state as you attend to X. For both TT and ST, as Campbell indicates, the process “is ‘off-line’ in that its upshot is not permanent and it is decoupled from action” (2005, 242). Decoupled from action because TT and ST have traditionally been cast in third-person observational mode rather than second-person interaction.⁵ Just this by itself should tell us that TT and ST are going to have

⁵ Pace Peter Carruthers, who denies this is the case (2009, 167), but who nonetheless characterizes mindreading in precisely these third-person terms, that is, as something done by “a third-party observer” (2009, 134). For him, the task of mindreading is “to provide fine-grained intentionalistic predictions and explanations” based on “inferences from observation” (1996). And he indicates that “we surely use our mind-reading system, for example, when processing a *description* of someone’s state of mind as well as when observing their behavior” (Carruthers 2002). This third-person observational stance is consistently implied throughout most of the literature on TT, and in most discussions of false-belief tasks, which are set up as third-person observational tasks.

a difficult time explaining joint attention, which is clearly 'on-line' and interactional. As Johannes Roessler (2005, 236) points out, this is already problematic for TT and ST – that is, for any account of social cognition that depends on some kind of additional step of interpretation beyond what is available perceptually and in the interactive context. “The problem is that while there is compelling intuition to the effect that 1-year-olds have some grasp of others’ attention, there is also prima facie grounds for doubting that they have the conceptual abilities for interpretation (such as the ability to give causal explanations)” (236).

Campbell, however, provides examples where this kind of coordination of attention does not involve propositional attitudes, is not psychological in that sense, and is very low level – a herd of cows “engaging in social referencing” as they move towards an object; a football team non-conceptually monitoring one another’s attention.

I want to favor the cows and the football players rather than the theory theorists or simulation theorists who set the task as psychological coordination and knowing the mind of the other, and who appeal to propositional attitudes or mental representations to do this. In taking an enactive or interactionist approach, I want to say that joint attention decoupled from action is the rare case (perhaps the case in which my connection or coordination with the other person breaks down).

Cows

In John Campbell’s example I find myself in a pasture looking at some cattle who, when they see me, start to move in my direction. As the individual cow moves it seems to be checking that its fellow cows are coming along. I’m not sure what to say about the cows themselves, or what it might mean for cows to engage in social referencing among themselves (if that’s what’s happening), but without trying to get into the minds of a herd of cows, without taking the intentional stance or trying to work out some set of propositional attitudes that I attribute to them, my understanding of their joint attention on a particular object (and, since I know they see me and are heading my way, my own coordinated joint attention on the same object) when that object happens to be me, translates immediately into movement on my part. If I enter into musings about whether they intend to change direction before they reach me, that kind of intention is something I’m trying to perceive in their movements – or in the movement of the herd as a whole – and in the shape of the field and the various possibilities they have for changing course – and not something that I am trying to discern in their mental states. I can see that they have me as a target, and I can see that there is nothing else in this pasture that would capture their attention. My coordinated attention to what and where they are attending, and a concern for my own safety, is setting my feet in motion.

In many cases, attention that I share with other humans is nothing more than something like this. If John and I happen to be in the pasture looking at a stampede coming towards us, if we catch each other’s eye, as

they say, if John grabs my arm and yells and we start to run, is there anything more to joint attention that we have to explain? I'm assuming that we have here, following Peacocke's (2005, 302) terminology, a "mutual open-ended perceptual availability" of which we are mutually aware. We know that we see the herd coming toward us, and we know that we know – and I take the status of such knowledge to be of a very practical kind that is based on occurrent perception. Do I need to have a theory that explains why someone grabs another person's arm? Do I need to simulate John's situation or what he might be thinking? Rather, I suggest, everything I need for mutual interaction, and for understanding John's intentions, is already there in the eye direction and its timing, in the arm grabbing, in the intonation of the yell, and I don't have to go any further to try to discover a set of beliefs or desires that John might have. Of course it might be interesting to learn that John believes that these cows are actually bulls (something I might learn later in conversation); but it would serve no useful purpose in the moment when we decide to move out of the way.

Infants

Somewhere between the idea that cows themselves might be engaged in a form of joint attention (which Campbell suggests) and the idea that John and I might engage in joint attention as we make a run for it, there are accounts of how infants between 9 months and 1 year of age develop joint attention capability as they move from primary intersubjectivity into secondary intersubjectivity. Here Roessler's doubt about the infants' cognitive abilities, cited above, seems a serious challenge to TT and ST accounts.

Even acknowledging this, theory theorists and simulation theorists may still persist: if it is not theory or simulation that provides access to others' minds, then what? What is the nature of the perceptual and contextual factors that seemingly give us direct access to the other person's mental state of attention. First, I think this is just the wrong way to frame the problem – because once we admit that what is required is to discern mental states that are not accessible and must be inferred, then joint attention in young infants is problematic in the way Roessler explains, and anything so simple as perception and context seem insufficient to the job. If, however, we think of the task not as accessing interior propositional attitudes, but as seeing intentions and dispositions in the embodied behaviors, and movements, and facial expressions, and gestures, and actions of others (without denying an interior dimension of experience associated with these externalities), then we have not rigged the problem in such a way that only theory or simulation could solve it.

To get a better sense of what perception and context can do for us in this respect, and to get a good sense of what one might mean by claiming that some kind of "understanding" is involved⁶ (at least some theorists use this term in the case of infants, if not in the case of cows), let's look at the

⁶ Roessler worries about this (pp. 237ff) as does Hutto (2009).

footballers. We need to keep in mind too that the primary intersubjective capabilities that we have at year one for gaining pragmatic understandings, and the capacity for joint attention that we develop around that time, do not disappear and are not replaced by later developing theories or simulation abilities. Both behavioral and phenomenological evidence suggest that primary- and secondary-intersubjective capabilities are not simply precursors – they continue to be resource capacities that we use in our everyday interactions (see, e.g., Hobson and Lee 1999; Dittrich & Lea 1996). Close analysis of facial expression, gesture and action in everyday contexts, for example, shows that adults continue to rely on embodied interactive abilities to understand the intentions and actions of others and to accomplish interactive tasks (Lindblom 2007).

The footballers

Campbell calls our attention to the kind of attention that is in play in a game of football. As he puts it: “a team playing football are continuously monitoring one another’s attention. But this does not require them to be engaged in conceptual thought, or to have even iterated knowledge of the direction of each other’s attention” (2005, 245). We can put this more positively by extending what Merleau-Ponty had already said about this.

For the player in action the football field is not an "object," that is, the ideal term which can give rise to an indefinite multiplicity of perspectival views and remain equivalent under its apparent transformations. It is pervaded with lines of force (the "yard line"; those lines that demarcate the "penalty area") and is articulated in sectors (for example, the "openings" between the adversaries) which call for a certain mode of action and which initiate and guide the action as if the player were unaware of it. The field is not given to him, but present as the immanent term of his practical intentions; the player becomes one with it and feels the direction of the "goal," for example, just as immediately as the vertical and the horizontal planes of his own body (Merleau-Ponty 1983, p. 168-69).

What we have here is a description of how the player’s intentions and actions are shaped by the physical environment and by the nature of the game that he is playing. Controlling the ball on this field, and strategizing on how to get to the goal are not things accomplished solely in the player’s head, but necessarily are processes that are laid out across this field from the perspective of the player as he is positioned and as he moves across the grid. My control of the ball is accomplished in the movement that is elicited by the particular context of here-and-now-on this-field-as-I-am-running-and-kicking and as these lines on the field are looming and receding in response to my own movement. This is a very ecological account (Gibson would have been on Merleau-Ponty’s team in this regard). All of the affordances are laid

out in the points that connect my embodied movement to the precisely defined field in the context of the game.

As Merleau-Ponty acknowledges, this field is not empty of others. And many of these others are clearly in relations of joint attention with the player who controls the ball. Everyone is attending to the ball (among other things), and the player knows that everyone is attending; and everyone knows that he is attending, and so forth. More than this, everyone's intentions are quite transparent and are specified by the context and rules of the game. No need for theory of mind here; I don't have to infer anything about your propositional attitudes if you wear a different colored jersey. I don't have to put myself in your place and work up some pretend beliefs in order to know your intentions. Your specific intentions are quite apparent in the way you are moving towards me or positioning yourself between me and the goal. My intentions-in-action (how I am going to carry out my intention of scoring a goal) are decided not just by rules of the game, not just by my decisive tactics, but just as much by you and my team mates as by the lines on the field. As Hobson (in press) suggests in the developmental context, others are affordances or in some cases disaffordances, as much as the field is. As Merleau-Ponty suggests, my consciousness of all of this may only catch up to my actions as I find myself moving this way and that.

Joint attention, in this case, is perception and context and movement all the way down. Moreover, my football-field understanding of particular others is pragmatic in the sense of a knowing-how, rather than knowing-what. It's geared to action and interaction with them. Theory-theorists might argue that all of this presupposes a theory of football that includes a theory of how to expect footballers to act. It's not clear to me that this theory is what enters into the pragmatic understanding which helps to constitute the meaning of the others' behavior. One learns football by practice and by playing; and one comes to understand the precise actions of others on the field in terms of that practice, rather than in terms of some general theory. And as I kick the ball down the field, and try to circumnavigate the adversary player, I don't do so by theorizing about his mental states.⁷

My pragmatic understanding is not an ideational or intellectual achievement. There is a use of the term *understanding* in Heidegger (1962) that gets closer to the sense of it here. That is, just as the field is not an object – something *Vorhanden* – that I have to cogitate about – so the other player is not first someone that I observe as such from a third-person stance in which I measure him up as an adversary. Rather the other is someone I am already interacting with such that he is facilitating or blocking my goal. I relate to the ball and the field as *Zuhanden* – a set of ready-to-hand (or in this case, “ready-to-foot”) affordances. Others fall into place around these kinds of pragmatic involvements.

⁷ In this regard, the play of football is not at all like that portrayed in Monty-Python's philosophical football game (see <http://www.youtube.com/watch?v=ur5fGSBsfq8>) although theory theorists at the extreme might picture it this way.

Concluding in the pub

One might object, however, that practices on the football field are rather limited in terms of what we need to understand for intersubjective interaction. One's intentions are, we might say, worn on one's jersey sleeve; movements have well-defined goals even if they are sometimes fabulously complex. There's not much of a challenge here when it comes to working out patterns of joint attention, or to understanding social cognition. But I think this applies to many human situations, circumscribed by time, place, and custom.

We know, for example, that things change dramatically when after the game we go out to have a few pints. This includes our immediate relations to others. Yet, we continue to engage them in joint attentional ways that remain pragmatic or specifically social. The game changes; the rules change; but the basic capacities of primary and secondary intersubjectivity, including joint attention, continue to give us access to the other person's meaning. Even in the noisy pub where I can have great difficulty hearing what my teammate has to say, I can still follow his narrative and participate in the conversation with great assistance from gestures, facial expressions, postural adjustments, vocal intonations, and so on. Even in our very brief, but highly significant encounters with the bartender, she never seems to have a problem comprehending our intentions, desires, and appreciations even if they are expressed by gestures alone.

In the pub, as in football, as in life more generally, there are, on the one side, the external scaffolds – the physical place or architecture, the game, the rules, or just the customs, and on the other side there are my embodied and cognitive abilities – abilities that start out and continue as sensory-motor, perceptual and action-oriented, and are made more subtle and sophisticated via communicative and narrative practices.

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