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Participatory sense-making

An enactive approach to social cognition

Hanne De Jaegher · Ezequiel Di Paolo

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Abstract As yet, there is no enactive account of social cognition. This paper extends the enactive concept of *sense-making* into the social domain. It takes as its departure point the process of interaction between individuals in a social encounter. It is a well-established finding that individuals can and generally do coordinate their movements and utterances in such situations. We argue that the interaction process can take on a form of autonomy. This allows us to reframe the problem of social cognition as that of how meaning is generated and transformed in the interplay between the unfolding interaction process and the individuals engaged in it. The notion of sense-making in this realm becomes *participatory sense-making*. The onus of social understanding thus moves away from strictly the individual only.

Keywords Social cognition · Enaction · Sense-making · Interaction process · Coordination · Participatory sense-making · Autonomy

Introduction

Enaction is a promising and growing paradigm in cognitive science. However, there is no well-rounded proposal for an enactive account of social cognition yet. This may seem strange since enactivism, with its focused examination of the coupling between agent and world and on experience as a full aspect of cognition and of cognition research, seems to be a particularly promising arena for addressing unresolved problems in the study of social cognition. Our aim in this paper is to sketch an enactive account of social understanding that takes the properties of the interaction process as its point of departure. In doing so, we hope to re-instill the notion of 'interaction' – fashionable yet faded by casual usage – with a workable meaning.

H. De Jaegher (✉) · E. Di Paolo
Centre for Computational Neuroscience and Robotics, Centre for Research in Cognitive Science, University of Sussex, Brighton, UK
e-mail: H.De.Jaegher@sussex.ac.uk

Traditional approaches such as Theory of Mind theory and simulation theory have had to endure anti-cognitivist arguments like the problems of homuncularity, the absence of the body, and the threatening infinite regress of perspectives that are rule-based at the pragmatic level and therefore can never account for meaning-generating processes. Apart from that, there is a recognition that explanation and prediction may not be at the centre of our everyday social practice. Over-emphasis on the latter skills has led most of contemporary social cognitive science to paint a picture of individuals who have to work out each other's minds much like they do with scientific problems. In this view, what counts as 'social' differs from non-social problem-solving merely as a matter of degree. These worries have led to a call for embodied alternatives, which have been duly proposed. However, even though their proponents recognise the need for a perspective change that does proper justice to the situatedness and embodiment of the social subject, they often remain themselves methodologically individualistic. That the importance of the interaction process is recognised in these circles is without doubt (Gallagher 2001; 2004; Hutto 2004; 2007; Ratcliffe 2007; Thompson 2001). What we now need, however, is to move beyond recognition and work out what the interaction process does for social cognition.

When we talk about social interaction in this paper, we refer to the face-to-face encounters of everyday life. These encounters range from brief and superficial to deep and extensive. At the affective level, they reach from leaving their participants cold to changing their life forever. They take place in many different situations, which can have more or less of an impact on what can and does get conveyed between the interaction partners. We are concerned here with what, in social science, is called the micro-level (not the macro-level of how societies form, live or change). At this level, we focus on the common patterns found in the widest possible range of social interactions, i.e. not restricted to linguistic or even human ones. Furthermore, for reasons of simplification, we take as a model the dyadic interaction. We are aware that interactions between more than two participants may present their own characteristics, but we expect that many of the properties examined in this paper will extend into those cases as well. With these caveats in mind we hope to lay a foundation from which more specific future analyses can follow.

This intuitive scope has to be clarified by a proper definition of social interaction, which we provide later in the paper. First, we introduce the enactive notion of *sense-making*. Then we extend it into the social domain, passing through an analysis of the interaction process in dynamical terms, and propose *participatory sense-making* as a starting point for a richer account of social understanding. Finally, we outline some implications emanating from this proposal.

Sense-making

There exist wider and narrower conceptions of 'enaction'. Today we find a variety of applications of this term, often sharing a family resemblance. In this paper, we restrict its use to a well-defined set of ideas that together constitute a new approach to cognitive science. These ideas have been articulated in the writings of Francisco Varela and colleagues (Thompson 2007; Torrance 2005; Varela et al. 1991) and link several themes centred around the role of life, self-organization, experience and the

animate body in shaping cognition as an ongoing and situated activity. When referring to the enactive approach in this paper we will be referring specifically to these central concepts.

Rather than being a set of all radically novel ideas, the enactive approach is better construed as a synthesis of some new but also some old themes. Overall, the enactive perspective is a kind of non-reductive naturalism. It sees the properties of living and cognitive systems as part of a continuum and consequently advocates a scientific program that explores several phases along this dimension. We identify five core ideas that define the enactive paradigm. These are the mutually supporting concepts of *autonomy*, *sense-making*, *embodiment*, *emergence*, and *experience* (Di Paolo, Rohde and De Jaegher 2007; Thompson 2005, 2007; Varela et al. 1991). We will not attempt anything beyond the briefest of descriptions of these important concepts here.

The enactive approach takes as its point of departure the organizational properties of living organisms that make them paradigmatic cases of cognisers. One such crucial property is the constitutive and interactive *autonomy* that living systems enjoy by virtue of their self-generated identity as distinct entities in constant material flux. An autonomous system is defined as a system composed of several processes that actively generate and sustain an identity under precarious conditions. To generate an identity in this context is to possess the property of *operational closure*. This is the property that among the enabling conditions for any constituent process in the system one will always find one or more other processes in the system (i.e., there are no processes that are not conditioned by other processes in the network – which does not mean, of course, that conditions external to the system cannot be necessary as well for such processes to exist). By *precarious* we mean the fact that in the absence of the organization of the system as a network of processes, under otherwise equal physical conditions, isolated component processes would tend to run down or extinguish. Similar constitutive and interactive properties have been proposed to emerge at different levels of identity-generation, including sensorimotor and neuro-dynamical forms of autonomy (Di Paolo, Rohde and De Jaegher 2007; Moreno and Etxeberria 2005; Thompson 2007; Varela 1979, 1997).

Such a view of cognitive systems as autonomous rejects the traditional poles of seeing cognisers as responding to environmental stimuli on the one hand, and as satisfying internal demands on the other – both of which fail to give the autonomous agent its proper ontological status and subordinate it to a passive role of obedience. A key principle of the enactive approach is that the organism is a centre of activity in the world. The relation of *emergence* between novel forms of identity (e.g., integrated sensorimotor engagements as emerging from neural, bodily and environmental dynamics) is one whereby the coupling between the emergent process and its context leads to constraints and modulation of the operation of the underlying levels (Di Paolo, Rohde and De Jaegher 2007; Thompson 2007; Thompson and Varela 2001). Taking emergence seriously makes the enactive approach very skeptical about the localisation of function at one level in specific components at a lower level (homuncularity) and consequently it leads to the rejection of 'boxology' as a valid method to address the 'how does it work' question.

For the enactive approach, cognition is *embodied* action. In a concrete and practical sense, a cognitive system is embodied to the extent to which its activity depends non-trivially on the body. This is close to expressing a tautology: cognition

cannot but be embodied. But pointing to this has been (and still is) necessary in the computational/representational climate that gave rise to the embodied turn in cognitive science. Far from being a controlled puppet, the animate body is the autonomous locus and means for significant activity. But in order for this message not to dilute, it is important to do much more than just say that cognition is embodied (Sheets-Johnstone 1999). The debate must be moved to the concrete realm of seeing exactly how the animate body in its world is a mind. Abstract discussions of embodiment tend to be rather impoverished and defenders of the role of the body in cognition have often easily fallen back into disembodied patterns of thought (see discussion in Di Paolo, Rohde and De Jaegher (2007)). The same indictment applies to taking *experience* seriously (see also the discussion of 'corporeal impersonalism' by Colombetti 2007). For enaction, experience is central both methodologically and thematically. Far from being an epiphenomenon or a puzzle – as it is for cognitivism – experience in the enactive approach is intertwined with being alive and enacting a meaningful world. As part of the enactive method, experience goes beyond being data to be explained. It becomes a guiding force in a dialogue between phenomenology and science, resulting in an ongoing pragmatic circulation and mutual illumination between the two (Gallagher 1997; van Gelder 1999; Varela 1996, 1999).

All these ideas (which we have hardly done justice to) will play a role in a fully-fledged enactive theory of social cognition. But the central notion that best facilitates our initial steps is that of *sense-making.*

Already implied in the notion of interactive autonomy is the realisation that organisms cast a web of significance on their world. An organism that regulates its coupling with the environment does so because there is a direction that this process is aiming at: that of the continuity of the self-generated identity or identities that initiate the regulation. This establishes a *perspective* on the world with its own normativity, which is the counterpart of the agent being a centre of *activity* in the world (Di Paolo, Rohde and De Jaegher 2007; Di Paolo 2005; Thompson 2007; Varela 1997; Weber and Varela 2002). Exchanges with the world are inherently significant for the cogniser and this is a definitional property of a cognitive system: the creation and appreciation of meaning or *sense-making* in short. The distinction between a strictly physical encounter and a cognitive one is to be found in the dimension of significance for the cogniser itself that is characteristic only of the latter class, even though cognitive interactions are themselves also physical processes. Like few ideas in the past, the concept of sense-making strikes at the heart of what is to be cognitive.

Reaffirming the implications of autonomy, sense-making is an inherently active concept. Organisms do not passively receive information from their environments, which they then translate into internal representations whose significant value is to be added later. Natural cognitive systems are simply not in the business of accessing their world in order to build accurate pictures of it. They actively participate in the generation of meaning in what matters to them; they enact a world. Sense-making is a relational and affect-laden process grounded in biological organization. The idea that metabolism creates a perspective of *value* on the world has been defended by Jonas (1966) and recently elaborated scientifically in terms of the theory of autopoiesis (Di Paolo 2005; Thompson 2007; Varela 1991, 1997; Weber and Varela 2002). Hence it does not promote a fissure between affect and cognition.

Traditional distinctions between action and perception arise only as the specialisation of phases in an act of sense-making. Several examples that illustrate this point have been discussed in the enaction literature, but perhaps the simplest and clearest one is that of perceiving the softness of a sponge (Myin 2003). The softness of a sponge is not to be found 'in it' but in how it responds to the active probing and squeezing of our appropriate bodily movements (e.g., with the fingers or the palms of the hand). It is the outcome of a particular kind of encounter between a 'questioning' agent with a particular body (sponges are solid ground for ants) and a 'responding' segment of the world. The confluence of lawful co-variations in this dialogue stabilises the cogniser's sense-making into an *object*. Movements are at the centre of mental activity: a sense-making agent's movements – which include utterances – are the tools of her cognition.

Based on these core ideas, can we speculate on what might be the central concerns of an enactive theory of social cognition? Such a theory would be concerned with defining the social in terms of the embodiment of interaction, in terms of shifting and emerging levels of autonomous identity, and in terms of joint sense-making and its experience. This is in contrast to defining the problematic of the social as the expansion of a very narrow perspective that focuses on a problem that might be caricaturised as that of figuring out someone else's intentions out of our individual observations of them; a sort of *Rear Window* approach to the social. As we will see below, even embodied criticisms of cognitivist theories tend to subscribe to some version of this approach as the framework for asking questions about social cognition. This removed cognitive problem belongs indeed to a theory of social understanding, but it has unfairly defined the flavour of most of the field at the expense of downplaying the role of more engaged forms of interaction. One of the main objectives of this paper is to shift the focus towards a view that is not exclusively defined by individual cognitive mechanisms.

Participatory sense-making

Although several researchers have already started to regard problems in social cognition from embodied perspectives (Gallagher 2001, 2005, 2007; Hutto 2004; Klin et al. 2003; Thompson 2001), one motivation for our proposal is the observation that they have not yet gone far enough in taking the interaction process as central. For example, Gallagher's 'embodied practice of mind' (whereby our embodiment allows for a direct perception of the expressiveness of the other's body, Gallagher 2005) does not yet integrate a rich account of the interaction process and its role in social understanding, even though it certainly recognises its importance (Gallagher 2004). Once the point is made that the interaction is crucial, the next thing we need to do is to clarify why and how this is so.

An account of our social capacities based solely on expressiveness can explain why babies become distressed when their previously very engaging mother suddenly sits very still and puts on an immobile, neutral face (Tronick et al. 1979). But it cannot explain why, when mother and baby interact via a double TV monitor, it seriously upsets the baby when the live footage of his mother is suddenly replaced with a recording of her behaviour earlier in the same interaction (Murray and

Trevarthen 1985). Here, we can be certain that it is not expressiveness that is lacking, but the ongoing engagement that has been unhinged. If this (the lack of contingency) disturbs the baby as much as the suddenly expressionless mother, something crucial must also be going on in the interaction *process* itself. Experientially this is not surprising – interactions often have an affective dimension in the sense that we can feel varying degrees of connectedness with the other.

Dynamics of coordination

In order to put the process of interaction at the centre of our investigation, we borrow some concepts from dynamical systems theory. In particular, we spend some time describing the phenomenon of coordination between coupled systems. This allows us to view interactions as processes extended in time with a rich structure that is only apparent at the relational level of collective dynamics. Once we understand how coordination arises, is sustained, changes, and breaks down during social encounters, we will be in a position to make a connection between these temporal aspects of interaction and their consequences for joint and individual sense-making.

For our purposes, we take *coordination* to mean the non-accidental correlation between the behaviours of two or more systems that are in sustained coupling, or have been coupled in the past, or have been coupled to another, common, system. A *correlation* is a coherence in the behaviour of two or more systems over and above what is expected, given what those systems are capable of doing. For instance, when we observe a crowd of people walking on a busy road, the fact that they walk is not surprising, and we do not label this a case of coordination since walking is one of the things people do on a road (as opposed to, say, flying). But if we find that they are all walking in the same direction this could be a correlation, and if we suspect that this is not by accident, we can hypothesise the presence of a coordinating factor (for instance, an anti-war demonstration).

Coordination is a ubiquitous phenomenon in physical and biological systems. Pendulum clocks, for instance, synchronise their oscillations when in each other's vicinity through the minute vibrations they provoke on the wall (Winfree 2001). Several physical systems exhibit similar behaviour even when their coupling (the amount of influence that a system's variables have on another's parametrical conditions) is weak. In biology, we also find many paradigmatic cases of coordination. For instance, Buck and Buck (1976) describe a species of firefly that lives in Southeast Asia, in which the individual flashing behaviour is synchronised at the group level through the visual influence of the collective flashing pattern on the individuals. These examples are merely indicators of the myriad of systems that coordinate when coupled collectively that have been heavily studied in physics, mathematical biology and dynamical approaches to cognition (e.g. Kelso 1995; Kuramoto 1984; Port and van Gelder 1995; Winfree 2001).

One common finding in almost all these studies is that coordination is typically easily achieved by simple mechanical means and, when cognitive systems are involved, it does not generally require any cognitively sophisticated skill. On the contrary, it is often hard to avoid. For instance, when asking pairs of subjects to avoid synchronous oscillations while swinging a pendulum with their arms, Schmidt and O'Brien (1997) found that their oscillations were independent (uncoordinated)

when not looking at each other, but presented strong tendency to phase-lock when they were allowed to look at each other. When coordination is observed we need not postulate dedicated individual mechanisms that sustain it, but rather, in general, it is a phenomenon to be expected under a variety of conditions if the systems possess broadly similar properties. A commonly encountered characteristic is that coordination happens at multiple timescales (Winfree 2001). It is also important to note that synchronization is not the only kind of coordination; many cases of appropriately patterned behaviour, such as mirroring, anticipation, imitation, etcetera are general forms of coordination according to our definition.

An important feature of coordination, particularly with regard to fluid social interactions, is that it does not have to be absolute or permanent. There are degrees of coordination and coupled systems may undergo changes in the level of coordination over time. Kelso (1995) uses the notions of *absolute* versus *relative* coordination to illustrate this point. He gives the following example. Imagine a child and an adult taking a walk together. Due to their different body sizes, they would naturally tend to walk at a different pace, but we often find that they remain together overall. In order for this to happen, one or the other has to adjust either the frequency of their step or the length of their stride. To keep up with each other, the adult may now and then slow down a bit, and the child may skip a step or two. This kind of coordination is "far more variable, plastic and fluid... than pure phase locking" (Kelso 1995, p. 98). Pure phase locking is a form of absolute coordination, where the synchrony is perfect: two series of events are perfectly entrained (e.g. pairs of duetting tropical birds that sing in perfect antiphonal coordination, see for instance Thorpe 1972). In absolute coordination, transitions in the coupling of the systems take place from one stable, perfectly locking state to another, or to non-coordination. Relative coordination, in contrast, has a much wider range of possibilities, as there are no such transitions from one strictly coherent state to another. Systems in relative coordination do not entrain perfectly. Instead they show phase attraction, which means that they tend to go near perfect synchrony, and move into and out of the zone that surrounds it. This is a common phenomenon in biology (Cook 1991; Haken and Köpchen 1991). Coordination can be like a swaying into and out of states that are close to stable, but not quite. Eventually, it may break down altogether.

The autonomy of social interaction

While coordination is common to various kinds of coupled systems, it is of particular interest when trying to understand social encounters. This concept allows us to claim that social interaction constitutes a proper level of analysis in itself.

Several researchers in social science have recognised the importance of different forms of coordination for understanding social interaction. There is indeed a tradition within social science championed by figures such as Erving Goffman, Harvey Sacks and others that starts from an understanding of interactive encounters (see e.g. Goffman 1972, 1983; Sacks 1992; Sacks et al. 1974). A whole field of study is dedicated to uncovering behavioural coordination in interaction going under different labels such as interaction studies, conversation analysis, gesture analysis (see Schiffrin 1994). Within this field there is a debate about how to delineate behaviour into the units to study, with sometimes rather arbitrary choices influencing

the results (for instance, Jaffe and Feldstein 1970). It is also the case, in general, that such studies do not amalgamate into a theoretical framework that has much concern for the individual cogniser as such.

In order to bridge what we perceive as a gap between the social science and cognitive science perspectives, we need to articulate how the individual and social levels interrelate. The concept of coordination helps us to understand the social interaction as an ongoing process. We must go beyond a view that defines interaction as simply the spatio-temporal coincidence of two agents that influence each other. We must move towards an understanding of how their history of coordination demarcates the interaction as an identifiable pattern with its own internal structure, and its own role to play in the process of understanding each other and the world.

Something that is not so common in cases of purely physical coupling, but that we find in the social domain, is that patterns of coordination can directly influence the continuing disposition of the individuals involved to sustain or modify their encounter. In this way, what arises in the process of coordination (e.g. gestures, utterances and changes in intonation that are sometimes labelled as back-channeling or turn-repair, etc.) can have the consequence of steering the encounter or facilitating (or not) its continuation. And the particular unravelling of these dynamics itself influences what kinds of coordination are more likely to happen. This is due to the fact that the interactors are highly plastic systems that are susceptible to being affected by the history of coordination. When this double influence is in place (from the coordination onto the unfolding of the encounter and from the dynamics of the encounter onto the likelihood to coordinate) we say we are in the presence of a *social interaction*. This emerging level is sustained and identifiable as long as the processes described (or some external factor) do not terminate it.

In accordance with the core ideas of enaction, the above description is nothing less than that of an emergent and autonomous process (Di Paolo, Rohde and De Jaegher 2007; Thompson 2007; Thompson and Varela 2001; Varela 1979). It is, however, typically a fleeting one. Even though normal social encounters, for instance conversations, may only last a few minutes, our point is that during that period they may organize themselves according to the two avenues of influence just described: the agents sustain the encounter, and the encounter itself influences the agents and invests them with the role of *interactors*. The interaction process emerges as an entity when social encounters acquire this operationally closed organization. It constitutes a level of analysis not reducible, in general, to individual behaviours. This perspective bypasses the circularity that arises from pre-conceiving individuals as ready-made interactors. Individuals co-emerge as interactors with the interaction. This brings us to the further requirement for calling an interaction properly *social*. Not only must the process itself enjoy a temporary form of autonomy, but the autonomy of the individuals as interactors must also not be broken (even though the interaction may enhance or diminish the scope of individual autonomy). If this were not so, if the autonomy of one of the interactors were destroyed, the process would reduce to the cognitive engagement of the remaining agent with his non-social world. The 'other' would simply become a tool, an object, or a problem for his individual cognition (such a situation would epitomise what we have diagnosed traditional perspectives on social cognition as suffering from: namely, the lack of a properly social level).

We propose the following definition of social interaction:

> Social interaction is the regulated coupling between at least two autonomous agents, where the regulation is aimed at aspects of the coupling itself so that it constitutes an emergent autonomous organization in the domain of relational dynamics, without destroying in the process the autonomy of the agents involved (though the latter's scope can be augmented or reduced).

The transfer of body heat, for instance when waiting for the bus at a crowded stop, is not a social interaction. In this case, there is coupling between the agents, but the coupling is not actively regulated by the agents involved so as to affect this coupling itself. Bumping into each other on a busy street is not a social interaction in the first instance, but it can become one once one or both of the parties start to regulate the ensuing coupling. A conversation about a sponge is a social interaction, because the participants decide upon the topic together, regulate beginning, course and ending of the dialogue, and their autonomy (neither as living beings, nor as conversation partners) is not destroyed in the process.

Thus, social interaction has two characteristics: (1) there is a coupling, which is regulated so as to generate and maintain an identity in the relational domain. Thus, the resulting relational dynamics are autonomous in the strict sense of precarious operational closure given in this paper and define events and processes as either internal or external to the interaction. And (2) the individuals involved are and remain autonomous as interactors. In order to illustrate the autonomy of the interaction, it is easy to think of interactions in which the participants have an interest in sustaining it (e.g., an interesting conversation, an enjoyable dance). But these would not exemplify the point well enough. It is much better to think of a situation where the individual interactors are attempting to *stop* interacting but where the interaction self-sustains in spite of this.

Consider the situation in a narrow corridor when two people walking in opposite directions have to get past each other. They have to decide whether to continue walking as they are, or shift their movement to the right or to the left. Occasionally, such encounters unfold like this. Instead of choosing complementary movements that would allow them to carry on walking, the individuals move into mirroring positions at the same time. This unintended coordinated change in individual position creates a symmetrical mirroring relation. This symmetry, in combination with the spatial constraints of the corridor, increases the likelihood that the next move will also be a mirroring one (there are not many other moves available). Thus, the coordination maintains a property of the relational dynamics that forces the individuals to keep facing each other and consequently to remain in interaction (in spite of, or rather because of, their efforts to break from this situation). In addition, the interaction promotes individual actions that tend to maintain the symmetrical coordination. Coordinated sideways movements conserve symmetry and symmetry promotes coordinated sideways movements.

We may describe this relation as the mutual influence between coordination patterns and the interaction process (Fig. 1). Here, the coordinated lateral shifts in position are functional for the continuation of the interaction (not for the interactors' intentions!) and so we call them functional coordination. And the relational symmetry present in the interaction promotes certain patterns of coordination (interactional coordination). Only when the symmetry is broken through some

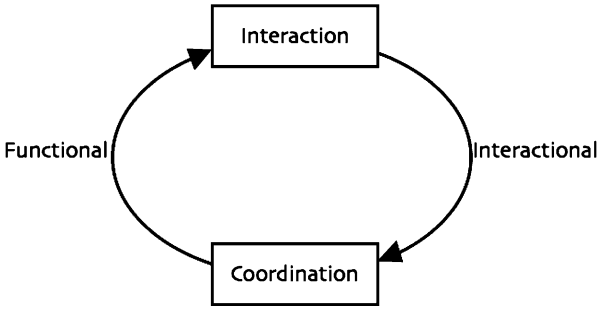

Fig. 1 Interaction influences coordination (interactional coordination), and coordination influences interaction or has a function for the interaction (functional coordination)

channel different from lateral position shifting (e.g., when one person invites the other to move first) does the interaction finally break down. While it lasts, the interaction shows the organization described above in terms of the mutual influence between the individual actions and the relational dynamics. Here, we see that interaction is not reducible to individual actions or intentions but installs a relational domain with its own properties that constrains and modulates individual behaviour.

As we said above, there is a tendency in current approaches to social cognition to acknowledge the importance of the interaction (see e.g. Gallagher 2001; Hutto 2004; Pickering and Garrod 2004), but as long as there is no explicit and focused attention to this relational domain as illustrated in the example above, this emphasis on interaction remains vacuous. In many of these approaches, the interaction seems merely an addendum to a position that departs from what is really still an individualistic perspective. In our opinion, any approach that mentions interaction, but fails to go into the relational dynamics of the interaction process in detail, is simply not an interactive account and probably not even a social one, despite the goodwill driving it. There are other approaches that go further and not only recognise the importance of the interaction but see in it a central and irreducible component of social cognition (e.g. Auvray et al. 2006; Cowley 2007; Fogel 1993; Gill et al. 2000; Hobson 2002; Ratcliffe 2007; Shanker and King 2002; Trevarthen 1979; Tronick 2005). However, what is still lacking is the articulation of a theoretical and methodological framework that takes the interaction process as its point of departure. With the concept of coordination and how it enables us to explicate the autonomy of the interaction process, we have taken an alternative, inherently social route.

At the same time, it is vital to avoid the error of considering only the interaction and ignoring the individual elements in it. Hence our emphasis on the autonomy of the interactors throughout their engagement with each other in order for the interaction to be considered properly social. For example, couple dancing involves moving each other, making each other move, and being moved by each other. This goes for both leader and follower. Following is part of an agreement and does not equate with being shifted into position by the other. If the follower were to give up her autonomy, the couple dancing would end there, and it would look more like a doll being carried around the dance floor. The same goes for conversations: each partner must engage from an autonomous standpoint. If conversational autonomy were given up, neither partner would be able to influence the other. There are,

however, interactions where one agent attempts to break (at least partly) the autonomy of the other (e.g. coercion and torture). They do not always achieve this goal, however, and when they do, in our view, they cease to be social at that point.[1]

By escaping from the methodological individualism prevalent in today's cognitive science (Boden 2006), our perspective offers an important implication for fashionable theories of social cognition. There is a strong tendency in recent embodied proposals to rely on neurological mechanisms such as so-called mirror neurons when explaining social understanding. Unfortunately, such explanations do not address the need to see the interaction as a structured and structuring process. A subject's mirror neurons fire when he performs a goal-directed action and when he perceives someone else doing it (Gallese et al. 1996). Even if these explanations had no problems (but see de Vignemont and Singer 2006; Georgieff and Jeannerod 1998), in our view they remain within the problem-framework of a detached individual trying to figure out the other; what we have earlier called the *Rear Window* position. The problem of how such a figuring out participates in and is itself shaped by coordination dynamics remains untouched. Appropriate correlations in social activity are what we are trying to explain. Transferring their cause to a neural correlation is simply to re-describe the problem. Explanations based on mirror neurons provide no more than a snapshot view of how recognition of intentional action could work. The problem is that the same recognition could equally be part of a coordinated or un-coordinated period in an interaction, and the difference between the two could not therefore be explained by this mechanism. It is this difference that, we argue, plays a crucial role in how the interaction unfolds.

A similar problem results from attempts to explain social cognition by other forms of pre-given coordination (i.e., coordinated tendencies of behaviour that pre-date the encounter). These undoubtedly exist. How else would we be able to account for situations where persons who have never met show the same table manners? In cases like this, some level of structural congruence between these persons is already present before the encounter thanks to previous interaction with culturally prevalent behavioural norms – what Bourdieu calls the *habitus* (Bourdieu 1990). Even though certain pre-dispositions to coordinate can play a great role in everyday interactions, a view based on pre-dispositions foregoes the need and capacity to account for all the possible influences on an interaction; biological, bodily, emotional, situational, and cultural. A pre-disposition for a particular coordination may break down as a result of these influences in a given situational context. An account of social cognition should be able to explain how we cope with this, and we propose that this coping happens in interaction. Imagine two people from France – where (for the sake of

[1] We must acknowledge here that by autonomy of the interactors we should understand a possibly multi-dimensional complex of identities that co-exist in what we call a subject, from his physical body, his sensorimotor integration, his function in the interaction, to his broader contextual, relational and historical roles. Complex interactions may result in the loss of the autonomy associated with a specific identity but they are still social as long as other autonomous identities remain in interaction (e.g., a conversation where an employee loses his job is a definitive blow to the sustained identity of the employee as such, but not to the social agent that still enjoys his autonomy to express his reaction to the situation). We expect that even though the proposed distinction holds in general (encounters are not social if an interactor's autonomy is lost), specific instances must be unpacked carefully in terms of what identities are at play in what we have loosely termed an interactor.

argument) people kiss each other on the cheek when saying goodbye – who meet for the first time in Britain – where they both have been living for a number of years, and where (again for the sake of the argument) strangers or even friends never kiss in such situations. What will they do? We may expect a tension between the pre-coordination given by their French habit and the present context. Faces may move in probingly and cheeks may turn. Whether these two people kiss is determined by their interactional coordination right there and then. On any other occasion the outcome may be different. It is much like the two people attempting to pass each other in the corridor. The solution depends on how the interaction and the individual intentions eventually achieve (or not) a coordination.

In this section we have conceived of the interaction as an autonomous process. One advantage of this view is that it allows us to understand the history of coordination, breakdowns, and recoveries at different levels as elements that shape the interaction throughout its history. Sustained interactions can be expected to have undergone several instances of loss and regain of coordinating structures, each of them leaving the interactors slightly better able to remain in such interaction or reinitiate it – experientially, we often perceive some interactions as improving over time, and the recovery from a breakdown as a sort of learning in which our previous moves acquire new contextual significance. Viewing interactions from this perspective is akin to understanding the growth of an adaptive system. Such a view allows us to connect interaction dynamics with sense-making. We now turn to how meaning is generated and transformed in social interactions.

Sense-makers interacting

In the previous subsection we have described how coordination happens in physical, biological and social systems. Now we ask the question: how does coordination affect the picture of social understanding? How does the physical, interactional coordination of behaviour, in particular movements, relate to our capacity to share meanings and to understand each other?

Previous work has looked at the relation between patterns of coordination and affect. This is already a way of connecting the interaction dynamics with the dimension of significance for the interactors. An initial proposal is that periods of high temporal coordination (manifested in the form of synchrony of movements and speech) relate to periods of high rapport between the interactors (Condon and Ogston 1971; Kendon 1990). This observation seems intuitively right as it is indeed possible to generally associate well-coordinated engagements with typically positive affective experiences. Further research, however, has proposed that it is actually a moderate amount of coordination that correlates most strongly with positive affect (Jaffe et al. 2001). Everyday experience, though, seems to indicate that correlations between rapport and coordination are not unequivocal. A highly-charged verbal fight can sometimes demonstrate a good degree of coordination without the corresponding affect being positive. The relation between patterns of coordination and their implications for meaning should perhaps not be approached in terms of general mappings between the two domains but rather in terms of how the processes involved in the grasping and generation of meaning are affected by coordination during interaction.

In socially interactive situations, coordination affects individual sense-making. Individuals are constantly engaged in sense-making activity and this is also true in social encounters. As an activity, sense-making is intentional and expressive; it is essentially embodied in action. Thus, it is directly affected by the coordination of movements in interaction. Indeed, the activities of sense-making may themselves become coordinated. If regulation of social coupling takes place through coordination of movements, and if movements – including utterances – are the tools of sense-making, then our proposal is: social agents can coordinate their sense-making in social encounters. This means that the sense-making of interactors acquires a coherence through their interaction and not just in their physical manifestation, but also in their significance. This is what we call *participatory sense-making*: the coordination of intentional activity in interaction, whereby individual sense-making processes are affected and new domains of social sense-making can be generated that were not available to each individual on her own.

The coherence of sense-making activities and the coordination patterns that enable it do not relate as simple mappings but in a range of ways that can be conceived as sitting on a spectrum of participation (see Fig. 2). On one end of the scale, we find cases where sense-making remains largely an individual activity that is at most modulated by the existence of coordination in interaction. At the other end of the spectrum, where participation is highest, we find the sophisticated cases where we fully and directly participate in a joint process of sense-making and the whole sense-making activity becomes a shared one.

In what ways does coordination affect the process of sense-making? Firstly, we can illustrate how the patterns of coordination (and breakdowns in coordination) can directly influence the significance of a situation for the individual sense-makers. Consider a dialogue over a low quality video conferencing line where there is a short time delay. Pauses between turns are unavoidable in this channel. But even when the interactors are aware of these technical constraints, they are often affected by the potential significance of a pause as they may not be certain of its cause. This kind of situation shows how properties of the interaction dynamics may alter the sense-

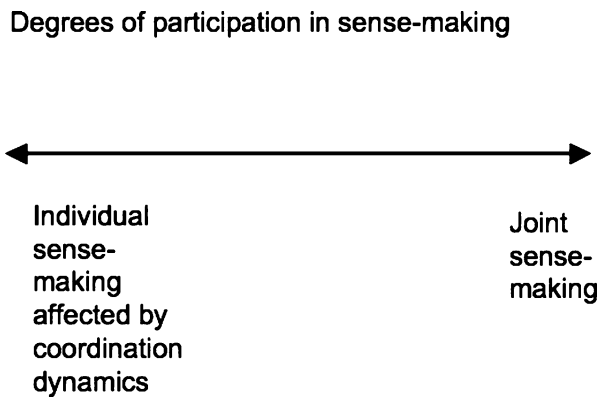

Fig. 2 Spectrum of degrees of participation in sense-making

making of each individual without this change being intended by either. Consider the following conversation (Ruhleder and Jordan 2001, p. 121):

A: That was a pretty good presentation.
(Pause)
A: If you're into that kind of work.
B: Well, I suppose someone has to do it.

Because B did not respond immediately, A – anticipating a disagreement – rephrased what she said, slightly diminishing her praise, and thus altering its meaning. B, who may have initially shared A's enthusiasm has now adjusted to the more moderate view. This example illustrates two things: (1) how the individual sense-making activities become adjusted through the situation and how a shift in meaning is in this case created by the interaction dynamics and not just the individuals, and (2) that a crucial element in this adjustment is the (here temporal) coordination in the interaction. It becomes clear that much of our sense-making in interaction relies on continuously appropriate coordination, since breakdowns of such coordination can alter the meaning and progression of the interaction.

This situation is not only manifested in the presence of external breakdowns of coordination. It is often the case that breakdowns emerge from the dynamics of the interaction even when the interactors are actively trying to avoid it. Misinterpretations about the intentions of others often provoke responses that are themselves misinterpreted, leading the interaction into a spiralling dynamics likely to engender a general breakdown. Examples of this abound in literature, we find a very clear one in Ian McEwan's recent novel *On Chesil Beach* (an account of a disastrously failed sexual encounter by a couple on their honeymoon). Granic (2000) describes similar run-away processes at a developmental timescale in her investigation of how relationships between parents and child can turn sour even if this is not the intention of either party.

Moving right on the qualitative scale of participation proposed in Fig. 2, we encounter situations where, through coordination of sense-making, one of the interactors is oriented towards a novel domain of significance that was part of the sense-making activity of the other. Such cases of orientation are ubiquitous. Calling attention to what is salient to one of the interactors and not yet the other is achieved by the purposeful modulation of the sense-making of one interactor (who, for instance, is visually scanning in search of a lost object) by the other (who grabs his attention and points to it). We can see a similar phenomenon in the regulation of affect between mother and infant, which is more explicit in the dimension of extended temporal coordination. Stern describes an example. A mother repeats the phrase "I'm gonna getcha" to her infant, each time stretching the temporal interval to the next utterance and the phrase itself (Stern 2002/1977, p. 114). Stern says that this "increases the discrepancy from the expected" for the infant and the infant becomes more and more excited (ibid.). In his explanations, Stern seems to oscillate between emphasising the interaction as a process and attempting to explain it in terms of individual cognitive capabilities. He says "there could be no such effect…unless the infant had some mechanism for timing the beat and forming a temporal estimate of when the next beat should fall" (ibid.). It is not necessary to go that far. In the view presented here, the infant is oriented towards a change of affective state through his

participation in coordination with the mother's tempo. This could not have happened if the mother were not herself attuned to the infant's response or if the infant for some reason was not able to sustain the interaction dynamics in this particular engagement. The above example can be explained in terms of relative coordination as described in the section "Dynamics of coordination" whereby, like the adult and the child walking together, the tempos of mother and child exhibit the property of phase attraction through their mutual coupling. This explanation would not require the positing of any specialised individual cognitive capability. If pendulum clocks can do it without mechanisms for "timing the beat" and "forming a temporal estimate", why can't babies? In our perspective, what infant and mother do in this example is possible through the interaction alone. It may well be that they both have capabilities for entering into a temporal interaction with an external event or object, but no more than this is needed. What makes it a case of orientation is the mother's intended regulation of the relative coordination and through it of the baby's sense-making.

Intermediate between the cases of direct orientation and regulatory orientation, we could place the following description by Currie that does justice to the fragility and brittleness of this process. He describes a beautiful example of the subtlety of an everyday social interaction. A man and a woman come to agree on a perspective on their current, shared experience, and they do this with minimal gesturing or uttering. Upon arriving at their holiday destination, Janet stands in front of the open window and takes an appreciative breath of the air, in such a way as to make sure that John perceives it. It is clearly a communicative act.

> What does Janet mean by doing this? That the air is fresh? The freshness of the air is already evident to John. Janet is arranging things so that she and John attend to the freshness of the air, in a way that is mutually manifest to both of them. But Janet is doing more: she is adjusting John's cognitive and affective take on the world: trying to get John to see the world in somewhat the way she is currently seeing it. There is a small, highly salient portion of the world visible to both of them, and Janet wants John to attend to that portion of it in the way that she is attending to it: appreciatively, gratefully, with excitement at the possibilities for the holiday that has just begun. She does not want to convey any propositions to John: she wants him to notice certain things; to engage imaginatively with certain possibilities which these things present; to see these things and possibilities as valuable in certain ways. She wants John to frame the visible world in a certain way. It would be vastly impractical – perhaps impossible – for Janet to try to say all this, to make explicit the way she wants John to frame the bit of world they are looking at. It would also be pointless: the minimal gesture does the job very well (Currie 2007).

In these cases of orientation the orientee does not relate to the orienter as someone who is trying to figure out her individual actions like a detached observer. Rather, it is through a process of coordination and modulation of sense-making activities that the orientee is directly affected by the orienter's intentions and sense-making and therefore he does not need to figure out what these intentions are in order to respond accordingly. A coordinated response already embodies a practical understanding. There is no need for John to attempt to decypher Janet as she directly calls his attention to the intended meaning. But for this to happen the response must be

attainable from the domain of possibilities of the orientee so that he can autonomously turn towards it. In order to be oriented, the orientee cannot be totally passive. He is a sense-maker himself. In her turn, the orienter must not only grasp the other's sense-making but must skilfully act so that the right modulation comes about. The more participation is required, the more the orienter may find herself changing her own sense-making in the process. The interactions between mother and infant described above involve more participation than the first case where a simple gesture to look over there keeps the orienter's sense-making virtually unchanged. The picture is at the same time more parsimonious and richer than the individualistic portrait of interaction as the mutual figuring out of intentions.

An even more radical possibility towards the right-hand side of Fig. 2 is when interactors move beyond the coordination (e.g., orientation) of individual sense-making activities and become engaged in a joint process of sense-making. Here meaning is created and transformed through patterns of coordination and breakdowns. The phases of action and perception typically used to describe individual sense-making now acquire collective aspects and sense is created through the stabilization of patterns of joint activity. When such patterns lawfully stabilise some invariant relation the perceptual result is jointly constructed, and novel meanings may be established in interaction. In this kind of activity the interactors engage in the highest degree of participation in sense-making.

High level of participation in sense-making, like orientation, is also ubiquitous. It happens in all kinds of human social contacts to the extent that it is rather difficult to see. Many obvious cases come to mind (e.g., collaborating in a joint research project, reaching an agreement after group negotiation, making a shopping list or improvising a dish together). But these examples are hard to unpack. To illustrate participatory sense-making, we must drastically reduce the complexity of the situation.[2]

Consider the game of charades. This is a game of pantomimes: players have to 'act out' a phrase without speaking, while the other members of the same team try to guess what the phrase is. Imagine that the phrase is the title of a film with two words. There are well-established gestures for indicating this (e.g., emulating an old camera by rotating the right hand in small circles in front of the eye, and indicating the number two by tapping the arm with two fingers). These gestures are readily interpreted. The player starts miming the second word. With his fingers he draws a large square in the air in front of him. Someone suggests "box". He gestures "no". Another guesses "picture", again no. He changes the gesture, drawing the big square again and then moving his hands together to the centre of the square and pulling his closed hands towards him while opening his arms outwards. "Cupboard." "Wardrobe." He gestures "no" but adds a waving 'almost there' movement of the hand. Then he makes the same square, puts his hands in the middle, but now pushes

[2] Participatory sense-making is not restricted to human social interactions. Many social animals build up coherences of significance by engaging in coordinated displays, such as circle-walking in wolves where potential contenders size each other up by making turns around each other (Moran et al. 1981), their intention to fight or not being affected by the emergent coordination. Even in simple models in evolutionary robotics the discrimination between different significant contexts can be performed through appropriate coordination between individuals (Di Paolo, Rohde and De Jaegher 2007; Quinn 2001). Recent work modelling the detection of social contingency in minimal agents shows in explicit terms how individual perception alters its meaning as a result of social coordination (Di Paolo, Rohde and Iizuka 2007).

his hands forwards and outwards with an opening movement and then leans forwards with his upper body and moves his head and gaze from left to right. The right answer comes: "Window!" Then he points to his back with his thumb over his shoulder. "Rear Window!"

This situation begins very much like the examples of orientation. The player intends to orient his team-mates. In the beginning this is easy thanks to established conventions. The first attempt at gesturing a window is misinterpreted. The player now must improve the situation by adding to the initial gesture something more specific, so he gestures the opening of a window. The team-mates do not yet guess the right answer, but their guesses show that they have understood the 'opening' aspect. Now the player can improve on this partial re-affirmation of his intended meaning and he gestures the act of opening the window again, but this time outwards (avoiding previous misinterpretations); he stresses the gesture by looking out. Now they guess correctly. As the interaction unfolds, what started off as orientation becomes more symmetrical since all interactors have to adjust their sense-making in a way that converges towards the 'right' gesture and the 'right' interpretation. The new meaning of the gesture is jointly constructed during interaction and evolves through patterns of coordination and breakdowns. It is now available to the interactors for futher use and possible transformation (imagine when film titles like *Room with a View* or *Through a Glass Darkly* come up).

Of course, the game of charades is not the same as interactions in daily life. It is guided by rules that prescribe certain kinds of interaction (i.e. non-verbal). The example, however, illustrates the possibility of meanings being generated and transformed during interaction. This also happens in everyday situations where sustained interactions (e.g., in couples, between friends, family members, work-mates) develop their own language and shared perspectives. A certain reference may develop over time (cf. Levin and Kitty's dialogue using the first letters of words, written in chalk, in chapter 13, part 4 of Tolstoy's *Anna Karenina*). Such an intimately shared referent comes about precisely through what we conjecture goes on in the highest realms of participation in sense-making.

While it is clear that making sense together may happen in situations where the interactors are collaborating towards this goal, it is even more convincing to think of situations where sense-making is done purely in the interaction without the individuals even being aware of how it is happening. Recent experimental studies in dyadic interaction show exactly this (Auvray et al. 2006; Di Paolo, Rohde and Iizuka 2007). In these experiments, two blindfolded participants interacting in a shared minimal virtual environment are asked to recognise the presence of each other. The only possibility to act is to move the cursor left and right along a virtual 'tape' that wraps around. Subjects sense the presence of an object or the other player only through a touch sensor whenever their own cursor 'steps' on them. To make the task non-trivial, there is also a static object of the same size as the other subject on the tape (fixed lure), as well as a mobile object that shadows the motion of each participant at a constant distance (attached lure). The problem to be solved is therefore not only distinguishing moving from non-moving entities along the tape using the touch feedback, but distinguishing between two entities that move exactly the same, only one of which represents the 'sensing' position of the other subject. The momentary sensory patterns therefore do not suffice to distinguish the three

entities that may be encountered. The only clue to tell whether a sensation is caused by the other subject or not is the change of sensation over time in response to the subject's own motion. It is conceivable that, from an individual point of view, the problem could be solved by detecting this relational contingency. This is not what happens. Even when the movement of the attached lure and the other partner are indistinguishable, recognition still occurs, because both participants are looking for each other. The findings show that recognition relies on sensorimotor coordination, rather than on an individual's capacity to express a confident judgement on whether a stimulus is actually caused by the partner or not. When subjects encounter a stimulus they tend to oscillate around it and these scanning movements only remain stable in the case that both subjects are in contact with each other. A subject could be fooled by the partner's attached lure, but only to the point that the partner remains more or less on the spot (one-way coupling). This situation is unstable as the partner (unaware that his shadow is being scanned) will eventually move away to continue the search. Only when the two-way interaction is established (i.e. when both subjects are in direct contact) does the situation become globally stable. Hence the solution to the cognitive task is established because both partners are searching for each other, but it does not rely on individuals performing any kind of perceptual recognition between responsive and non-responsive objects. They find each other almost inadvertently. The sense-making that solves the task only happens at the level of the collective dynamics.

The spectrum of participation in sense-making sketched here covers a very wide range of possibilities in social encounters, from third person observations of others' behaviours, to development of properly jointly created meanings. By taking the core enactive ideas seriously and focusing on the dynamics of the interaction process we have seen how an approach to social understanding can be based on unpacking the relation between coordination and sense-making along its many possibilities.

Discussion

In this paper we have established a set of ideas that together lay the foundations for a radical reorientation in approaches to social cognition. Many of these ideas undoubtedly deserve further elaboration and improvement. In this final section we limit ourselves to briefly mentioning some implications and directions for development; they remain speculative at this stage.

A central question arising from this proposal is that of clarifying further the relations between autonomy, agency, interaction, and intersubjectivity. Since new domains of sense-making can be opened up through participation, these can affect the individual and social identity of the interactors. Our dynamical view can provide a novel theoretical link between the social and individual domains for advancing on this issue. One possible route for this is developmental. The dynamics of interaction can span multiple timescales: from coordination patterns in interaction, over single and recurring interactions, to histories of interaction (relationships). Ontogenetically, we need to explain how the early embodied, highly affective interactions between mothers and infants eventually lead all the way up to the capacity for full-blown adult conversations and the use of symbolic inscriptions with all their intricacies and

subtleties (Cowley 2007). Until now, there is no unified account that can encompass the whole range of social capacities from primary intersubjectivity to the highest reaches of human language and social cognition. We think there is potential for the enactive approach presented here to advance on this problem. What this approach does ensure, in contrast to non-interactive proposals, is an explicit two-way link between individual and social processes, leaving open the possibility for individual cognitive skills to have dual or even purely social developmental origins. This is a strictly closed avenue for approaches that are not properly interactive, be they embodied or not.

Social skills, under the enactive view, are by definition relational. Although agents can have different individual potentials for entering into an interaction, this potential is not fixed and can be modulated by actual interactions. This is an implication of having established the autonomy of the interactional domain. Sometimes otherwise socially stilted persons are able to interact very well with particular others or in certain situations. As we have seen, it is easy but often misleading to infer individual level cognitive capabilities in order to explain interactional phenomena. This same lesson applies to social skills. It is easy to make individuals fully responsible for aspects of a social interaction; to infer competence from performance. But this misses the part of responsibility that corresponds to the interaction itself. This simple systemic insight can have implications for approaching disorders with a social aspect such as autism where individual predispositions undoubtedly have an effect on social encounters, but less attention has been paid to the dynamics of the latter for better understanding, diagnosing and treating the disorder (see De Jaegher 2006).

Relatedly, we implicitly hold the view (but have not argued for it) that other social aspects of cognition, including those that are third-personal or observational, can be understood through the interaction either in a direct or derivative sense. Proponents of embodied alternatives have recognised the importance of this latter point. In accordance with Gallagher's suggestion in his (2001) paper, and those of other researchers, we hold that third-person observational social capacities develop on the back of interpersonal social capacities. Our proposal should help to elaborate on the implications of this realisation. By now it should be clear that we have turned the traditional approaches on their head and instead of going from third-personal situations into the interaction, we take the opposite route. Even outside direct social interaction, sense-making can be expressive and this is at play in third-personal social aspects of cognition. To complement this, an observer of a social phenomenon, even though he *can* indeed be a passive bystander as it were, is *qua* sense-maker always in some way, even if minimally, engaged with the other whose behaviour he is observing.

The enactive perspective, therefore, questions the traditional axiom that others are non-transparent to us. We have demonstrated how the sense-making that underlies social understanding can itself be coordinated and extended in interaction. But how is the other experienced according to this view? We have seen the example of the squeezing of a sponge as a now almost paradigmatic instance of enactive perception. Unlike a sponge, the other-in-interaction is not fully and lawfully constituted by my sense-making activity. The sponge becomes an object in itself when confronted by my sense-making. It is experienced as complete as far as my practical interests are

concerned. By contrast, from a purely individual perspective, the other-in-interaction is available to me in this way only partially. Her autonomy demands frequent re-adjustments of my individual sense-making. When interaction and individual intentions coordinate, we feel mutually skilful to navigate the interaction: we experience a kind of transparency of the other-in-interaction. But when, for a variety of reasons, a breakdown occurs, and until a new coordination is attained, we experience the other as opaque. Keeping the interactors' autonomy as an essential requirement of the social achieves in this way a correspondence with the phenomenological insight of the alterity of the other (e.g. Zahavi 2005). We don't experience the other-in-interaction as totally obscure and inaccessible, nor as fully transparent (like an object fully constituted by my sense-making activity), but as something else: a protean pattern with knowable and unknowable surfaces and angles of familiarity that shapeshift as the interaction unfolds. Those patterns of change are influenced by my own participation in the emergence and breakdown of joint relational sense-making, hence they are not totally alien. My actions contribute to define the other-in-interaction not so much as my squeezing contributes to the experience of softness of the sponge but rather in ways that do not necessarily settle into a lawful relationship. I must alter my actions contextually in order to re-encounter the other and in the process, sometimes, be encountered myself when her sense-making unexpectedly modulates my own. This recursive effect on my actions describes the co-modulation of self-in-interaction and other-in-interaction. Others have pointed to the co-determination of self and other (Thompson 2001; Thompson and Varela 2001). We concord, but choose to call this mutual modulation instead so as not to imply a self-sufficiency of the social domain that obscures the interplay between the autonomy of the interaction process and that of the interactors.

Our approach also has practical implications. It reinforces certain styles of studying social cognition from the interaction (e.g. conversation analysis), but looking at coordination dynamics in its many guises (not just linguistic). For this, experimental approaches that minimalise and control sensorimotor coupling (such as the perceptual crossing studies of Auvray et al. 2006) are likely to yield the most interesting results in support of the ideas presented here. Combined dynamical systems and robotics modelling and novel measures of interaction (Di Paolo, Rohde and Iizuka 2007) have already shown their value at complementing such empirical studies. The measurement of coordination is an enormously important issue, where inspiration could be taken from movement analysis and neuroscience. Measuring coordination however, needs to be complemented by a disciplined approach to the experience of interaction, including experiences such as connectedness. Our enactive proposal favours an approach that combines empirical research in psychology and social science with dynamical and synthetic modelling and phenomenology.

Conclusions

The task of elaborating a strong and coherent enactive theory of social cognition can only be sketched in this paper. We believe that the enactive approach can say very specific things about social cognition. It can do so by two non-traditional starting moves: first, by providing the tools that allow us to recognise the interaction process

as establishing an autonomous domain, and second, by defining cognitive engagement as the activity of sense-making. The interplay between these initial moves is what we have attempted to develop here. It is, however, only an initial analysis and much further work will be needed.

By positing the process of interaction as an emergent autonomous domain, our enactive proposal, paradoxically, devolves an autonomy to social agents that was never thematised by previous approaches to social cognition: that of participation.

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