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Self-consciousness and intersubjectivity[1]

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Abstract

This paper distinguishes between implicit self-related information and explicit self-representation and argues that the latter is required for self-consciousness. It is further argued that self-consciousness requires an awareness of other minds and that this awareness develops over the course of an increasingly complex perspectival differentiation, during which information about self and other that is implicit in early forms of social interaction becomes redescribed into an explicit format.

1. Self-consciousness

What is self-consciousness? Well, it seems to be the case that we have an unmediated, direct access to (at least some) of our mental and bodily states. At this particular moment in time, I know that I am sitting at my desk, looking at the monitor in front of me, thinking about what to write. I am aware of my slight feeling of thirst and of the slight pain in my back. And I seem to be aware of all of this in a very direct, immediate way. In fact, it seems that I know these things in a special way, from the *first-person perspective* or "from the inside", so to speak. To be sure, someone else could know these things about myself as well, but they would have to rely on me telling them, or on observing my behavior. They could observe my

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getting up, walking to the kitchen and fetching a glass of water, and conclude that I must have been thirsty, for example. But I do not need to rely on observation to know about my feeling of thirst, or about the pain in my back. I just know. It is this immediate awareness of one's mental and bodily states that we are ultimately after when we speak of self-consciousness.[2]

Of course, there are many other things that I can know about myself, but that I don't have access to in this immediate way. For instance, I know that I was born in January, because my parents told me so, and I can know that I am wearing a blue sweater because I just looked in the mirror. Similarly, I know what my face looks like from looking in the mirror or from looking at pictures of myself. The way I come to know about these things is not different from the way someone else can come to know them. All these facts about myself can also be learned by someone else, in much the same way that I learn about them, namely from the *third person perspective.*

In fact, I can even come to know facts about myself from the third person perspective without realizing that they are about myself. For instance, someone might tell me "KM was born in January" and I could fail to understand that this is a piece of information about myself because I am suffering from amnesia and have forgotten my name. Or I might, in passing, glance at a mirror and – without realizing that I am looking into a mirror – think "That person really needs a haircut!" while failing to notice that the person is me. This is not possible when I feel a pain in my back and on the basis of this sensation come to think "I have a pain in my back", or when I am feeling thirsty and on the basis of this feeling think or say "I am thirsty". I know these things immediately and there can be no doubt as to who it is that is thirsty or has a hurting back when I form the corresponding judgment. I may have forgotten my name and I may know nothing else about me, but I can still refer to myself with the first-person pronoun in order to self-ascribe a state of thirst or a feeling of pain.

As I just indicated, the canonical expression of self-ascriptions of this latter kind involves the first-person pronoun. Moreover, these self-ascriptions are such that they do not rely on any inference or identification and that there can be no doubt as to who is their subject. In other words, they are "immune to error through misidentification relative to the first person pronoun" (Shoemaker, 1968).[3] That is to say that when making these types of self-ascriptions,

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[2] Note that throughout this paper I will follow the common convention of using the terms self-awareness and self-consciousness interchangeably.

[3] Notice that not all judgments that involve the first person pronoun are immune to error through misidentification. Rather, it is only those judgments that, as Wittgenstein puts it, use the "I" as subject (as opposed to those where the "I" is used as object). These, in turn, are those that rely on a specific evidence base characteristic of the first person perspective. However, as first-person judgments that are immune to error through misidentification provide the basis for those first-person judgments that do not (see Bermúdez 1998; this volume), we can neglect this distinction for the present purposes.

the subject might be mistaken with regard to the predicate she is ascribing to herself, but she cannot be mistaken with regard to the subject of her self-ascriptions.[4] As I discuss elsewhere in more detail (Musholt, forthcoming), this immunity can be traced back to the information upon which these judgments are based. This information must be such that in obtaining it the subject necessarily *ipso facto* obtains information that relates to herself.[5] No self-identification or inference is required in order to form an "I"-thought based on this kind of information, and hence no misidentification (relative to the first person pronoun) is possible.

Thus, we can define self-consciousness as the ability to think 'I'-thoughts, that is, the ability to think thoughts that are about oneself, that are known to be about oneself by the subject entertaining them, and that are immune to error through misidentification.[6]

2. Implicit self-related information vs. explicit self-representation

How is this ability to think 'I'-thoughts to be explained? As indicated above, 'I'-thoughts rely on a specific kind of evidence base, namely on information about the subject that is immediately accessible to the subject as such. Obvious candidates for these types of information include information about occurrent mental and bodily states.[7]

Take perception and proprioception, both of which have been much discussed as providing the subject with nonconceptual[8] first-personal content (e.g. Bermúdez 1998). Perception, it is argued, provides the perceiver not just with information about the environment, but – necessarily – also with information about the perceiving subject. For instance, according to Gibson's (1979) ecological theory of vision, the visual field contains self-specifying structural invariants such as the boundedness of the visual field and the occlusion of parts of the visual field by various parts of the body. Moreover, the patterns of flow in the optic array and the relations between the variant and invariant features provide the perceiver with information about her movement in the world, and the perception of affordances, that is, properties of objects in the environment that relate to the abilities of the perceiver, provides the subject with information about the possibilities for action that these objects afford. (Cf. Bermúdez

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[4] Consequently, these judgments have immediate implications for action. (See Perry 2000.)

[5] Also see Evans (1982) and Bermúdez (1998; this volume).

[6] As we will see in what follows, self-consciousness is a gradual phenomenon. As I will argue below, the ability to think 'I'-thoughts in the sense just specified requires explicit self-representations. However, we can distinguish between different levels of explicitness, and hence between different degrees to which one can possess this ability.

[7] Bermúdez, this volume, also discusses autobiographical memory as a further source of this type of information.

[8] Nonconceptual content is standardly defined as representational content that can be ascribed to a creature even if that creature lacks the concepts required to specify the content in question (cf. Bermúdez 1998).

1998.) Proprioception, on the other hand, provides the organism with information regarding the state of the body, such as its position in space, or its balance.[9]

Thus, it is argued, the content of perception and proprioception provides the organism with information that is about itself. Moreover, this information is thought to be immune to error through misidentification. This is because ecological perception delivers information that is necessarily about *one's own* spatio-temporal position relative to other objects in the environment and about *one's own* possibilities for interaction with these objects. Likewise, somatic proprioception delivers information that it necessarily about *one's own* body. If I perceive the apple in front of me to be within reaching distance, no question can arise as to *who* it is that can reach the apple. Likewise, if I proprioceive my legs to be crossed, there is no question as to *whose* legs are crossed – perception and proprioception do not require any self-identification. Hence, it is claimed, perception and proprioception qualify as basic, nonconceptual, forms of self-consciousness, or 'I'-thoughts (Bermúdez 1998).

However, on my view, what perception and proprioception provide the organism with is *implicit self-related information*, and this ought to be distinguished from *explicit self-representation* (Musholt, forthcoming). Only the latter can provide the subject with thoughts that are known by the subject to be about itself.[10] Hence, only the latter qualifies as self-consciousness in the sense defined above.

Following Dienes and Perner (1999), I take it that a "fact is explicitly represented if there is an expression (mental or otherwise) whose meaning is just that fact; in other words, there is an internal state whose function is to indicate that fact" (Dienes and Perner 1999, 736). That is to say that a fact or state of affairs is represented explicitly when the mental state in question contains a component that directly refers to this fact or states of affairs. In contrast, a fact or state of affairs is implicit in a mental representation when the mental state in question does not contain a component that directly refers to this fact, but when this fact or state of affairs is conveyed as part of the contextual function of the mental state.

Now, any given conscious experience contains several different aspects (or "facts"), each of which can be either implicitly or explicitly represented. For instance, according to the standard analysis of propositional attitudes, we can distinguish between the content or

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[9] Crucially, the body is never presented to the subject in the way other objects in the environment are, but rather as a "system of possible movements" (Dokic 2003) that are subject to the will.

[10] Moreover, as I argue elsewhere (Musholt, forthcoming), only the latter can be said to be immune to error through misidentification. Roughly speaking, this is because immunity requires the possibility of representing the subject of a self-ascription independently from the property and this in turn requires that the representation in question contains an explicitly self-referring component (as well as a component referring to the property).

proposition (standardly expressed by means of a "that"-clause), the propositional attitude (e.g. knowledge vs. belief vs. desire, etc.), and the holder of that attitude. Accordingly, as Dienes and Perner (1999) point out, there are three main types of explicit representation, depending on which of the three constituents of the propositional attitude is represented explicitly. We can distinguish between: (1) explicit content but implicit attitude and implicit holder of the attitude; (2) explicit content and attitude but implicit holder of attitude; (3) explicit content, attitude and holder of attitude.[11] Their idea is that in the first instance it is the proposition that is represented, whereas the attitude results from the functional role of that representation. For example, a desire has a different functional role in my cognitive architecture than a belief, a fear or a wish. But the propositional attitude itself can also be explicitly represented as in when I am aware of the fact that I am currently entertaining a belief as opposed to a wish, imagination or worry. The attitude can then also be explicitly ascribed to myself (or, as it were, to another subject), thus making the holder of the attitude explicit.[12]

So say I am at this moment seeing a red lamp on my desk. In order to consciously access the content of this visual experience (so that I can report on the lamp, for instance), I must explicitly represent the red lamp. But I need not explicitly represent the fact that this is a visual perception, or that it is me who has this experience. However, in order for me to be aware of the fact that I am entertaining a visual representation, the information that was previously implicit in the functional role that my representation played must be represented explicitly. And the same holds for the fact that it is me (rather than someone else) who is seeing the lamp. This fact is implicit in the fact that I do indeed have the experience, but it must be made explicit for me to consciously access it (such that I can then form an 'I'-thought).

Now, on my view, proponents of theories of nonconceptual content are correct in pointing out the fact that perception is always perception from a specific egocentric perspective and hence necessarily self-related.[13] They are also correct in pointing out that proprioception delivers the

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[11] Moreover, propositional contents contain different components, such as individuals, properties, predication relations between the former and the latter, as well as temporal context and factuality vs. fiction, each of which can also be either implicitly or explicitly represented.

[12] Note that, as we are concerned here with nonconceptual as well as conceptual representations, in the following, I will sometimes choose the more neutral term "intentional attitude", rather than "propositional attitude". In contrast to the former, the latter suggests that the content of the representation in question is propositional, and it is not obvious that this is the case for nonconceptual representations.

[13] Note that this is consistent with my claim above that my knowledge that I wear a blue sweater (which I gain by looking in the mirror) is not different in kind from the knowledge that 'she is wearing a blue sweater' gained by another person who is looking at me. In both cases, an identification component is involved (hence the possibility of misidentification is provided for). Although my perception necessarily contains self-specifying information, this information is not about the blue sweater being mine – rather it is information regarding my

subject with information regarding its bodily states and properties. However, this does not imply that the information is also explicitly represented as being about the subject. Rather, because perception always occurs from a unique perspective, and because proprioception always delivers information about a unique body, there is no need for the self to be explicitly represented. In other words, there is no need for the organism to keep track of the subject of its perceptual and proprioceptive states. Rather, as I argue elsewhere (Musholt, forthcoming), the self should be understood as an 'unarticulated constituent' (Perry, 2000) of perception and proprioception. The information that is provided by perception and proprioception is implicitly self-related because it is part of the function of perception and proprioception to provide information that is related to the subject such that the information can be used for the guidance of intentional action. But this ought to be distinguished from explicit self-representation where the information is explicitly represented as being about the organism. In other words, it is one thing *to be* in a perceptual or bodily state, but it is another thing to *explicitly ascribe* this state to oneself. And to put it differently again: it is one thing to be conscious and another thing to be *self*-conscious. [14]

While perception *per se* does not require explicit self-representation, the explicit representation of the subject of my perception – myself – comes into play when I am about to contrast my perception (and hence my egocentric perspective) with that of another subject. For instance, it might be the case that I can see a book on the table, but you cannot, because your visual access to the book is blocked by some other object that is located between you and the book on the table. Now once I realize that this is the case, I might come to the explicit judgment that *I* can see the book (while you cannot). This at once provides me with an understanding of a certain mental state being *mine* (rather than anybody else's) and with the realization that the world as I perceive it is not necessarily the world as you perceive it (while I perceive the book to be on the table, you do not).

So explicit self-representation, and hence self-consciousness, comes into play when the organism is aware of the fact that there are other individuals with mental and bodily states similar to it's own, and when it begins to contrast them with its own.[15] As long as I am merely

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possibilities for interaction with the environment.

[14] Also see Baker, this volume, who argues that "the subject with only simple consciousness (only a rudimentary first-person perspective) is the origin of his perceptual field. He does not represent himself in his perceptual field; he is its source. He does not need to make any first-person reference; the question of a first-person pronoun does not arise.", and Kapitan, who argues that the fact that "direct proprioceptive awareness and other forms of inner awareness are exclusively of a unique center of reception and reaction [...] obviates the need for any separate first-person representation". (2006, 32)

[15] The reason that this relation between self- and other-ascriptions holds for both mental and bodily states

engaged in interactions with the environment, I do not need to explicitly represent my perspective or my bodily states as such. (And the same holds, of course, for other mental states, such as emotions, intentions or desires.) It makes only sense for me to explicitly represent and refer to *myself* insofar as I am aware that the property or state I am ascribing to myself could, in principle, be ascribed to someone else, and insofar as I intend to draw a contrast between myself and others. To put it briefly: I am self-conscious only insofar as I can distinguish myself from other subjects. That is to say that explicit self-representation requires the ability to contrast one's own perceptions, emotions, proprioceptive feelings and other mental and bodily states with those of others. So on the view proposed here, self-consciousness emerges in concert with the ability to represent other subjects via a process of an increasingly complex "perspectival differentiation" (cf. Pauen 1999). Accordingly, we should find that self-awareness and the awareness of other minds develop in parallel, and, as we will see in the following sections, this is indeed the case.

Although this is not the place to explore these relations further, it is noteworthy that the view that self-consciousness and intersubjectivity are intimately related has predecessors in the phenomenological tradition, as well as in German Idealism.[16] Fichte, and later Hegel, for instance, held that self-consciousness becomes reflective and intentional only through intersubjective encounters (which are characterized by a mutual "summoning").[17] Similarly, in Sartre's phenomenology, (reflective) self-consciousness is the result of intersubjectivity, which, for him, is characterized by a constant mutual objectification and, consequently, self-alienation (as famously explicated in his description of the other's gaze in his "Being and nothingness"). In other words, according to Sartre, I acquire reflective self-awareness in considering how I am being perceived by the other. However, according to other thinkers in the phenomenological tradition, most notably Merleau-Ponty (1945), my encounter with another can only motivate self-reflection if I am already aware of my visibility to the other (Gallagher & Zahavi 2010). This awareness, in turn, is based on the pre-reflective, proprioceptive-kinaesthetic sense of my body and a common "corporeal schema" between self and other, which enables my recognition of the similarity between my own and the

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consists in the fact that we never experience our bodies as objects among others objects, but rather, as I indicated above, as a "system of possible movements" (Dokic 2003) that are subject to the will. Hence, the relevant contrast space consists of other such "systems" (that is to say of the bodily states of other subjects), not of inanimate objects.

[16] Note that I take the notion of intersubjectivity to mean the encounter between two subjects who (in some sense) recognize each other as such. That is to say that not every social interaction qualifies as an instance of intersubjectivity (also see section 3.1).

[17] For a detailed discussion see (Wood 2006).

other's body; an insight that, according to Gallagher and Zahavi (2010), goes back to Husserl. Thus, Merleau-Ponty seeks to locate the relation between self-consciousness and intersubjectivity already at the pre-reflexive, bodily level, rather than at the more abstract level of mutual recognition, perspective taking and summoning. Other thinkers, such as Mead or Habermas, in turn emphasize the linguistically mediated encounters between individuals as being constitutive for self-consciousness.[18]

As we will see in the following, the awareness of self and others is indeed a multi-facetted phenomenon, which includes bodily and nonconceptual as well as conceptual and linguistic aspects. It will be the task of the following section to spell out the different levels of this multi-facetted phenomenon systematically and in more detail.

3. Levels of self- and other-representation

In the following, I will argue that there is a gradual transition from implicit to explicit self- and other representation. Accordingly, we ought to distinguish different levels of self- and other representation, with different degrees of explicitness.

As well as on Dienes' and Perner's (1999) theory of implicit and explicit knowledge, my account builds on Barresi's and Moore's (1996) multi-level account of social understanding and on Karmiloff-Smith's (1996) model of "representational redescription", according to which implicit information is turned into explicit representation through a reiterative process by which "information already present in the organism's independently functioning, special-purpose representations, is made progressively available, via redescriptive processes, to other parts of the cognitive system" (Karmiloff-Smith, 1996, p.18). Her model posits at least four levels of representation, ranging from implicit information that is encoded in procedural form to explicit information that is coded linguistically. At the first level (I), information is encoded in procedural form and the information embedded in the procedures remains implicit and is not available to other operations in the cognitive system. At the second level (E1), representations are available as data to the system, although not necessarily to conscious access and verbal report. (Karmiloff-Smith speaks of "theories-in-action" at this level.) At the third level (E2), representations become available to conscious access, but not to verbal

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[18] Note that some phenomenologists claim that every conscious experience entails a minimal, pre-reflective self-consciousness (e.g. Zahavi 2006). In contrast, I think that we should distinguish consciousness from self-consciousness, for the reasons mentioned above. Moreover, it is not obvious to me how the notion of pre-reflective self-consciousness is to be understood or what explanatory work it is supposed to do, and I don't think that it is phenomenologically obvious either that every conscious experience is also self-conscious. (For a more detailed discussion of these reasons see Musholt, forthcoming. Also see Schear 2009 for a critical discussion of the notion of pre-reflective self-consciousness.)

report. And finally, at the fourth level (E3), information is recoded into a cross-system code that allows for the translation into a linguistic format (cf. Karmiloff-Smith, 1996, chapter 1).[19]

It is important to note that on this account, implicit representations are not simply replaced by explicit representations, although they might in some cases be subsumed under them. While explicit representations require a representational redescription of the original implicit representations, this does not mean that the implicit representations are abolished during this process of redescription. For example, while a tennis player who wants to become a trainer or write a book on how to play tennis needs to find a way to access the information that is implicit in his skillful play, such that it can be described verbally, this does not mean that he thereby loses his ability to play. Both the implicit representations that guide his fluid and automatic play as well as the explicit representations that enable him to write books and teach others remain present, albeit in very different formats.

Similarly, as we will see in what follows, we have various ways of representing others (and ourselves) at different levels of explicitness. On my view, although some of these occur earlier in development than others, all of them are retained so as to help us navigate the social world in different contexts and situations.

3.1 Primary intersubjectivity or self-other matching

In order to recognize that other beings have bodily and mental states like oneself, and to contrast these with one's own, a being needs to be in a position to recognize the similarity between itself and others. This requires that the being is able to match the information it receives about others, from the third person perspective, with the information it receives about itself, from the first person perspective (Barresi & Moore 1996)[20]. That this is by no means trivial should have become obvious from my discussion of the difference between the first- and the third-person perspective in the first section.

A first requirement for this recognition is that conspecifics must be recognized as such. Empirical results show that in humans, there are a number of -- presumably innate – mechanisms that ensure that infants recognize members of their own species. For instance,

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[19] Note that empirically, it is not always possible to distinguish between levels E2 and E3, which is why they are generally taken together as E2/E3. In effect then, the model Karmiloff-Smith proposes has three levels. Notice that I will defend a model with four levels – this is consistent, because I am going to introduce an additional level, which is even more basic than level (I) in Karmiloff-Smith's model.

[20] One might argue that insofar as we are dealing with information about other subjects (rather than objects), it would be more appropriate to talk about the second person perspective here. Indeed, there is a nascent debate within philosophy as to whether there is a specific epistemic perspective (i.e. a second person perspective) associated with intersubjectivity. While this is arguably the case, for the sake of simplicity I will ignore this rather complex debate here and only refer to the distinction between first and third person perspective.

neonates preferentially attend to stimuli with face-like arrangements of elements (Johnson & Morton 1991). Moreover, already at birth, infants attend preferentially to human speech over other auditory input, and by 4 days they distinguish properties of their mother tongue from those of other languages (Mehler et al. 1988). Also, young infants can distinguish animate from inanimate movement and young children use potential movements as the basis for discriminating between photos of animates and inanimates (Massey & Gelman 1988). This suggests that humans possess innate attentional biases that cause them to treat conspecifics as subjects rather than as (inanimate) objects.

However, the preferential treatment of social stimuli in comparison to stimuli from objects in the environment does not yet imply an understanding that these social stimuli originate in beings that are similar to oneself. For this understanding to be possible, there needs to be some kind of matching mechanism that enables subjects to match input from self and other, or first and third person information and to integrate the information in such a way that the resulting representation can be applied to both self and other. Otherwise, first and third person information would always be treated separately, and no common representational (and, ultimately, conceptual and linguistic) scheme could develop (cf. Barresi and Moore 1996). It has been suggested that the neural basis for this matching mechanism lies in the mirror neuron system. Mirror neurons are neurons that fire both when an action (such as grasping for an object) is perceived, and when that same action is executed (Gallese 2001; Gallese et al. 2004), thus bridging the gap between agent and perceiver. They were first detected in the premotor area F5 of monkeys (Rizzolatti et al. 1996). Although it has (for methodological reasons) not been established that humans possess single neurons that fire both during action execution and observation, there is evidence from functional imaging studies for a similar system in the human brain (Iacoboni et al. 1999; Keysers & Gazzola 2009).

Empirical evidence suggests that in humans some such matching mechanism is in place from very early onwards, and might even be innate, such that "infants, even newborns, are capable of apprehending the equivalence between body transformations they see and the ones they feel themselves perform" (Meltzoff 1990, p.160). For instance, as Meltzoff and Moore (1977) have demonstrated, newborns seem to be able to imitate the facial gestures of adults, such as tongue protrusion and mouth opening shortly after birth. This seems to suggest that they are able to match visual information about the facial expression of others with the proprioceptive information they receive about their own faces. Accordingly, it has been argued that the ability to match first person and third person inputs is innate. However, according to Anisfeld, infants were shown to reliably match only one gesture, namely tongue protrusion, and this

effect was transitory (Anisfeld 1991).[21] So the innateness of this matching mechanism is controversial.[22] But whatever the case may be, it is uncontroversial that some such mechanism exists, explaining humans' general abilities for imitation and the possibility of the development of a common conceptual scheme for self and other.

However, this is not to say that at very early stages of social interaction, infants already have an explicit representation of a self-other matching (or a self-other difference, for that matter). The content of the multi-modal representations at these stages is nonconceptual and implicit, and does neither require the explicit distinction between self and other, nor the explicit representation of an intentional relation.[23] In fact, it seems plausible that at the very early stages of self-other matching indicated by neonate imitation, there is no differentiation between self and other whatsoever. Cases of early infant imitation are thus comparable to the phenomenon of emotional contagion (which will be further discussed in section 3.3), where the perception of an emotional expression by another subject causes the experience of that same emotion in oneself, so that there is no differentiation between the other's emotion and one's own. Because there is no self-other differentiation at this level (and hence no awareness of other subjects as such), we cannot yet speak of self-awareness or intersubjectivity in a philosophical sense (despite the fact that the phenomena in question are discussed under the label of "primary intersubjectivity" in the developmental literature).

3.2 Secondary intersubjectivity

Social interactions and the representations associated with them reach a new quality from about the age of 9 to 12 months. At this age, infants enter into contexts of shared attention and intentionality. Within the developmental literature, these are also called forms of "secondary intersubjectivity", in contrast to the so-called forms of "primary intersubjectivity" described in the previous section (Trevarthen 1979). At this stage, infants begin to coordinate their object-directed behavior with their person-directed behavior, that is, they move from purely dyadic forms of interaction to triadic forms of interaction. In other words, they begin to engage in shared intentional relations. For instance, they will follow the gaze or the pointing gesture of another person to an object of mutual interest, thus exhibiting "shared attention" towards that object (Tomasello et al. 2005). This suggests an implicit understanding of others

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[21] Similar results were recently found in newborn monkeys (Ferrari et al. 2006).
[22] See Heyes (2009) for an account that suggests that mirror neurons develop on the basis of sensorimotor learning processes, rather than constituting a specialized and innate module for imitation and/or action recognition.
[23] According to Barresi and Moore (1996), an intentional relation is a relation involving an agent, a directed activity and an object. Examples include intentional actions as well as perceptions, beliefs, desires and emotions.

as perceivers, and the existence of a mechanism that integrates the first person information about one's own perceptual situation with the third person information received about another's perceptual understanding.

Moreover, infants at this age will begin to develop social referencing, which is to say that they use emotional information from their caregivers to regulate their own behavior in situations that are perceived as threatening (e.g., Feinman 1982). One example for such social referencing is the visual cliff paradigm used by Klinnert et al. (1983). A visual cliff is a table made of glass and visually divided into two halves. On one half, a pattern is placed immediately below the glass plate so that this half appears opaque, while on the other half a similar pattern is placed at a distance from the glass plate, so that there appears to be a sudden drop-off. When children reach the drop-off point, they will stop and look to their mothers. If the mother looks happy, the child will continue its crawl, but if the mother looks worried, it will refuse to move forward. This suggests a matching between first and third person emotional intentional relations (in addition to the perceptual and action-related intentional relations described above), such that children adopt the emotion they perceive their mothers to be expressing.

Children at this age will also begin to display communicative gestures, such as proto-imperative and proto-declarative pointing gestures (Bates 1979). Proto-imperatives function as a form of nonverbal request to a partner, for instance in order to obtain an object that is out of reach. In contrast, proto-declaratives are more akin to nonverbal comments on a situation, for instance when the pointing-gesture is used to inform another about the location of an object. While the former is an attempt at influencing what another person does, and is thus directed at action-related intentional relations, the latter is trying to affect the other's attention or thoughts, and is thus directed at epistemic intentional relations. So while the former seems to suggest an implicit grasp of others as agents, the latter seems to suggest an implicit understanding of others as perceivers and/or believers. Interestingly, while non-human (human-raised) primates have been found to use proto-imperatives to some degree, they do not seem to use proto-declaratives (Tomasello 2008). This suggests that while chimpanzees have an implicit understanding of others as perceivers and agents and can use this understanding instrumentally to their advantage, they either have no understanding or no interest (or both) to influence the mental states of others outside of instrumental contexts. That is, in contrast to humans, they do not seem to engage in the sharing of information or cooperation outside of instrumental contexts.[24]

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[24] In fact, Tomasello argues that it is precisely the ability and desire for cooperation (enabling the development of

However, neither shared attention, nor social referencing, nor the ability to use proto-imperatives and declaratives imply the explicit attribution of mental states to others, for they do not require the distinction between propositional attitudes and propositional contents. That is to say that children at this age do not understand mental representations as such, so they are not able to understand, for instance, that mental states can misrepresent. Rather, the representations of others as agents, perceivers, and bearers of emotions that are involved in these contexts of secondary intersubjectivity are implicit in the procedures for different types of social interaction.

Nor do these abilities require an explicit differentiation between self and other. During episodes of shared attention, there is a matching of first and third person information in the sense that infants perceive the gaze orientation of the other while simultaneously seeing the object of shared attention and sensing the position of their own head or eyes. Likewise, in the case of social referencing, the infant sees another's emotional expression and adopts a corresponding emotional attitude. So shared intentionality enables the matching of third person information about another's behavior with first person information about being in an intentional relation. Nonetheless, infants understand the intentional relations associated with these types of social interaction only to the extend that they actually engage in episodes of shared intentionality, and this engagement does not require an explicit differentiation between first and third personal sources of information, nor does it involve the explicit attribution of an intentional relation to an intentional agent (cf. Barresi and Moore 1996).

Thus, the understanding of others (and thus of oneself) as intentional agents still seems to be located at the implicit level. This analysis is further supported by the fact that these representations seem to be domain-specific, for, according to Karmiloff-Smith (1996), in order for information that is implicit in specific behavioral procedures to become available to other parts of the cognitive system, it needs to be redescribed into a more explicit format.

> "At ten months of age, when infants are in the process of developing understanding of communicative actions such as pointing, and of states of social attention such as mutual gaze, these developments are not closely related: a child may master one of these domains while making little progress in the other […]. Moreover, ten-month-old infants reliably follow a person's gaze to the object at which she is looking and look at an object to which she is reaching, but they fail to connect these two abilities so as to predict that a person will reach for the object to which she looks." (Spelke 2009; also see Phillips et al. 2002)

"we-intentions (Tuomela & Miller 1988)) that distinguishes humans from other primates, and that accounts for language learning and other cultural achievements (e.g., Tomasello 2009).

This suggests that infants at this age fail to integrate their implicit understanding of others as agents with their implicit understanding of others as perceivers who share their own experiences of the world (cf. Spelke 2009). The representations that are implicit in different social interactions must first be transformed into more general, explicit representations before the infant can develop an integrated understanding of others – and consequently of themselves – as agents, perceivers *and* bearers of emotions.

3.3. Mirror self recognition and self-conscious emotions

In order for a subject to realize that other subjects are distinct beings with their own mental states, and as such are similar to herself, she needs to be in a position to not only match third person information from others with first person information from her own experience in current episodes of shared intentionality, but she also needs to understand that others possess first person information about their mental states which might differ from her own. Moreover, she needs to understand that others have third person information about herself (just like she has third person information about them). In other words, she needs to understand that others can perceive and observe her (just like she can perceive and observe others), and that others ascribe intentional relations to herself on the basis of these perceptions. That is to say that she must understand the other's mental state about her own mental states.

One indicator that the child is aware of third person information about the self is its ability for mirror-self-recognition (Barresi and Moore 1996). This ability is standardly tested with the help of the rouge test, in which the subject is marked with a red spot on its face and then put in front of a mirror (Amsterdam 1972; Gallup Jr 1979). If the subject attempts to remove the spot on her face, this is taken to demonstrate that she recognizes herself in the mirror. This ability typically emerges in children at about the age of 18 to 24 months. Self-recognition indicates that the child recognizes herself as a subject among other subjects, and thus as a subject that can be perceived by others. Interestingly, mirror self-recognition is accompanied by the development of so-called secondary or self-conscious emotions, such as embarrassment and coyness (Lewis et al. 1989).[25] This suggests that the child's emotional attitudes are affected by her imagination of what she might look like to others, and thus indicate an integration of her first person experience with the third person information others have about herself (and that she can henceforth also have about herself by gaining information about herself in the ways others do, namely, for instance, by observing herself in a mirror).

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[25] Notice that this affective component of intersubjectivity and self-consciousness was already emphasized by Sartre.

Thus, to use Rochat's terminology, from this point onwards, the child has "others in mind" (Rochat 2009). The child now begins to understand that she is a subject that can be observed by others, just like she can observe the behavior of others, and she can begin to consider others' perspectives on herself. It is at this point that the child begins to fully appreciate herself as a subject among other subjects, and thus that we can speak of genuine (if rudimentary) forms of self-awareness and intersubjectivity.

Signs for a clear understanding of the emotional intentional relations of others as being different from one's own also begin to emerge during the second half of the second year. One example is the development of empathy (Hobson 2002). Younger children will typically get distressed themselves and seek comfort when they perceive expressions of distress by others, thus exhibiting signs of emotional contagion. In contrast, children during the second half of the second year – while still showing some signs of distress themselves, indicating that there is some first personal experience of the relevant emotional state -- will try to do something to console the other, thus demonstrating an understanding that the emotion belongs to the other (Barresi and Moore, 1996). Much later, once children develop an explicit theory of mind, they will even be able to show sympathy, which is the ability to understand and be sensitive towards the mental states of others without experiencing them from the first person perspective.

Moreover, at around this age, children begin to display a general understanding of the fact that someone else's perspective towards an object can differ from their own. For instance, 24-months olds are capable of level 1 perspective taking, which is to say that they can understand that what another person sees is different from what they see (for instance that they can see an object that another person cannot see)[26], and vice versa (Moll & Tomasello 2006).

Thus, it is at this level that the child begins to explicitly differentiate between self and other and to attribute intentional relations differentially to self and other. Prior to this level, the child has de facto access to the mental states of others, but she need not explicitly represent these states as belonging to the other, for she is always engaged in an episode of shared intentionality during which she herself also experiences the intentional relations that she shares with her partner. In order for this shared intentionality to occur, it is sufficient that intentional relations are in fact shared; the child does not have to explicitly represent her own mental states as being distinct from those of others. In contrast, in the case of empathy, although the child will share some of the emotion of the other (as evidenced by her display of behavioral signs of distress), the comforting behavior that she directs towards the other does

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[26] In contrast, according to Flavell, level 2 perspective taking requires the understanding that the *same* object can be seen from different perspectives. The ability for level-2 perspective taking emerges later; see below.

show that she explicitly represents the emotion as belonging to the other. Likewise, as the ability to for level-1 perspective taking indicates, she learns to represent perceptual states as belonging either to herself or to others. Thus, during the second half of the second year the child begins to understand that others have mental states (first person experiences) like herself, and that they may have different perspectives on the same world. That is to say that she now explicitly represents intentional subjects as well as intentional relations. However, these representations do not yet have to be in a conceptual or linguistic format. Rather, following Karmiloff-Smith's terminology, they might be said to constitute something like a theory-of-mind-in-action (at level E1 of explicitness), without that theory being conceptualized or consciously accessible, for instance in terms of folk psychological belief-desire explanations.

3.4. Explicit mentalizing and theory of mind

Although mirror self recognition and empathy indicate an emerging understanding of being a subject among others subjects, none of the abilities described above does yet imply the existence of an explicit theory of mind. To truly appreciate the nature of mental states, a subject must be able to distinguish propositional attitudes from propositional content, and she must understand that mental states can misrepresent.

This ability is demonstrated when children pass so-called false belief tasks, which is usually the case at around 4 years of age. It is only at this stage that they reach the ability to explicitly represent belief states as states that can be held by others and thus differ from one's own beliefs, and as states that can misrepresent, and thus differ from reality. In the classical false-belief task designed by Wimmer and Perner (1983), the child watches a scene involving a boy called Maxi and an experimenter. The experimenter hides a piece of chocolate in a box. When Maxi temporarily leaves the room, the chocolate is transferred into a different container. The child who is watching the scene is asked where the chocolate really is, and where Maxi will look for it upon his return. That is to say that the child has to distinguish between what she herself knows about the reality and Maxi's (false) belief about the location of the chocolate. So she has to differentiate her own belief from Maxi's belief, and she has to distinguish between propositional attitude ('Maxi believes that …') and propositional content ('the chocolate is…'). Thus, in order to pass the false-belief task, the child has to have an explicit representation of propositional content, propositional attitude, and holder of the attitude.

The child also has to know that Maxi's behavior will be determined by his mental state, rather than by reality. This implies that she now has to be able to integrate her knowledge about

Maxi as an agent with her knowledge about him as a perceiver and believer (for his belief state will be determined by where he saw the chocolate being hidden earlier and this in turn will determine how he behaves). As we saw in section 3.2, this kind of integrated representation is lacking at the level of implicit representations of intentional relations. At the implicit level, representations of others as perceiver, agents and bearers of emotions are domain specific and cannot be transferred to or integrated with information from other domains. But once the information has been recoded into an explicit format, it can be generalized and applied across domains, thus leading to a more complete notion of other persons – and of oneself.

Crucially for the thesis of this paper, there is also direct evidence that the ability to ascribe (false) beliefs to others develops in parallel with the ability to ascribe (false) beliefs to oneself. Although the relevant empirical evidence to date must be regarded as preliminary due to the fact that the majority of research on ToM has focused on 'reading other minds' rather than self-attribution of mental states, several recent studies confirm such a parallel development (see Happé 2003 for a review). Most impressively, a recent meta-analysis of ToM studies (involving 178 separate studies) comes to the conclusion that children do not pass self-belief tasks earlier than other-belief tasks:

> "The essential age trajectory for tasks requiring judgments of someone else's false belief is paralleled by an identical age trajectory for children's judgments of their own false beliefs. Young children, for example, are just as incorrect at attributing a false belief to themselves as they are at attributing it to others." (Wellman et al., 2001, p.665).

This confirms that there is a parallel development for the explicit representation of one's own mental states and those of others.

At around the same time of passing false-belief tasks, children also begin to display a number of related cognitive abilities (see Rakoczy 2008 for an overview). For instance, they begin to be able to solve unexpected content tasks (Perner et al. 1987)[27]. Moreover, they begin to distinguish appearance from reality (J. H. Flavell et al. 1983). That is, they begin to distinguish what an object seems to be (for instance a sponge that looks like a stone) from what it really is (i.e. a sponge). They also begin to participate in second-level perspective taking; for instance, they are able to tell whether a drawing looks upside-down to an observer that is sitting opposite from them (J. H. Flavell et al. 1981). Finally, they master tasks

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[27] In this task, children are being presented with a box (e.g. a smarties box) and asked what they think is inside. They are then being shown the real content of the box, for example a pen. Afterwards, they are being asked a) what another child will think is in the box, and b) what they previously thought was in the box.

involving intentional deception, for example by deceiving a "nasty" puppet, with whom they (or a "friendly" puppet) are competing for a reward, either through deceptive pointing or by telling a lie (Sodian 1991; Sodian 1994). What these tasks have in common is that they imply an understanding of epistemic perspectives as being different from reality, and of the fact that it is the content of subjective mental states provided by the respective perspective that is guiding the actions of individuals. In other words, the child learns to ascribe propositional attitudes to others and to use these as premises in predicting and explaining the behavior of others (Perner 1991; Rakoczy 2008).

Thus, at this level, children possess a theory of mind that is explicitly represented in E2/3 format. This is further supported by the strong connection between linguistic abilities and the understanding of beliefs and folk psychology (see P. A. de Villiers 2005; Zlatev 2008 for an overview). For example, deaf children who are not exposed to sign language from very early on show a delayed understanding of the (false) beliefs of others compared to children with signing parents and hearing children (Peterson & Siegal 1995). Moreover, longitudinal studies indicate that language development predicts theory of mind performance, but not vice versa (Astington & Jenkins 1999; J. de Villiers & Pyers 1997). Also, exposure to discourse involving different perspectives enhances false belief understanding (Lohmann & Tomasello 2003).[28]

Once the child has acquired the relevant linguistic skills that enable explicit theory-of-mind reasoning, it can also begin to engage in inner speech. There is evidence that inner speech in particular plays an important role for explicit self-consciousness, in the sense of explicit self-reflection. Portions of the left prefrontal lobe are associated both with inner speech and self-reflective activities, and studies using various measures of self-talk and self-reflection indicate a strong correlation between these two mental activities (Morin, 2005). According to Morin, inner speech turns the initially socially generated practice of talking and reflection upon oneself into an inner experience. As Morin points out, this idea was already expressed by Mead (1912/1964), who argued that inner speech in early childhood serves to make young speakers aware of themselves and their separate existence through an internalization of others' perspectives on oneself. So inner speech would reproduce social feedback and perspective taking, thereby internalizing it. Moreover, inner speech is thought to facilitate the conceptualization and labeling of self-related aspects, thereby rendering these aspects more salient and more differentiated (Morin 2005).

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[28] The relation between language acquisition and the development of self-concept is also emphasized by Baker, this volume.

As we can see, a number of social cognitive skills and forms of intersubjectivity are undoubtedly in place before the onset of linguistic abilities, and are arguably necessary requirements for the development of language. Nonetheless, linguistic abilities seem to be necessary to develop a full-fledged theory of mind. This might explain why chimpanzees and other great apes do not seem to be able to ascribe (false) beliefs or other mental states to others (with the probably exception of visual perceptual states), although they do seem to be able to engage in shared attention and selective imitation, and display mirror-self-recognition (Call & Tomasello, 2008).

Notice that I am not arguing that pre-linguistic forms of social cognition, which rely on an implicit understanding of others, are being replaced or abolished by later, linguistically mediated and explicit forms of mentalizing. Rather, the model I propose assumes that the more basic forms of social cognition are retained, such that social cognitive skills become gradually enriched and more complex as implicit information is redescribed into a more explicit format. In other words, we have various ways of understanding and interacting with others, some of which are based on implicit information about the mental states of others, others based on explicit representation.

4. Conclusion

I have argued that explicit self-representation requires the awareness of other subjects and of their similarity to oneself, such that one can contrast one's own bodily and mental states with those of others. This awareness develops over the course of an increasingly complex perspectival differentiation, during which information about self and other that is implicit in early forms of social interaction becomes redescribed into an explicit format. So my account suggests a gradual transition from implicit to explicit forms of self- and other-representation that leads to an increasingly complex array of social cognitive abilities and, in turn, to the development of a self-concept. The account is summarized in table 1 below.

We can now see how we get from the self-related information that is implicit in perception and bodily forms of self-awareness to an explicit representation of oneself as a subject among other subjects. The crucial element is intersubjectivity, which requires a mechanism that allows for the matching of first and third person information in concert with a process of representational redescription such as to enable a differentiation between self and other.

My account also suggests that we have multiple ways of understanding and engaging with others, which might require multiple explanatory strategies. Some of these are likely to

involve simulation processes and rely on bodily and implicit self-other matching, others require explicit mentalizing and linguistic abilities. Once the level of conceptual and linguistic self-other representation is reached, communicative actions, including personal and cultural narratives can begin to shape an individual's self-notion and influence its self-reflection and subsequently self-conceptualization as belonging to particular groups or cultures. It is not the place to argue for this claim here, but note that the account I have proposed suggests that it might be possible to conceptualize the different theories of mind which are currently debated, namely the theory-theory, the simulation theory, the interaction theory and the narrative practice hypothesis as complementary rather than as competing theories.[29]

Level	Age	Social cognitive abilities	Representational format
1	Birth onwards	Detection of multi-modal contingencies, neonatal imitation	Automatic cross-modal matching, no self-other differentiation
2	9 months onwards	Shared attention, selective imitation, social referencing, proto-imperatives and proto-declaratives	Implicit representation of self-other and of intentional relations, domain specific
3	18 months onwards	Mirror-self-recognition, self-conscious emotions, empathy, level-1 perspective taking	Explicit self-other differentiation and representation of intentional relations (E1)
4	4 years onwards	Mastery of false-belief and unexpected content tasks, level-2 perspective taking, appearance-reality distinction, intentional deception	Explicit representations of mental states, distinction between propositional attitudes and propositional contents, E2/3 representations, conceptual & linguistic

Table 1: Levels of self-and other-representation[30]

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[29] In this respect I take my account to be broadly compatible with the view expressed in Newen & Schlicht (2009). Although Newen & Schlicht see their "Person Model Theory" as an alternative to other theories of mind (and thus would object to the claim that they might be seen as compatible), they also argue that we have both nonconceptual and conceptual ways of representing and understanding other persons. Of course, whether we can see the different theories of mind as compatible rather than as competing will depend on how they are spelled out in detail – after all, for instance, both theory-theory and simulation theory come in rather 'different flavours'.

[30] Notice that the first level in my model is even more basic than level (I) in Karmiloff-Smith's model. Accordingly, my account posits at least four different levels, while Karmiloff-Smith's account posits three levels (if E2/3 representations are taken together as one level). However, I do not necessarily mean to suggest that children remain at this very basic level up until the age of 9 months – it is entirely possible that one might have to allow for even more fine-grained distinctions throughout the different developmental stages than the ones outlined here.

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