Social cognition, mindreading and narratives. A cognitive semiotics perspective on narrative practices from early mindreading to Autism Spectrum Disorders

SOCIAL COGNITION, MINDREADING AND NARRATIVES. A COGNITIVE SEMIOTICS PERSPECTIVE ON NARRATIVE PRACTICES FROM EARLY MINDREADING TO AUTISM SPECTRUM DISORDERS

ABSTRACT.[1] Understanding social cognition referring to narratives without relying on mindreading skills has been the main aim of the Narrative Practice Hypothesis (NPH) proposed by Daniel Hutto and Shaun Gallagher. In this paper, I offer a semiotic reformulation of the NPH, expanding the notion of narrative beyond its conventional common-sense understanding and claiming that the kind of social cognition that operates in implicit false belief task competency is developed out of the narrative logic of interaction. I will try to show how experience is shaped through meaning by the structure of narrativity and the way this can account for how narrative competencies do not just depend on language acquisition, but permeate the interactive competencies of pre-linguistic children and some social non-human animals. Developing during primary and secondary intersubjectivity and rooted in the semiotic ability to deceive and manipulate others, semiotic narrativity is the key bridge that leads us to mind and beliefs starting from basic perceptions, emotions and embodied enactive interactions. I will test my Narrative Practice Semiotic Hypothesis (NPSH) on Autism spectrum disorders, where social cognition skills don't work properly, connecting NPSH to the *Social Motivation Theory* of Autism (Dawson et al. 2005; Chevalier et al. 2012). I will finally answer some criticisms towards the original NPH, connecting its semiotic reformulation to early mindreading in infants and to some very recent experiments by Krupeneye et al. (2016) and Buttelmann et al. (2017) about false beliefs understanding in primates.

1. Early Mindreading and Narrative Practices

Things have changed a lot in the last ten years inside the debates about mindreading and social cognition. Mindreading skills were originally connected with the ability to pass a linguistic false belief test around the age of four. The idea of grounding a human child's ability to understand and represent another's false belief in her narrative competency, without the need to bring mindreading in, made a lot of sense for children who have been shown to successfully pass the standard false belief task at that age. As Shaun Gallagher and Daniel Hutto (2008: 25) have stressed, "it is notable that many false-belief tests are presented in the form of a narrative and could be interpreted as tests for a certain level of narrative competency".

[1] My thanks to Shaun Gallagher and to my two anonymous reviewers for the help in making this paper a lot better than it originally was.

In the last ten years, starting from the Onishi and Baillargeon (2005) experiments, early-mindreading entered the scene, becoming little by little the core business of social cognition ongoing researches. Indeed, the distinction between implicit and explicit knowledge played an increasingly important role not only in cognitive development, but in cognitive science at large. There are now several studies suggesting that implicit knowledge precedes explicit understanding. One important source of evidence is the finding that children learn to perform particular tasks before they can understand and talk about what they are doing.[2] Moreover, false beliefs tasks seem to require many other cognitive abilities in addition to mindreading skills. That's why mindreading could be at play a long time before the explicit capacity to pass a false belief linguistic task structured in narrative form. Many experiments during these last ten years are supposed to show that this is the case.

According to Onishi and Baillargeon (2005), 15 months old children have the same mindreading skills adults have, even if in a "implicit" and "more rudimentary" form. According to them, mindreading abilities simply refine and specialize themselves during the development, but they are already at work in infants before the acquisition of language and of those "explicit" skills that allow them to pass a false belief task. This position, shared also by Carruthers (2013) and Leslie (2005), has been challenged.[3] For instance, Ruffman and Perner (2005a: 215) think that infants need longer looking time simply because they must form a new association between the box, the actor and the object if compared to the one "still sustained in the frontal cortex when babies are exposed to the test stimuli". They also think that babies are simply using behavior rules and do not appeal to others' mental states (goals, perceptions and beliefs) to make sense of their actions (Ruffman and Perner 2005b: 463). A comparable interpretation grounded on behavioral abstractions concerning Theory of Mind experiments in primates has been provided by Daniel Povinelli[4] (Povinelli and Vonk 2003, Gallagher and Povinelli 2012). In any case, even if we think that early-mindreading deals with beliefs,[5] there is certainly no need to buy Onishi and Baillargeon's (2005: 257) idea that "children are born with an abstract computational system that guides interpretation of other's behavior". As I will claim in this paper, mindreading can be a very specific skill that children develop from interaction with their caregivers and from other cognitive skills before their 15 months of life. It has been argued that while explicit Theory of Mind tasks involve a fully-fledged Theory of Mind that operates on belief representations, implicit tasks recruit a minimal Theory of

[2] For an overview, Clements and Perner 1994, Ellis 2009.

[3] Low and Wang (2011) extended to infant data the original idea on mindreading in primates by Povinelli and Vonk (2004): no single behavioral experiment has been designed that can be uniquely explained by a mindreading account rather than behavioral rules. Shortly said, there are no experimental protocols intended to test mindreading capacities that could not also in principle be explained by the use of purely behavioral, non-mentalistic rules.

[4] See also Povinelli and Vonk (2004) and, for the so called "Povinelli's problem", Lurz, Shalisse and Krachun (2014) and Andrews (2015: chapter 6).

[5] See *infra*, § 8.

Mind that relies on some simpler states that are not belief representations, but make it possible to encode relations between the agent and its environment (Butterfill and Apperly 2013, see also Kovacs 2016).

Obviously, there is no general agreement on the interpretation of these data, but both the *anticipatory looking* and the *violation of expectation* methodologies[6] grounded on eye-tracking techniques allow us to go further than the original false belief tests, which assess only explicit understanding, in the sense that children are asked a question about the protagonist's belief or action that they have to answer. Both methodologies have been tested also on primates (Martin and Santos 2014, 2016, Krupeneye et al. 2016), showing that human infants and some nonhuman animals are actually able to solve some theory of mind tasks (cf. Apperly and Butterfill 2009, 2013, Buttelmann et al. 2017).

Is this early mindreading a challenge for the Narrative Practice Hypothesis (Hutto 2008, 2009, Gallagher and Hutto 2008)?

2. Interaction Theory and Narrative Practices

The Narrative Practice Hypothesis (NPH) is part of a larger enactive account of interaction sometimes referred to as "Interaction Theory (IT)" (Gallagher and Zahavi 2008, Gallagher and Hutto 2008). Inside this theory, NPH plays the role of an externalist way of accounting for the kind of third-person, "high level" ways of thinking about others' intentional states that explain ostensible behavior, like beliefs, intentions and desires (see *infra*, § 4) One claim of IT is that in early-mindreading experiments (both in infants and primates), we are not dealing with beliefs or other folk psychological states at all. IT claims that when the infants or the monkeys see that the agent is not in the position to see the shift of the toy from box A to box B, they are not inferring that the agent has a false belief about the location (Gallagher and Povinelli 2012: 147). On the contrary, "seeing what the other is doing is framed in terms of the possible actions I would take if I were to engage with that agent", without requiring the infant to "infer the agent's mental states (Gallagher and Povinelli 2012: 149). Since infants normally spend their entire first year interacting with others, they gain through interactions all those skills that are sufficient to handle meaning in situations like the ones at play in the early-mindreading experiments. During primary intersubjectivity (1-9 months), human infants, as well as some other social animals (Myowa-Yamakowshi et al. 2004), are already able to see bodily movements as goal-directed, meaningful intentional movements and to perceive other persons as agents, perfectly discriminating a biological movement from other kinds of movements (Simion et al. 2011). During

[6] Here is the general scenario of those experiments: (1) Agent puts toy in A, or sees toy put in A. (2) Infant sees that the agent can see where the toy is. (3) The toy is shifted from A to B, but the agent is not in a position to see this. (4) Infant sees that the agent couldn't see the shift. (5) When the agent still looks in B, there is a Violation of Expectation of the infant. Infants' looking time and places are recorded through eye-tracking techniques.

their embodied interactions, infants perform proto-mimesis, emotional interchange, imitation and the parsing of perceived intentions, interpreting the actions and the expressive movements of the others through meaning (Zlatev 2008). Later, during secondary intersubjectivity (after 9 months), children gain abilities like joint attention, joint actions and the reference to pragmatic contexts of action and this is all that is needed in order to explain early-mindreading experiments. Without appealing to mental states nor to behavioral rules, IT suggests that infants perceive the world and the others in terms of how the infant can act and interact with the agent and the world. According to Gallagher, this can be seen in some of the more interactive experimental designs used to study infants' social cognition.

> In a study by Buttelmann et al. (2009) 18-month-olds try to help an agent retrieve a toy while taking into account the fact that the agent doesn't know about a switched location (the false belief situation). In that situation, when the agent focuses on the wrong container (the original location, A), the infant is ready to lead him to the correct box (B), but not in the situation when the agent does know about the switch, i.e., the true belief situation, and still goes to A. In the latter case the infant goes to assist the agent at A. (Gallagher and Povinelli 2012: 149)

In my opinion, this is a key experiment not only for the IT approach to social cognition, but for the whole debate on mindreading. There is something really important here, since the experiment cannot be interpreted in terms of behavioral rules, because the infant sees exactly the same thing in the case of true belief (when the agent knows there has been a shift from A to B) as in the case of false belief (when the agent does not know about the shift).[7] The most obvious way to give an account for this result would be to introduce different mental states ("true belief" and "false belief") in order to explain behavior, but Gallagher denies that and interprets the experiments as an example of knowledge-ignorance:

> The fact that the infant knows either that the agent has seen the switch or not, plus the agent's situated behavior with respect to A (e.g., moving to A and attempting to open it), is enough to specify the difference in the agent's intention. […] The infant does not have to make inferences to mental states since all of the information needed to understand the other and to interact is already available in what the infant has seen of the situation. (Gallagher and Povinelli 2012: 149-50)

Buttelmann et al. (2009, 2017) explicitly deny that all of the information needed to understand the other and to interact with her is actually already available in what the infant has seen of the situation. This is why they think that their experiments cannot be interpretable in terms of knowledge-ignorance.

[7] In their 2017 version of the experiment (with apes), Buttelmann et al. (2017) decided to set up a second experiment in an "ignorance control condition" (the actor didn't know which box contained the object), demonstrating that apes were not responding based on a rule like "whenever someone is ignorant about where his object is, he will be looking for it". One of the main results of the Buttelmann et al. (2017)'s study is that apes behaved exactly like infants in the Buttelmann et al. (2009)'s experiments.

Buttelmann et al. underline this point with strength:

In all studies of false belief understanding, a key interpretive challenge is to distinguish an understanding of false belief from an understanding of knowledge-ignorance. This challenge applies even to the standard verbal false belief task: the child in the false belief condition might reason that the returning protagonist is ignorant about the location of the toy (which was switched when she was out of the room) and so she will just go where she saw it last (which is the correct answer). […] We also do not believe the knowledge-ignorance interpretation is a plausible one for our study. [...] The key moment is when the agent is trying unsuccessfully to get into the box, and clearly needs help. The child wants to help. What should she do? (Buttelmann et al. 2009: 341-2)

In the true belief condition, 75% of 2 and half year old children correctly opened the wrong box with no toy which the agent had just tried to open, "assuming that since he knew the toy was in the other box, he must want to open this one for some reason" (Buttelmann et al. 2009: 339). In the false belief condition, 83.3% of children opened *the other box*, the one containing the toy, apparently assuming that the agent, who had a false belief, was trying to open the first box in order to get the toy. The percentages changed at 84%/72% with eighteen-month-old infants and at 56%/80% with sixteen-month-old children. In this way, Buttelmann et al. (2009: 340) claimed that "infants clearly make use of their understanding of others' false beliefs to help them appropriately".
Is there a way to interpret Buttelmann's experiments without introducing a mental "in the head" explanation, or without thinking that the information needed to understand the other and to interact with her is actually already available in what the infant has seen of the situation?
Some months ago, Buttelmann et al. (2017) replicated the very same experiments with great apes (chimpanzees, bonobos and orangutans), finding out the very same results they had with 16-month-old infants, with striking similarities also regarding percentages in both true and false beliefs conditions. This is why they claimed that "apes may have a basic understanding of others' false beliefs". According to Buttelmann et al., the main question is on what basis did infants and apes act as they do in the false belief condition. Why did they not just help the agent open the box as in the other condition?

The most plausible explanation for this behavior, in our opinion, is that children imagined (as it were) a thought bubble in agent's head containing the desired toy in the box he put it in: he is trying to get into the box because he believes the toy is in there (he saw it go in there but did not see it go out), and so that must be what he wants. If children in this false belief condition were simply attributing to the agent a blank thought bubble of ignorance, then they would have no reason to go retrieve the toy – unless one thinks that somehow the toy is especially salient on its own. But then – flipping back to the true belief control – one must explain why they do not find the toy especially salient when everything is exactly the same but the agent was in the room when its location was switched. To override the tendency to simply help the agent open the box, which is their most frequent natural response (and a kind of 'pull of the real'), children in the false belief condition had to attribute to the agent the false belief that the toy was in there. Thus, the main

logic of the current study – and what makes it a study of false belief, in our opinion – is that without an understanding of the agent's false belief, children cannot help him appropriately because they cannot know that he wants the toy. (Buttelmann et al. 2009: 342)

This is the "in the head" interpretation given by Buttelmann et al. (2009), but, even if we don't buy it, in my opinion their experiments are still not fully explainable in terms of perceptual and interaction processes of primary and secondary intersubjectivity, as IT claims. In order to act as they do, infants have to imagine two different contents driving different behaviors: ignorance is not enough, as Buttelmann et al. (2009) already said, but in the true belief condition infants can help opening the empty box only if they imagine that the agent wants to open the empty box *for some other reason*, different from the one of getting the toy. The world can afford a different possibility of action only because the child bets something about the kind of cognitive content driving the agent's behavior: that's why in the false belief condition they open the other box, imagining that the agents wants to get the toy, but in the true belief condition they help the agent to open the empty box, since they are imagining that another kind of content is driving her behavior. The idea of cognitive content driving the behavior of someone who act for reasons seems to be needed here.

However, in order to account for folk psychology competence in terms of "acting for reasons" without introducing the capabilities of inferring other's mental states, IT has to refer to narrative practices, which cannot be involved in those kind of early-mindreading embodied interactions, since the Narrative Practice Hypothesis, in Gallagher and Hutto's formulation, is actually linked to stories, to language acquisition and to a full-fledged development of the self. So we face an explicatory gap: i) we are dealing with some kind of "high-level" practice of making sense of intentional actions in terms of reasons, involving some way of thinking about others' intentional states that explain ostensible behavior. ii) In order to account for all that without introducing some internal, "in the head", mechanism of cognition (as Buttelmann et al. do), IT has to rely on the Narrative Practice Hypothesis, but, iii) how can those mindreading-like skills be grounded on narrative practices, if both children and primates do not even have language or a fully developed standard narrative competence?

In this paper, I will try to resolve this explanatory gap and show that narrative practices do play a central role even in early mindreading skills. This will help IT to account for social cognition skills relying exclusively on narrative embodied interactions. Of course, what is needed is a reformulation of Daniel Hutto's language-based conception of the Narrative Practice Hypothesis (NPH), that holds that "we only acquire a practical understanding of belief by engaging in conversation" and "it is only those linguistically competent actors that […] are the proper subjects of folk psychological narratives" (Hutto 2006: 207, 238). In order to do this, I will introduce one main founding idea of the semiotics tradition: *narrativity is the deep structure of meaning*, so that we always make sense

out of our own actions and out of the action of others by placing them in a narrative framework, in a technical sense that I will outline below. As we will see, according to semiotics, narrativity is derived neither from meaning nor from language: on the contrary, meaning and language are built on its structure. In this way, reframing the Narrative Practice Hypothesis on a semiotic ground means to claim that social cognition skills related to narrative practices develop in babies before their acquisition of language, in agreement with Onishi and Baillergon (2005), Southgate et al. (2007) and Michael Tomasello's proposals (2014). We can move thus towards a new conception of social cognition that sees mindreading as a very specific skill developed from semiotic and prelinguistic narrative practices, that language extends beyond embodied interactions (Extended Mind Theory)[8] quite a long time before we are able to pass the "false belief" test (Theory of Mind). This idea, that I am going to develop now, can integrate and give strength to narrative theories as an alternative to the Theory of Mind inside the current debate of social cognition. In brief, we are going to propose a Narrative Practice Semiotic Hypothesis (NPSH), bringing together a semiotic approach with the narrative theory originally developed by Gallagher and Hutto.

3. Theory of Mind?

What is a "Theory of Mind" within that cognitive science tradition?

> The expression "theory of mind" is generally used as a shorthand for our ability to attribute mental states to self and others and to interpret, predict, and explain behaviour in terms of mental states such as intentions, beliefs and desires. (Gallagher and Zahavi 2008: 171)

"Classic" cognitive scientists considered cognition as an autonomous and internal realm which had to be studied as such and which could be useful also to account for the way we give meaning to our actions by referring to mental states such as beliefs, desires, intentions, etc. The idea that beliefs, desires, sensations guiding our actions depend on a specific *corpus* of knowledge that explains how our mental states connect and interact has been called "theory theory" (TT). Its name indicates that the specific *corpus* of knowledge controlling action is a kind of "theory" on the basis of which we act. Furthermore, this theory is also the basis of our reading of others' actions, beliefs, desires and intentions: we use a "theory" about how people behave (folk psychology) in order to infer (mind-read) beliefs, desires and intentions that give meaning to others' actions. Of course, the use of those "theories" is not always explicit and conscious, nevertheless, it controls our attribution of meaning to all those phenomena (cf. Crane 1995).

[8] *Cf.* Fusaroli, Gangopadhyay and Tylén (2013). For a new perspective on embodiment, see Pennisi and Falzone 2017.

TT holds that the understanding of minded beings (be it oneself or others) is theoretical, inferential, and quasi-scientific in nature. It views the attribution of mental states as a matter of inference to best explanation and prediction of behavioural data and argues that mental states are unobservable and theoretically postulated entities. It consequently denies that we have any direct experience of such states. (Gallagher and Zahavi 2008: 172)

In cognitive sciences, this theory has reigned undisputed for years, until the arrival of the simulation theory (ST) (*cf.* Gordon, 1986; Heal, 1998; Goldman, 1989, 2006). ST proposes a radically different model: it argues that, in order to understand others, we use our own mind as a model and through it we simulate beliefs, desires and other intentional states that we then project onto others' minds, in order to explain or predict their behaviours.
This theory, developed in the late 80s, has been strongly helped by more recent neurophysiological researches on mirror neurons (Rizzolati and Vozza, 2011), since the existence of mirror neurons has been interpreted as the existence of an unconscious simulation principle already working at a neural level (Rizzolati and Craighero, 2004; Gallese 2001, 2007).

Whenever we are looking at someone performing an action, beside the activation of visual areas, there is a current activation of the motor circuits that are recruited when we ourselves perform that action. […] Our motor system becomes active as if we were executing the very same action that we are observing. Action observation implies action simulation. (Gallese 2007: 37-38)

However, aside from the interpretation in terms of ST, the neuroscientific discovery of mirror neurons basically shows us a common neurobiological ground for action, perception and imagination. It tells us that specific social cognitive endowments of our species are the evolutionary outcome of the selection of mechanisms that are not intrinsically cognitive or, at the very least, certainly not mind-reading specific. They come from action and, as we are going to see, from action's motor and rewarding structures. The main claim is that key aspects of human social cognition are underpinned by neural exploitation; that is, the adaptation of sensory-motor and rewards integrating brain mechanisms to serve new roles in thought and language, while retaining their original functions as well (see Gallese and Lakoff 2005).
All this seems to go in the direction of an enactivist theory of perception like the Interaction Theory, rather than towards Simulation Theory, since it poses a common basis for perception and action, which is the strong argument made by the enactivists (Noë, 2006, Menary 2006, Gallagher 2017). If perception is an enactive, sensorimotor process, and not simply a process of sensory reception, the resonance processes through mirror neurons can be easily considered as being part of the perceptual process when perception focuses on others' actions. Gallagher, for example, has proposed an enactive alternative to the ST interpretation: mirror neuron activation is not the beginning of a

simulation, but it is part of an intersubjective perception of what the other is doing. Indeed, neural systems do not activate themselves, but they are activated by the other's action. It is the other that triggers the activation. But this is not a simulation, it is a perceptual event that is a response to the other (*cf*. Gallagher and Zahavi 2008: 268-279). This seems to be just the opposite of what the ST argues, namely that our mind is activated as a model in order to "put ourselves in the other's shoes". However, whatever position we take on these topics, this subpersonal level cannot explain on its own the majority of the "high level" social cognition skills that require folk psychology competence. Here is where the Narrative Practice Hypothesis enters the scene.

4. Narrative practices and social cognition

The NPH claims that the normal route by which children acquire their folk psychological competence is through exposure to narratives of a special sort, those that "make explicit mention of how mental states (most prominently, beliefs and desires) figure in the lives, history and larger projects of their owners, *inter alia*" (Hutto, 2009: 11).

We have mental states, but mental states come from social narrative practices grounded in the world and not in the head, in which beliefs and desires figure in the lives and projects of their owners. That's why folk psychology is acquired through narratives.

> The core claim of the Narrative Practice Hypothesis is that direct encounters with stories about reasons for acting, supplied in interactive contexts by responsive caregivers, is the normal route through which children become familiar with both (1) the core structure of folk psychology and (2) the norm-governed possibilities for wielding it in practice, knowing *how* and knowing *when* to use it. (Hutto 2006: 231-2)

By folk psychology, Hutto means our everyday practice of making sense of intentional actions (our own and those of others) in terms of reasons (beliefs, desires etc.).[9] Since folk psychological narratives – as exemplified by *Little Red Riding Hood* – are distinguished by being about agents who act for reasons, the NPH claims that folk psychological competence is constitutively related to narrative practices. That is the core claim of the NPH.

> The Narrative Practice Hypothesis provides a different story about the basis of this competence than that of TT, ST or their various combos. Without distracting refinements, its central claim is that specific kinds of narrative encounters are responsible for establishing folk psychology-competence. It denies that its acquisition depends on the existence of any kind of dedicated mindreading mechanisms. Nor is it forged by theorizing activity. (Hutto 2008: 177)

[9] Hutto makes an important departure from classical theories of mind explicitly excluding prediction from it and concentrating only on explanation based on reasons.

Hutto's idea (2008: 177) is that our cognitive folk psychological competence is developed by and rooted in a *socially shared set of narrative practices*: "this requires that children are appropriately immersed in intersubjective narrative activities and supported by others". Rather than by reading others' minds, by simulation or by a theory, our cognitive folk psychological competence is shaped by a stereotypical set of narrations.

The Narrative Practice Hypothesis (NPH) claims that children normally achieve this understanding by engaging in story-telling practices, with the support of others. The stories about those who act for reasons — i.e. folk psychological narratives — are the foci of this practice. Stories of this special kind provide the crucial training set needed for understanding reasons. They do this by serving as exemplars, having precisely the right features to foster an understanding of the *forms* and *norms* of folk psychology. (Hutto 2007: 53)

Therefore, according to this hypothesis, not only does the narrative competence not depend on a guide-theory or a set of principles located in our mind, but it is indeed the cognitive competence itself that depends on the structure of narrativity. It is no coincidence that Hutto argues that different kinds of folk psychology can result from different stocks of "stories" inscribed in a culture's encyclopaedia.

The central claim of the NPH is not compatible with TT, ST or TT-ST combos where these theories seek to explain the basis of our core FP [folk psychology]-competence. If the NPH is true, FP-competence does not equate to or derive from having a Theory of Mind (ToM). […] Our minds do not literally contain the basic FP principles. The NPH eschews any crude internalizing stories that claim that whenever we learn a competence we must store it as a set of propositional rules in our 'heads'. (Hutto 2008: 178)

This kind of position radically undermines the internalism which had characterised a big part of the cognitive science paradigm. It is no coincidence that, for these internalist theories, what controlled actions and their meaning was exactly a theory of mind. Furthermore, the theory of mind was the very condition of possibility for intersubjectivity and for the construction of a social world, which constitutively depended on it. This kind of position was widely shared inside the scientific community:

Mind-reading appears to be a prerequisite for normal social interaction: in everyday life we make sense of each other's behavior by appeal to a belief-desire psychology. (Frith and Happé, 1999: 2)
It is hard for us to make sense of behavior in any other way than via the mentalistic (or "intentional") framework. […] Attribution of mental states is to humans as echolocation is to the bat. It is our natural way of understanding the social environment. (Baron-Cohen 1995: 3-4)

Mind-reading and the capacity to negotiate the social world are not the same thing, but the former seems to be necessary for the latter. […] Our basic grip on the social world depends on our being able to see our fellows as motivated by beliefs and desires we sometimes share and sometimes do not. (Currie and Sterelny 2000: 145)

In the more radical proposals, like the one by Malle (2002), a cognitive theory of mind has been considered as the equivalent of the Kantian categories for cognition and for the human social behaviour based on cognition:

Theory of mind arguably underlies all conscious and unconscious cognition of human behaviour, thus resembling a system of Kantian categories of social perception — i.e., the concepts by which people grasp social reality. (Malle 2002: 267)

The introduction of the idea of narrativity overturns that series of relationships placed under the primacy of internalism: social perceptions and social cognitions are the condition of possibility of our inner mental states. Once the concept of narrativity appears, the very idea of cognition stops concerning necessarily the mind and the processes occurring under the individual's skin. Instead, folk psychology and, more in general, cognition starts to depend constitutively on the construction of a social world and on intersubjectivity, which both define its conditions of possibility.

A complementary idea is that other kinds of narrative competences enable a less mediated interpretation of the other's actions and intentions, that is, without the need for a folk psychology of mental states. Normally, coming to understand another's reasons is not a matter of comprehending their discrete "mental states" but rather their attitudes and responses as whole situated persons. I encounter the other person, not abstracted from their circumstances, but in the middle of something that has a beginning and that is going somewhere. I see them in the framework of a story in which either I have a part to play or I don't. The narrative is not primarily about what is "going on inside their heads"; it's about what is going on in our shared world and about how they understand and respond to it. In this sense, our commonsense understanding of others does not consist of folk psychological theory, but of the skilful practical reasoning that depends on a developed narrative competency. (Gallagher and Zahavi 2008: 193)

It seems promising to argue that the way we understand the others is not grounded on a mindreading mechanism, which indeed is a very specific skill developed from our pragmatic interaction with others, where the subject is not an observer of others' actions but a "fellow character" interacting with them inside of a practice. The aim is to show how social cognition skills like mindreading can be derived from narrative practices of this kind. This would allow us to build a perspective through which, as far as mindreading is concerned, intersubjectivity and sociality logically precede the cognitive processes occurring under the individual's skin, crucially contributing to their formation. As I will try to show in the next paragraphs, it is action with its

narrative logic that shapes the mindreading cognitive ability and the related theory of mind, not vice versa. Cognition is a function of action and action is immediately an inter-action. This is the key point both for the enactivist Interaction Theory and for the semiotic perspective. Indeed, semiotics has been grounded on pragmatism and the work of Charles Sanders Peirce, according to whom cognition – from perception to the most complex problem-solving activity – was a form of action and not a relation between a thought in the head and a behaviour in the world. This is not the best place to discuss all those points in detail.[10] It is enough to say that semiotics was originally born as a theory of cognition and that, from the very beginning, it was conceived as a theory of *social* cognition, grounded on intersubjectivity and on habits established starting from the previous knowledge circulating within the community (interpretants), rather than on processes occurring under the skin of the individuals. Peirce will often be extremely radical about this point: he will argue that "just as we say that a body is in motion, and not that motion is in a body we ought to say that we are in thought and not that thoughts are in us" (CP 5.289); that mind is an "external phenomenon" which has been confused with a series a internal processes (CP. 7.365); and finally that "we have no power of Introspection, but all knowledge of the internal world is derived by hypothetical reasoning from our knowledge of external facts" (CP 5.265).[11]

5. Weak points of NPH and the Narrative Practice Semiotic Hypothesis

That said, let's come to our main question: what is the theory of narrativity implicit in the NPH, which entrusts narratives with such a great power at the level of cognition? In my opinion, the NPH does not offer or incorporate a theory of narrative competence at all. It simply says that narrative practices play a critical part in engendering folk psychological competence, but it studiously avoids providing a theory or definition of what narratives are. Rather, it operates under the assumption that it is uncontroversial that narrative practices of the right kind exist. This has to be challenged. I think that NPH cannot be taken as a real alternative to Theory of Mind positions if it doesn't throw light on this topic and points out what narratives really are.

Moreover, as Pierre Jacob (2011) pointed out, in order to accomplish the task it wants to accomplish, NPH has to answer two questions: i) what is distinctive of the cognitive ability of framing and understanding a narrative and, ii) how could it be the basis of one's understanding of other minds beyond the limits of the interactive approach, like in the enactivist theory of action and perception developing through primary and secondary intersubjectivity we have dealt with (cf. Jacob 2011: 533-4).

10 I have discussed all those points in connection with the Extended Mind and Distributed Cognition theories in Paolucci (2011). See also Eco 1979 and Paolucci 2010.

11 For an overview on the relationship between semiotics and cognitive sciences, see Fusaroli and Paolucci 2011.

We will handle all these questions, going a little bit more into the details of Jacob's argumentations in the last paragraph of this paper. Let's start from the definition of narratives, from Gallagher and Hutto (2008):

> What are narratives? This is a tricky question and providing a good answer to it is beyond the scope of this paper. A very minimal definition will suffice for our purposes. Larmarque tells us that for something to be a narrative "at least two events must be depicted in a narrative and there must be some more or less loose, albeit non-logical relation between the events. Crucially, there is a temporal dimension in narrative". (Gallagher and Hutto 2008: 31)

This definition is too minimal, because the main point concerns exactly the nature of that "non-logical relation between the events" which constitutes narratives. Hutto tells us nothing on this crucial point. Here is exactly where semiotics enters the scene, because semiotics is able to throw light exactly on that topic, unfolding the nature of these non-logical (narrative) relations between events which constitute narrativity.

For semiotics, *narrativity is a morphology with a regular pattern that structures meaning and experience*. This form is irreducible to either cause-effect logic or type-token logic. According to this idea, narrativity is prototypically expressed in narrative texts and practices, but is at work even in non-narrative ones. The idea comes from two of the most important semioticians, the French-Lituanian Algirdas J. Greimas and the Italian semiotician Umberto Eco. In *The role of the reader*, there is a very popular analysis by Umberto Eco (1979) that shows not only that the structure of narrativity lays also in non-narrative texts, such as Spinoza's *Ethics*, but also that it was constitutive of a peculiar way of organising actions and events in time. In the semiotic view, stories provide forms of organisation able to help human cognition organise the manifold domains of experience and knowledge, each one with its set of beliefs, practices and procedures.[12] Narratively accounting for facts and happenings is a way of filling the cognitive gap between general encyclopaedic knowledge of the world (e.g., the knowledge that water freezes at 0°C) and the way that knowledge is used in a particular situation (e.g., the fact that I slipped on the ice yesterday).[13]

> Understanding reasons for action demands more than simply knowing which beliefs and desires have moved a person to act. To understand intentional action requires contextualizing these, both in terms of cultural norms and the peculiarities of a particular person's history or values. In this light, reasons for acting are best thought of as "the *elements* of a possible storyline". (Gallagher and Hutto 2008: 27)

If we make a distinction between a particular experience and the understanding of some elements as

12 *Cf.* Lorusso, Paolucci and Violi (2012). See also Herman (2003: 165).

13 *Cf.* Danto 1985: 238. See also Mink 1978 and Talmy 2000. This fits perfectly well with Laura's example in Gallagher and Hutto (2008: 26-8).

tokens of abstract schemes, we can place narrativity *between* those two extremes, in a position of mediation. According to semiotics, narrativity plays the role of schematism (in the Kantian sense) between type and token and between our phenomenological experience and our capacity to interpret it as the token of a type. This is exactly that "non-logical" relationship between events which constitutes the particular form through which narratives shape experience. Narrativity mediates between intersubjectivity and my own personal story and that's why, as Hutto perfectly states, our own folk psychological competence is acquired through exposure to stories that show how beliefs and desires figure in the lives and projects of their owners. This answers to Pierre Jacob's first question to NPH, showing what is distinctive of the cognitive ability to frame and understand a narrative.

Semiotic's idea of narrativity is an evolution and an improvement of Jerome Bruner's argument according to which "there are two modes of cognitive functioning", two modes of thought, "each providing distinctive ways of ordering experience, of constructing reality": narrative thought and paradigmatic thought.

> The two (though complementary) are irreducible to one another. […] Perhaps Richard Rorty is right in characterizing the mainstream of Anglo-American philosophy (which, on the whole, he rejects) as preoccupied with the epistemological question of how to know truth-which he contrasts with the broader question of how we come to endow experience with meaning, which is the question that preoccupies the poet and the storyteller.[…] Scientists, perhaps because they rely on familiar stories to fill in the gaps of their knowledge, have a harder time in practice. But their salvation is to wash the stories away when causes can be substituted for them." (Bruner 1986: 11-3).

But obviously it is not enough. According to semiotics, narratives show a regular pattern, a deep structure which stays constant. Semioticians call it "narrativity" and think that narrativity is the form of narratives, but it is also the form of our attribution of meaning to experience. This is why semioticians think meaning has a narrative form, which is at work even in non-narrative texts or in social practices, institutions etc.

Inspired by Vladimir Propp's study of the Russian folktale (Propp, 1928), by Claude Levi-Strauss' analyses of the structures of myths (Levi-Strauss, 1958) and by Paul Ricoeur's theory of subject, Greimas (1970, 1983) argued that narrativity is at the core of the organisation of meaning, since it defines a set of structural relationships involved in any course of action. According to Greimas and to semiotic tradition, narrativity is not a property of a particular text type (tale, story etc.), but it constitutes a pattern of organisation which can be found in any text or practice concerned with action, be it a fairy tale, a cooking recipe or a scientific paper.[14]

[14] See Robichaud (2003: 39).

Narrativity is a particular way of shaping a process of transformations and to give meaning to experience means to organize it in a narrative way. This is an everyday experience in situations like anxiety or restlessness, when something important has happened and we still can't really focus its main point. What do we do? We call a friend or a girlfriend and we need to tell him or her our story. This is because storytelling has its own logic and its own structure, so to tell what has happened to us means to shape it through the structure of narrativity, and shaping it through this kind of structure means to give meaning to it. So restlessness asks for meaning, storytelling gives meaning thanks to its structure. That's why we usually feel better when we have told our story: we have given meaning to experience through the structure of narrativity. That's why narratives cannot be "a special kind of representational artifacts" or "complex representations": they don't represent experience, they shape it through meaning and this has a looping effect, in the sense that it gets reincorporated back into our experience.[15]

In the semiotic tradition, narrativity involves a set of positions called *actants* that can be filled by various concrete entities called *actors*.[16] We are actors that fill the positions of the actants, the positions of the others that can also be filled by other actors and not by us: that is why we gain folk psychology from narratives. We sometimes occupy the same position that can be filled by others. I would say that folk psychology and mindreading are topological properties of narratives. If the variety of actors is infinite, or, at least, indefinite and vary from story to story, the structure of the actants is much more stable and it is exactly with this structure that semiotics identifies narrativity. Briefly, narrativity is a processual form of interrelated positions organized in a suitable and stable way beyond the superficial variations characterizing any single story. According to semiotics, *narrativity is not the story, but the structure of positions that gives shape to the story and embodies in it*. These positions are interrelated according to a prototypical structure developing in four steps. These four steps have been identified studying narratives (tales, myths etc.), but it has been shown by semiotic tradition that they can be found in any discourse or practice involving acting for reasons.[17]

The first step, often called *contract*, is the one that is supposed to establish the system of values which will frame further actions. We can have different kind of manipulations between actants here: from *authority*, which Greimas describes as the transfer of a "having to do" (for example a king asking a hero to rescue a princess in order to save the village), to *persuasion* (described as the

[15] Gallagher and Hutto (2018) define narratives as "a special kind of representational artifacts" in order to i) distinguish narratives from action, ii) derive them from embodied experience and iii) avoid pan-narrativism. I will answer to all these ideas in a future paper, working on the relationship between narratives and experience.

[16] *Cf.* Greimas (1983). See also Lorusso, Paolucci and Violi (2012).

[17] The bibliography on this particular topic blends with the whole semiotic tradition and I believe that this is one of the most important discoveries of the whole discipline. However, a clear introduction can be found in Bertrand (2000) (chapters 4 and 5). Of course, Greimas (1970, 1983) has been the main developer of this idea.

transfer of a "willing to do"), to *permission* (for example someone who asks the permission for acting, as in the academia assistant professors do with full professor). In all these variable cases, what really matters is the establishment of something worth acting for: *values* that need actions in order to be preserved or transformed.

The second step is often called *competence*: in order to act a subject must have the necessary abilities, the "knowing how to do", as Greimas calls them. A number of important transformations enacted in narratives address this issue transforming the agent into an agent particularly competent to perform the transformation at the core of the story. We will have further different relations between actants here: helpers and opponents who help or create obstacles for the subject looking for "knowing how to do" (for instance, in order to free the princess, a hero of a tale may need a magical sword or some important information and loads of secondary characters and objects can fill the role of his helpers and opponents. Or in order to pass an exam a student needs books to build his own competence and these are helpers).

The third step is *performance*, a transformation where the subject transforms the undesired state by obtaining his object(s) of value (which, of course, can also be a non physical object, a state of mind or whatever else he aims for). This third step represents the core transformation in any narrative, the transformation for which the subject was previously prepared by being manipulated and made competent. Subject and object are usually the actants involved in this third stage.

The fourth step of the semiotic narrative schema is *sanction*. At this stage, the subject receives an acknowledgment of his success or failure by virtue of a given system of values (usually the one established in step 1). As we will see, this fourth step is extremely important and connected to impairments in social skills.

According to Greimas (1970, 1983), this simple list of four patterns of transformations can account for all the narrative construction he had ever encountered. This pattern of transformation is what makes a sequence with non-logical relations between the events a narrative. Behind this simple construction, semioticians would argue, there lies a fundamental organization of transformations that will be found in any description of action if it is to be meaningful. This is why, according to semiotics, narrativity is exactly the form of sense shaping the actions in their being meaningful for us.

Obviously, you have this kind of pattern in every detective story, in every fairy tale, in every blockbuster movie, but also in complex practices like an exam at university where an institution sets a system of values, the student must acquire a competence, make a performance and be judged by the teacher. Also, narrativity, in this semiotic sense, can be found in the majority of animal cultures: the little puppy has to gain competence about getting food, has to make his own performances and get judged on his own behaviors (Marrone and Mangano 2018). The semiotic idea for narrativity is

not an explicit narrative storytelling at all, but the deep pattern that structures it and develops the ability to see and to frame the other in a detailed pragmatic and social context, where values can be shared and transformed.

This kind of structure is at play during primary intersubjectivity, especially during proto-mimesis and emotional attunement between caregivers and babies (Violi 2012). However, a completely developed narrative pattern seems to emerge with the emerging of secondary intersubjectivity,[18] when an object or an event can become a focus between people: an object of value that can be communicated about. The emerging of a "third" beyond the mother/child interaction - that can be a value for both - is actually crucial for developing a full-fledged narrative framework. Around the age of 1 year, but also before, around 9 months, together with the developing of a semiotic competence (Vygotskij 1986), the infant goes beyond person-to-person immediacy and enters contexts of shared attention and shared situation in which he starts to learn what things mean and what they are for, together with the idea that these values can be transformed and manipulated. Children begin to build their own stories in order to cheat you, like in the false cry to get an object and not only the attention of their mother.

This is crucial for developing mindreading and all the cognitive skills required in order to handle and understand false belief situations properly. At around 9 months, children start to construct worlds which are alternatives to the one they are living in, situations decoupled from the actual one. They start to imagine fictional worlds and – more important – they start working in order to make these fictional imagined situations become the real actual one. They want an object, a third that is a value for them, so they begin to obtain the competence in order to get it and they actually perform something in order to own it, false crying in order to manipulate the mother and make her bring the object they want. They learn that they can manipulate, and be manipulated, that the others can believe things that are not actually true, that the caregiver can really believe they are actually crying and that all this can change their world in a way they want it to be. That's how human abilities to represent another's false belief are connected to narratives and to all those semiotic skills which allow someone to construct signs that stand for other things and can be used to lie. After all, this was exactly the most beautiful definition by Umberto Eco (1975: 13): "semiotics is the discipline that studies everything that can be used in order to lie".

This answers the second question raised by Pierre Jacob, showing how semiotic narratives can be the basis of one's understanding other minds beyond the limits of the interactive approach, like in the enactivist theory of action and perception we have dealt with in the previous paragraphs.

[18] Trevarthen and Hubley (1978), Gallagher and Hutto (2008).

6. Mindreading and narratives

It is important to stress that this idea of narratives introduces a stable pattern of action that is grounded on intersubjectivity. It concerns meaning and the way we give shape to our experience and it implies a set of evaluations that can be influenced by emotions, feelings etc. This stable pattern does not happen in the head, but embeds emotions, social practices, objects, affordances and transformations of values that are not about what is going on inside the heads, but are about what is going on in the world. Here again we can quote Bruner's idea that there are two basic ways of organizing our experience, the logical-cognitive one and the narrative one and my idea is that social cognition and meaning are mainly focused and structured by the narrative one. This is also why the Narrative Practice Hypothesis has nothing to do with a Theory Theory approach, which connects social cognition to logical-cognitive ways of organizing experience.

This semiotic characterization of narratives shows appropriately what Hutto states to be the main core of NPH, that is, the fact the narratives embody our practice of making sense of intentional actions in terms of reasons. More, semiotics unfolds the structures of this "acting in terms of reasons" (contract, competence, performance and sanction) and provides a reliable definition of what narratives are. However, there are some differences that need to be underlined. If compared to the "post-Brunerean" conception of narrativity developed by semiotics, Hutto's idea of narratives is much narrower, closer to the common use of the word and limited to folk psychology competence. It is no coincidence that, when Hutto speaks of "narrative competence", he refers to that particular kind of intersubjective interaction which is able to form the cultural competence of a child between 2 and 4 years of age, but surely not to what "narrative competence" means for semiotics.

This aspect should be carefully considered, if we want to understand the role played by narratives for our early mindreading problems. Indeed, for a semiotician, a narrative competence exists long before the second year of age, because there is narrative competence if there is a transformation of values developing through the acquisition of a competence, a performance and a sanction according to a certain system of values. So we have narrativity in secondary intersubjectivity, but also before. When a 7-8 months-old infant starts perceiving various bodily movements as meaningful and he can answer them in interactive response, and having back his mother's smile as a reward, for a semiotician there is an evident narrative competence already operating, able to transform the values involved and link together a series of correspondent actions/passions (*cf.* Violi 2012). Conversely, for Hutto and Gallagher (2008), narrative competence is what is linked to the "stories" in the strict sense of the word, and which is not shown earlier than 2-4 years of age. In particular, in Gallagher (2006) and Hutto's (2006) view, narrative competence develops through language acquisition, the development of an autobiographical memory and the formation of the concept of self.

But let's stop for one minute. This can tell us something important about theory of mind and the

whole story we are telling. The NPH has been introduced in order to explain our everyday practice of making sense of intentional actions in terms of reasons (beliefs, desires etc.), without introducing a theory of mind. I totally agree on that. We want a social cognition theory without buying into the idea of mindreading abilities as understood by Theory Theory or Simulation Theory. More, we want not only that the way we understand others is not grounded on a mindreading mechanism, but we also want to think mindreading as a very specific skill, developed from our pragmatic interaction with others. How can we derive mind-reading abilities by our pragmatic interaction with others inside narrative practices?

Animals also have social cognition skills: they read others' actions, desires and intentions. They have to do that in order to survive in the wild. But animals do not have language. They also don't have a mind like we are supposed to have in the sense of the theory of mind (cf. Martin and Santos 2014, Tommasello and Call 2008). But they have the ability of making sense of intentional actions in terms of reasons, to predict the behavior of other agents (specifically in competitive situations) by attributing simple, reality-congruent states such as seeing, knowing, and ignorance, as well as motivational states such as desiring, intending, and having a goal.[19] They need all that for their own survival. Very recent studies by Krupeneye et al. (2016) and Buttelmann et al. (2017) also claim that "in a nonverbal (implicit) false-belief test which is passed by human 1-years old infants, great apes as a group, including chimpanzees (*Pan troglodytes*), bonobos (*Pan paniscus*), and orangutans (*Pongo abelii*), distinguish between true and false beliefs in their helping behavior. Great apes thus may possess at least some basic understanding that an agent's actions are based on her beliefs about reality" (Buttelmann et al. 2017: 1).

What do all these animals have if they don't have language or a theory of mind connected to propositional attitudes like we do? They have all those kinds of social interactions where the immature animal has to gain competence about getting food or other crucial activities, he has to make his own performances and get judged on his own behaviors inside particular systems of values. Which is exactly the semiotic idea of narrativity. Our everyday practice of making sense of intentional actions in terms of reasons (beliefs, desires etc.) is a skill that comes from social

[19] See Fletcher and Carruthers 2013. Of course, there is no need to buy the idea that nonhuman primates, most specifically great apes, have an innately channeled mindreading module, especially because it seems not clear if they they lack the capacity to attribute reality to incongruent mental states, such as false beliefs and misperceptions. Martin and Santos (2016: 381) go in this direction: "primates understand something critical about the relation between agents and information: primates can represent relations between agents and information that is true from their own perspective. Such awareness relations allow primates to functionally exploit what others know and do not know, and to make correct predictions about others' future behavior. Importantly, however, there is also a critical limit to the awareness relations that primates can represent: primates cannot represent relations between agents and untrue or decoupled states of the world. […] In doing so, we may have become the only species that is able to track the contents of others' minds even when the contents of those other minds differ from our own". However, as said, very recent papers by Krupenye et al. (2016) and Buttelman et al. (2017) claim that great apes also distinguish true from false beliefs.

narrative practices in which we manipulate others, we try to make the others do things inside a shared system of values, we gain the competences needed to do these kind of things, we act and we get judged on our actions. This kind of activity grounds the relationship between caregiver and baby before verbal language shows up and it is a pattern of action that can be found not only in every primate, but also in a huge variety of other animal species. I think social cognition is derived by this mechanism and I call this the Narrative Practice Semiotic Hypothesis (NPSH). Semiotic narrativity is the key bridge that leads us to mind and beliefs starting from basic perceptions, emotions and embodied enactive interactions.

7. Autism spectrum disorders and Narrative Practice Semiotic Hypothesis

In order to test this, let's see when social cognition skills don't work properly, as in Autism spectrum disorders (ASD). We all know that the value of something actually shows up when we lose it. In a paper of 2013, Gallese, Rochat and Berchio worked a lot on the potential role of the mirror mechanism in Autism Spectrum Disorder, focusing on the deficit in chaining motor acts into a global action and in understanding others' intentions when ASD children have to rely on motor cues during embodied interactions. But what about a more general incapacity of succeeding in social cognition tasks which is at work in children with ASD?

I will refer here to the *Social Motivation Theory* of Autism spectrum disorders (Dawson et al. 2005; Chevalier et al. 2012). According to this theory, one of the possible causes underlying the difficulties of social interaction in subjects with ASD could be the presence of a motivational deficit, closely associated with anomalies in the reward system brain structures. Following these anomalies in brain reward systems, subjects with ASD would have a reduced sensitivity to social gratification and would fail to attribute a value of reward, which is usually intrinsically motivating, to socially relevant stimuli. According to the *Social Motivation Theory*, the lack of experience of the social world would prevent the specialization of neural circuits underlying these domains and we know that their development and their specialization is based on experience.

In this way, social cognition problems would be related to impairments in the fourth and in the first steps of the semiotic narrative account for action: children with ASD problems usually don't care to be judged positively, they don't prefer – like ordinary children do - tasks that give them back a social reward. Social reward is not an attractive and motivational property of a stimulus for them. Accordingly, they don't completely share our own system of values and this brings them to carry on their own business without paying attention to our own (impairments in contract phase).

The idea that social motivation deficits play a central role in Autism Spectrum Disorders (ASD) has recently gained increased interest. This constitutes a shift in autism research, which has traditionally focused more intensely on

cognitive impairments, such as Theory of Mind deficits or executive dysfunction, while granting comparatively less attention to motivational factors. […] ASD can be construed as an extreme case of diminished social motivation and, as such, provides a powerful model to understand humans' intrinsic drive to seek acceptance and avoid rejection. […] Social motivation is a powerful force guiding human behavior and that disruption of social motivational mechanisms may constitute a primary deficit in autism. In this framework, motivational deficits are thought to have downstream effects on the development of social cognition and deficits in social cognition are therefore construed as a consequence, rather than a cause, of disrupted social interest. (Chevalier et al. 2012: 231-2)

Here another neurobiological network opens if compared to the motor level: the brain structures that compose the reward system include the ventral tegmental area, ventral striatum (i.e., the nucleus accumbens and olfactory tubercle), dorsal striatum (i.e., the caudate nucleus and putamen), substantia nigra (i.e., the pars compacta and pars reticulata), prefrontal cortex, anterior cingulate cortex, insular cortex, hippocampus, hypothalamus (particularly, the orexinergic nucleus in the lateral hypothalamus), thalamus (multiple nuclei), subthalamic nucleus, globus pallidus (both external and internal), ventral pallidum, parabrachial nucleus, amygdala, and the remainder of the extended amygdala. More in particular, ASD deficits "appear to be rooted in biological disruptions of the orbitofrontal-striatal-amygdala circuitry as well as in dysregulation of certain neuropeptides and neurotransmitters" (Chevalier et al. 2012: 239).
Since early diagnosis has proven to be essential for effective treatment of ASD, recognizing a small baby that doesn't care to have his mother's smile returned when he acts is actually extremely important. ASD children usually don't prefer socially rewarding tasks, often their attention is not captured by the mother's voice compared to other stresses and this is visible from the very first months of their life.

Social motivation models of ASD posit that early-onset impairments in social attention set in motion developmental processes that ultimately deprive the child of adequate social learning experiences and that the resulting imbalance in attending to social and non-social stimuli further disrupts social skill and social cognition development. (Chevalier et al. 2012: 234)

More, unlike Theory of Mind ordinary accounts of ASD, NPSH grounded on social motivation models would explains apparently non-social deficit in ASD, such as repetitive behaviours and restricted interests. This opens a very promising future for the NPSH: we actually don't really know how ASD children behave in early mindreading tasks, because the ASD diagnosis usually arrives more than one year later. What we know is that there is a strict connection between experience and the specialisation of neurons in the reward areas, due to neuroplasticity. We also know that all the parents of babies with an ASD diagnosis reported indifference to social stimuli and to reception of a positive sanction from the others since the very first months of life. Diminished social interest

deprive the developing child of social interest and learning opportunities, which leads to diminished expertise in social cognition. An early diagnosis based on the monitoring of the sanction aspects during practices between children and caregivers could be an extremely important aim that a work on narrative practices can help to achieve.

8. Coming back to early mindreading

Our semiotic reformulation of the NPH allows us to answer the critiques that Pierre Jacob made towards narrative theory in social cognition in his paper of 2011. Jacob underlines perfectly the difference between TT and NPH,[20] which is for us the difference originally introduced by Bruner between paradigmatic and narrative thought.

> The explanation and understanding of the occurrence of an event based on a historical narrative are different from the kind of explanation and understanding based on law-like or nomological generalizations provided by science. If the event to be explained is an individual's behavior or a change in some of her psychological states, then, as advocates of the direct-perception model emphasize, a narrative explanation is likely to differ from the kind of explanation based on tacit knowledge of a psychological theory comprised of law-like psychological generalizations in the theory-theory conception of mindreading.
> Furthermore, unlike scientific explanations based on law-like generalizations, and like the ability to mindread, narrative explanations seem distributed in all human cultures. (Jacob 2011: 535)

However, Jacob introduces a definition of "narrative" connected to verbal language and working memory that we have challenged in this paper.

> From an epistemic point of view, a historical narrative (a story) is a linguistic *description* of a temporally or chronologically ordered sequence of (causally or not causally) related *events*. Arguably, by describing event En as the last of an ordered sequence of events from E1 to En-1, a narrative provides a historical explanation and understanding of the occurrence of event En. (Jacob 2011: 534-5)

This definition fits perfectly well with Hutto's idea of narratives and with the original concept of NPH, but it is exactly what we have tried to reformulate and overcome with our semiotic conception of narratives. All the critiques made by Pierre Jacob fail if we adopt the NPSH connected to a semiotic idea of narrativity instead of the NPH connected to a linguistic idea of narratives. Let's consider the criticisms in detail.

The first criticism by Jacob concerns the fact that the NPH can actually explain only a full-developed mindreading skill connected to linguistic false belief tests:

[20] On this topic, see Laura's example in Gallagher and Hutto 2008: 26-7.

The basic challenge for the strong version of the narrative competency hypothesis is: why and how should narrative competency be, in Gallagher's (2007: 354) terms, "the basis for our use of folk psychological concepts like beliefs, desires, reasons"? In particular, how could it be the basis of human children's ability to represent others' *false beliefs*? What could it be about the memorable chronological sequence of events (encoded in a narrative) that could anchor the basic (and arguably unique) human ability to represent another's false belief? Given what it takes to understand and frame a narrative, the idea of grounding a human child's ability to understand and represent another's false belief into her narrative competency would only make sense for children who have been shown to successfully pass the standard false belief task at around age 4. (Jacob 2011: 535)

But of course, as we have already seen, in the last years, experiments like the ones by Onishi and Baillergon (2005), Krupeneye et al. (2016) and Martin and Santos (2016) - which are based on spontaneous response tasks and eye-tracking measurement of looking behaviors - have shown that the ability to represent another's false belief is supposed to be present in preverbal human infants and primates "can represent relations between agents and information that is true from their own perspective" (Martin and Santos 2016: 381). And, although Martin and Santos (2008: 381) think "primates cannot represent relations between agents and untrue or decoupled states of the world", very recent experiments by Krupeneye et al. (2016) and Buttelmann et al. (2017) are supposed to show that they actually can do that, understanding false beliefs too.

This is not a threat at all for the NPSH. On the contrary, if our mindreading skills come from a narrative logic of inter-action, it is quite natural that social cognition skills are already present both in some animal species and in all babies before the acquisition of language.

It is important to stress - and with that we come to Jacob's second critique – that with NPSH there is more than an enactive perceptual ability to anticipate a certain contextual behavior, understanding the person's intention from the context. The NPSH is a way of accounting for that kind of third-personal high-level way of thinking about the other's intentional states (beliefs, desires etc.) that explain ostensible behavior without relying either on "in the head" explanations (on the one side) or on language and propositional attitudes (on the other side). According to Hutto (2006), beliefs, being propositional attitudes, are not at play in early mindreading situations. Infants and animals can only read intentions and harbour intentional attitudes. However, in the majority of early mindreading experiments, the agent's intention to retrieve the toy is the same whether she holds a true or false belief, so the introduction of the idea of belief seems to be needed here, since the child cannot understand the person's intention only from the pragmatic situation of action. But, even if we don't agree on that, as we have seen from our "explicatory gap" problem in *Section 1*, the experiments on infants and primates by Buttelmann et al. (2009, 2017) made more complex also the "intentions reading" part of the story. In order to act as they do, infants have to imagine two different

contents driving different behaviors. The world can afford a different possibility of action only because the infant/primate bets something about the kind of cognitive content driving the agent's behavior: that's why in the false belief condition they open the other box, imagining that the agents wants to get the toy, but in the true belief condition they help the agent to open the empty box, since they are imagining that another kind of content is driving her behavior and that the agent wants to open that box for some other reason, which is not the desire to get his toy.

NPSH can account for that without relying on some "in the head" explanation, as Buttelmann et al. do. Developing a semiotic competence and the capacity of projecting themselves into fictional worlds where they are characters among other fellow characters, NPSH claims that infants start understanding reasons behind the action of the others through the pattern of narrativity. This is quite evident in interactive helping tasks experiments like the ones conducted by Buttelmann et al. (2009, 2017): infants and primates are not simply framing action through the "competence-performance" steps, which would equate to the knowledge-ignorance explanation that Buttelmann et al. (2009, 2017) refuse. They are betting that the agent is acting inside a system of values for what is worth acting, guiding his behaviour (contract phase). That's why they sanction him opening the empty box (in the true belief condition) *or* the other one containing the toy (in the false belief condition). In interactive helping tasks, infants and primates are framing experience through the narrative logic of inter-action. But they are not doing that "in the head": the kind of social cognition that operates in implicit false belief task competency is developed out of the narrative logic of inter-action. That's why infants in the experiments based on both the "violation-of-expectation" and "anticipatory looking" paradigms seem to interpret correctly the behavior in both true and false beliefs situations, looking reliably longer either when they saw the agent retrieve the toy in the wrong location while she had a true belief about the toy's location, or when they saw the agent retrieve the toy in the right location while she had a false belief (see Jacob 2011: 535-7). Beliefs are at work with the NPSH. That's why semiotic narrative practices are the basis of human children's ability to represent others' false beliefs and can explain the pattern of data emerging from the experiments of Onishi and Baillergon (2005), Southgate et al. (2007) and Buttelmann et al. (2009, 2017), even when a purely enactive primary/secondary intersubjectivity explanation seems not to be enough.

There is one main philosophical difference here between NPH and NPSH. Hutto's conception of belief is connected to the idea of "propositional attitudes" coming from analytic philosophy, while semiotic conception of belief is connected to pragmatism and to the idea of habit: "a tendency actually to behave in a similar way under similar circumstances in the future" (Peirce CP: 5.487). According to the semiotic tradition, habits define the *meaning* of beliefs:

> The essence of belief is the establishment of a habit; and different beliefs are distinguished by the different modes of action to which they give rise. If beliefs do not differ in this respect, if they produce the same rule of action, then no mere differences in the manner of consciousness of them can make them different beliefs, any more than playing a tune in different keys is playing different tunes. […] To develop its meaning, we have, therefore, simply to determine what habits it produces, for what a thing means is simply what habits it involves. Now, the identity of a habit depends on how it might lead us to act, not merely under such circumstances as are likely to arise, but under such as might possibly occur, no matter how improbable they may be. (Peirce CP: 5.398-400)

On the contrary, since beliefs are connected to propositional attitudes and since "the only vehicles that permit to have an attitude directed at a proposition are uniquely those of natural languages", according to Hutto (2006: 189), "the non-verbal intentional attitudes of animals, infants and even those of adult humans are not to be understood in contentful terms, *full stop*. Non-verbal responding is not content-involving. And animals and infants are only capable of harbouring intentional attitudes, not propositional ones". But, as in the pragmatist tradition, if the meaning of belief is connected to habits and not to propositional attitudes, this can be challenged, grounding NPH also in the early mindreading debate. As Buttelmann et al. (2009) and Pierre Jacob (2011) already noticed, this matters, because the idea of belief seems to be needed in order to explain the pattern of data in many of these experiments.

That's why NPSH doesn't leave unexplained the experimental results showing "the ability of preverbal human infants to represent and reason about others' false beliefs" at all (see Jacob 2011: 536-7). On the contrary, it fits perfectly well with enactivist IT, grounding beliefs and mindreading skills in embodied interactions rooted in narrative practices. In its semiotic reformulation, which I have outlined here, NPSH supports the Interaction Theory model by extending one's understanding of another's psychological life beyond the limits of the second-personal interactive account, providing the adequate resources to account for the ability to represent and reason about another's false beliefs, filling the explanatory gap described earlier in this paper without the introduction of any kind of "in the head" solution.

References

Apperly, I. A. and Butterfill, S. A. (2009), "Do humans have two systems to track beliefs and belief-like states?", *Psychological Review*, 116: 953-970.

Apperly, I.A. and Butterfill, S. A. (2013), "How to construct a minimal theory of mind", *Mind & Language,* 28 (5): 606-637.

Andrews, K. (2015), *The Animal Mind*, London and New York, Routledge.

Baron-Cohen, S. (1995), *Mindblindness: an Essay on Autism and Theory of Mind*, Cambridge, MIT Press.

Bertrand, D. (2000), *Précis de sémiotique littéraire*. Paris, Nathan.

Bruner, J. (1986), *Actual minds, possible worlds*, Cambridge, Harvard University Press.

– (1991), "The Narrative Construction of Reality", *Critical Inquiry* 18: 1-21.

Buttelmann, D., Buttelmann, F., Carpenter, M., Call. J. And Tommasello, M. (2017), "Great apes distinguish true from false beliefs in an interactive helping task", *PLoS One* 12 (4): 1-13.

Carruthers, P. (2013), "Mindreading in infancy", *Mind & Language, 28 (2*): 141-172.

Chevalier, C., Kohls, G., Troiani, V., Brodkin, E. S., & Schultz, R. T. (2012), "The social motivation theory of autism", *Trends in cognitive sciences*, 16 (4): 231-239.

Clements, W. A. and Perner, J. (1994), "Implicit understanding of belief", *Cognitive Development*, 9 (4), October-December: 377-395.

Crane, T. (1995), *The Mechanical Mind*, London, Penguin Books.

Curry, G. and Sterelny, K. (2000), "How to Think About the Modularity of Mind-Reading". *Philosophical Quarterly* 50 (199): 145-160.

Danto, A. (1985), *Narration and Knowledge*, New York, Columbia University Press.

Dawson, G., Webb, S. J., and McPartland, J. (2005), "Understanding the nature of face processing impairment in autism: insights from behavioral and electrophysiological studies", *Developmental Neuropsychology*, 27 (3): 403–424.

Eco, U. (1975), *Trattato di semiotica generale*, Milano, Bompiani (English translation, *A Theory of Semiotics*, Bloomington, Indiana University Press).

– (1979), *Lector in fibula*, Milano, Bompiani (English translation, *The Role of the Reader*, Bloomington, Indiana University Press).

Ellis, R. (2009), "Implicit and explicit learning, knowledge and instruction", in Ellis, R. et al. *Implicit and explicit knowledge in second language learning*, Multilingual Matter, Buffalo/Toronto, 2009.

Fletcher, L. and Carruthers, P. (2013), "Behavior-reading versus mentalizing in animals", in J. Metcalfe and H. Terrace (eds), *Agency and Joint Attention*, Oxford, Oxford University

Press.
Frith, U. and Happe, F. (1999), "Theory of Mind and Self-Consciousness: what is it like to be Autistic", *Mind and Language* 14 (1): 1-22.
Fusaroli, R. e Paolucci, C. (2011), "The 'External Mind': an Introduction", *VS* 112-5: 3-30.
Fusaroli, R., Granelli, T. e Paolucci, C. (ed.) (2011). "The External Mind. Perspectives on Semiosis, Distribution and Situation in Cognition", VS 112-5, Milano, Bompiani.
Fusaroli, R., Gangopadhyay, and Tylén, K. (2013), "The dialogically extended mind: language as skilful intersubjective engagement", *Cognitive Systems Research*, 29-30 (1), DOI: 10.1016/j.cogsys.2013.06.002.
Gallagher, S. (2006). "The Narrative Alternative to Theory of Mind". In Menary, R. 2006 (ed.): 223–9.
– (2009), "Two Problems of Intersubjectivity", *Journal of Consciousness Studies*, 16, No. 6–7: 1-20.
– (2017), *Enactivist Interventions*. *Rethinking the Mind*, Oxford, Oxford University Press.
Gallagher, S. and Hutto, D. (2008), "Understanding others through Primary Interaction and Narrative Practice", in Zlatev, J., Racine, T., Sinha, C. and Itkonen, E. (eds.). *The Shared Mind: Perspectives on Intersubjectivity*, Amsterdam, John Benjamins: 17–38.
– (2018), "Narratives in embodied therapeutic practice: Getting the story straight", *in press*.
Gallagher, S. and Zahavi, D. (2008). *The Phenomenological Mind*, London, Routledge.
Gallese, V. (2001). "The 'shared manifold' hypothesys: from mirror neurons to empathy", *Journal of Consciousness Study* 8: 33-50.
– (2007) "Before and Below 'Theory of Mind': Embodied simulation and the neural correlates of social cognition", *Philosophical Transactions of the Royal Society B—Biological Sciences*, 362 (1480): 659–69.
Gallese, V. and Lakoff, G. (2005), "The Brain's Concepts: the Role of the Sensory-motor System in Conceptual Knowledge", *Cognitive Neuropsychology* 21 (2005).
Gallese, V., Rochat, M. and Berchio, C. (2013), "The mirror mechanism and its potential role in autism spectrum disorder", *Developemental Medicine & Child Neurology* 55 (1): 15-22.
Gardner, H. (1987), *The Mind's New Science*, New York, Basic Books.
Goldman, A. I. (1989), "Interpretation psychologised", *Mind and Language* 4: 161-185.
– (2006) *Simulating Minds. The Philosophy, Psychology and Neuroscience of Mindreading*, New York, Oxford University Press.
Gordon, R. M. (1986), "Folk Psychology as simulation", *Mind and Language* 1: 158-171.
Greimas, A. J. (1970), *Du sens*, Paris, Seuil.
– (1983),*Du sens 2*, Paris, Seuil.

Heal, J. (1998), “Understanding other minds from the inside”, in O’Hear, A. (ed.), *Current Issues in Philosophy of Mind*, New York, Cambridge University Press.

Herman, D. (2003), “Stories as a Tool for Thinking”, in Herman, D. (ed.) 2003: 163-194.

Herman, D. (ed.) (2003), *Narrative Theory and the Cognitive Science*, Stanford, CSLI Publications.

Hutto, D. (2006), “Narrative Practice and Understanding Reasons”, in Menary, R. (ed.) (2006): 231-247.

– (2007), “The Narrative Practice Hypothesis: Origins and Applications of Folk Psychology”. *Philosophy. Royal Institute of Philosophy Supplement*: 82: 60. (Also in Hutto, D. (ed.). *Narrative and Understanding Persons*, Cambridge, Cambridge University Press. 43–68).

– (2008), “The Narrative Practise Hypothesis: clarifications and implications”, *Philosophical Explorations*, Vol. 11, No. 3, September 2008: 175-192.

– (2009),“Folk Psychology as Narrative Practise”, *Journal of Consciousness Studies*, 16, No. 6-8: 9-39.

Hutto, D., Herschbach, M. And Southgate, V. (2011) “Social Cognition: Mindreading and Alternatives”, *Review of Philosophical Psychology* (2011) 2: 375-395.

Jacob, P. (2011), “The Direct-Perception Model of Empathy: a Critique”, *Review of Philosophy and Psychology*, 2011 (2), 519-540.

Jahn, M. (1997), “Frames, Preferences and the Reading of Third-Person Narratives. Towards a Cognitive Narratology”, *Poetics Today* 18 (4): 441-468.

Kovacs, A., (2016), “Belief Files in Theory of Mind Reasoning”, *Review of Philosophy and Psychology*, Vol. 7 (2): 509-527.

Krupeneye, C., Kano, F., Hirata, S., Call, J, and Tommasello, M. (2016), “Great apes anticipate agents’ actions based on their false beliefs”, *Science* 354, October 2016: 110-4.

Leslie, A. M. (2005), “Developmental parallels in understanding minds and bodies”, *Trends in Cognitive Sciences,* 9 (10): 459–462.

Levi-Strauss, C. (1958), *Anthropologie structural*, Paris, Plon.

Lorusso, A. M., Paolucci, C. and Violi, P. (eds.) (2012), *Narratività. Temi, Problemi, prospettive*. Bologna, Bononia University Press.

Low, J. and Wang, B. (2011), “On the long road to mentalism in children's spontaneous false-belief understanding: are we there yet?”, *Review of Philosophy and Psychology*, 2 (3): 411–28.

Lurz, Sharisse, J. and Krachun, C. (2014), “Animal Mindreading: a Defense of Optimistic Agnosticism” *Mind & Language*, Vol. 29, No. 4, September 2014: 428–454.

Malle, B.F. (2002), “The Relation between Language and Theory of Mind in Development and Evolution”, in Givón, T. and Malle, B. F. (eds.), *The Evolution of Language out of Pre-Language*, Amsterdam, John Benjamins: 265–84.

Marrone, G. and Mangano, D (2018), *Semiotics of Animals in Culture*, Dordrecht, Springer.

Martin, A., and Santos, L. R. (2014), "The origins of belief representation: Monkeys fail to automatically represent others' beliefs", *Cognition,* 130 (3): 300-308.

– (2016) "What cognitive mechanisms support primate theory of mind?", *Trends in Cognitive Sciences*, May; 20 (5): 375-82.

Menary, R. (ed.) (2006), *Radical Enactivism. Focus on the Philosophy of Daniel D. Hutto*, Amsterdam/Philadelphia, John Benjamins.

Mink, L. O. (1978), "Narrative Form as a Cognitive Instrument", in Canary, R. and Kozicki, H. (eds.), *The Writing of History: Literary Form and Historical Understanding*, Madison: University of Wisconsin Press.

Myowa-Yamakoshi, M., Tomonaga, M., Tanaka, M. and Matsuzawa, T. 2004. "Imitation in neonatal chimpanzees (Pan troglodytes)." *Developmental Science* 7 (4): 437–42.

Noë, A. (2006), *Action in Perception*, Cambridge, MIT Press.

Onishi, K. H., and Baillargeon, R. (2005), "Do 15-month-old infants understand false beliefs?", *Science* 308 (5719): 255–258.

Paolucci, C. (2010), *Strutturalismo e interpretazione*, Milano, Bompiani.

– (2011) "The 'External Mind': Semiotics, Pragmatism, Extended Mind and Distributed Cognition". *VS* 112-5: 67-94.

Peirce, C. S. (CP), *Collected Papers of Charles Sanders Peirce*, voll. I – VI edited by C. Hartshorne and P. Weiss, 1931-1935, voll. VII – VIII edited by A.W. Burks, 1958, Cambridge (Mass)., Belknap Press.

Pennisi, A. and Falzone, A. (2017), *Darwinian Biolinguistics*, Dordrecht, Springer.

Povinelli, D. J. and Vonk, J. (2004), "We don't need a microscope to explore the chimpanzee's mind", *Mind and Language* 19: 1-28.

Propp, V. (1928), *Morfologija skazki*, St. Petersburg, Academia.

Rizzolatti G. and Craighero L. (2004), "The mirror-neuron System", *Annual Review of Neuroscience*, 2004, 27: 169-92.

Rizzolatti G. and Sinigaglia C. (2006), *So quel che fai, Il cervello che agisce e i neuroni specchio*. Milano, Raffaello Cortina Editore.

Rizzolatti, G. and Vozza, L. (2011), *Nella mente degli altri. Neuroni specchio e comportamento sociale*, Bologna, Zanichelli.

Robichaud, D. (2003), "Narrative institutions we organize by: the case of municipal administration", in Czarniawska, B. and Gagliardi, P., *Narrative we organize by* (pp. 37-54), Amsterdam, John Benjamins.

Rowlands, M. (2010).*The New Science of the Mind. From Extended Mind to Embodied*

Phenomenology, Cambridge, MIT Press.

Ruffman, T. and Perner, J. (2005a), "Infants' insight into the mind: how deep?", *Science* vol. 308, no. 5719: 214-216.

Ruffman, T. and Perner, J. (2005b), "Do infants really understand false belief?", *Trends in Cognitive Sciences*, 9 (10): 462–463.

Simion F., Di Giorgio, E., Leo, I. and Bardi, L. (2011), "The processing of social stimuli in early infancy: From faces to biological motion perception", *Progress in brain research* 189: 173-93. DOI 10.1016/B978-0-444-53884-0.00024-5

Southgate, V., Senju, A. and Csibra, G. (2007), "Action anticipation through attribution of false belief by 2-year-olds", *Psychological Science* 18 (7): 587–592.

Talmy, L. (2000), "A Cognitive Framework for Narrative Structure", *Toward a Cognitive Semantics vol. 2*, Cambridge, MIT Press: 417-82.

Tomasello, M. (2014), *Unicamente umano. Storia naturale del pensiero*, il Mulino, Bologna.

Tomasello, M. Call, J. (2003), "Chimpanzees versus humans: it's not that simple", *Trends in cognitive science*, vol. 7 (6): 157-160.

Tomasello, M. Call, J. (2008), "Does the chimpanzee have a theory of mind? 30 years later", *Trends* in cognitive science,12 (5): 187-192.

Trevarthen, C. and Hubley, P. (1978), "Secondary intersubjectivity: Confidence, confiding and acts of meaning in the first year", in A. Lock (ed.), *Action, Gesture and Symbol: The Emergence of Language*, London, Academic Press: 183–229.

Vygotskij, L. S. (1986), *Thought and Language*, Cambridge, MIT Press.

Violi, P. (2012), "Nuove forme della narratività", in Lorusso, A. M., Paolucci, C. e Violi, P. (eds.) 2012.

Zlatev, J. (2008), "The co-evolution of intersubjectivity and bodily mimesis", in Zlatev, J., Racine, T., Sinha, C. and Itkonen, E. (eds.), *The Shared Mind: Perspectives on Intersubjectivity*. Amsterdam, John Benjamins: 215-244.