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Abstract
The philosophical and interdisciplinary debate about the nature of social cognition, and the processes involved, has important implications for psychiatry. On one account, mindreading depends on making theoretical inferences about another person's mental states based on knowledge of folk psychology, the so-called “theory theory” (TT). On a different account, “simulation theory” (ST), mindreading depends on simulating the other's mental states within one's own mental or motor system. A third approach, “interaction theory” (IT), looks to embodied processes (involving movement, gesture, facial expression, vocal intonation, etc.) and the dynamics of intersubjective interactions (joint attention, joint action, and processes not confined to an individual system) in highly contextualized situations to explain social cognition, and disruptions of these processes in some psychopathological conditions. In this paper, we present a brief summary of these three theoretical frameworks (TT, ST, IT). We then focus on impaired social abilities in autism and schizophrenia from the perspective of the three approaches. We discuss the limitations of such approaches in the scientific studies of these and other pathologies, and we close with a short reflection on the future of the field. In this regard we argue that, to the extent that TT, ST and IT offer explanations that capture different (limited) aspects of social cognition, a pluralist approach might be best.

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Social cognition and psychopathology: a critical overview

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The philosophical and interdisciplinary debate about the nature of social cognition, and the processes involved, has important implications for psychiatry. On one account, mindreading depends on making theoretical inferences about another person’s mental states based on knowledge of folk psychology, the so-called “theory theory” (TT). On a different account, “simulation theory” (ST), mindreading depends on attending to the other’s mental states within one’s own mental or motor system. A third approach, “interaction theory” (IT), looks to embodied processes (involving movement, gesture, facial expression, vocal intonation, etc.) and the dynamics of intersubjective interactions (joint attention, joint action, and processes not confined to an individual system) in highly contextualized situations to explain social cognition, and disruptions of these processes in some psychopathological conditions. In this paper, we present a brief summary of these three theoretical frameworks (TT, ST, IT). We then focus on impaired social abilities in autism and schizophrenia from the perspective of the three approaches. We discuss the limitations of such approaches in the scientific studies of these and other pathologies, and we close with a short reflection on the future of the field. In this regard we argue that, to the extent that TT, ST and IT offer explanations that capture different (limited) aspects of social cognition, a pluralist approach might be best.

Key words: Social cognition, autism, schizophrenia, theory of mind, simulation theory, interaction theory

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The area of research dealing with how we make sense of the behavior of other human beings (“social cognition”) has proved both productive and controversial, and has come to occupy an important position in contemporary debates in the philosophy of mind, psychology and neuroscience. The goal of this paper is to discuss the theoretical frameworks that connect social cognition and psychopathology, and that generate fruitful, philosophically well-grounded and empirically informed reflections that are relevant to psychiatric research.

The two leading approaches in this area are those called “theory theory” (TT) and “simulation theory” (ST). The TT claims that we make inferences about the mental states of others on the basis of a general and commonsense theory (“folk psychology”) about the way in which mental states are usually connected to behavior. In contrast, the ST proposes that we mentally “step into the shoes” of the relevant person and model the mental states behind the behaviors by generating an internal simulation. Alternatively, a more recently developed approach, “interaction theory” (IT), highlights the (constitutive) role of social interaction, and maintains that in many cases we do not need to theorize nor to run a simulation in order to make sense of others.

To understand the concept of “theorizing” in contemporary discussions in the field of social cognition, it is useful to point to Premack and Woodruff’s (1) famous experiments that led to reflections about whether chimpanzees might possess a “theory of mind”. The idea that the “folk” understanding of psychology is underpinned by some kind of “theory” was not unknown in philosophy. But since Premack and Woodruff’s paper it has become common to discuss processes in which we make sense of the mental states of others under the label “theory of mind” (ToM) (2). In this context, “theory” is defined as a system of inferences that can be used to “mindread”, i.e., to attribute mental states in order to explain or make predictions about the other’s behavior.

Having a ToM requires one to have a concept of belief, and one way to show that an animal or a human possesses the concept of belief is to show that it is able to impute a “false belief” to another. Wimmer and Perner (3) designed experiments to determine when, developmentally, children are able to impute false beliefs to others. The results showed that, on average, 3-year-old children fail on “false-belief tasks”, but they acquire the concept of false belief by the age of 4 or 5.

On some accounts of TT, the theory or theory mechanism is innate and activated at a certain stage of development (4-6); on other accounts, the theory (“folk psychology”) is acquired gradually: children, somewhat like scientists, revise their theories in light of new evidence (7,8).

Already by the mid 1980s, ST was put forth as an alternative to TT (9-11). ST denies that social cognition proceeds by deploying theories, and argues instead that “mindreaders capitalize on the fact that they themselves are decision makers, hence possessors of decision-making capacities; to read the minds of others, they need not consult a special chapter on human psychology, containing a theory about the human decision-making mechanism; because they have one of those mechanisms themselves, they can simply run their mechanism on the pretend input appropriate to the target’s initial position” (2).

Instead of relying on a theory, ST maintains that mindreaders use their own minds to make sense of others. Of
of our ordinary everyday interactions, mindreading is not necessary.

The closely related common assumption that often finds expression in the literature is that we can only know of mental states indirectly, as we only have access to outward behavior, but not to the mental states themselves.

In recent years, IT has been proposed as an alternative to TT and ST. IT puts more emphasis on social interaction and the direct perception of at least some mental states (15-20) and draws on embodied, embedded, and especially enactivist theories of perception and cognition (e.g., 17,21,22), which are currently gaining ground in cognitive science. Enactivists in general maintain that the mind is embodied, that perception and action are closely related (perception is “for action”), and that cognition is not mediated by internal representations (21,23,24). IT claims that social cognition is embodied, that perception is for interaction, and that, for most of our everyday interactions, mindreading (including meta-representational versions of mindreading) is not necessary.

To make this case IT appeals to ongoing research in developmental psychology. Psychologists like Trevarthen (25), Hobson (26), Reddy (27) and Rochat (28) have provided convincing evidence that sensory-motor processes of perception and action, as well as emotional aspects of dyadic encounters, are central to the early development (in the first year of life) of social interaction (this is termed “primary intersubjectivity”).

By the end of the first year of life, primary intersubjective processes allow the child to gain a basic perception- and interaction-based embodied understanding of the intentions and emotions of others. For example, given that intentions are perceptible as intrinsic features of actions (different intentions involve different kinematic properties) (e.g., 29), infants gain a perception-based understanding of other people’s intentions by 10 months (30,31). They also interact through embodied responses in line with their caregivers’ dynamically expressed emotions.

Importantly, such primary intersubjective processes are not merely developmental stages that disappear in adulthood. Rather, they continue operating and progressively become more refined, to the extent that in many everyday interactions we immediately understand the intentions, emotions and actions of others in their movements, gestures, facial expressions, vocalizations, and in the particular pragmatic and social contexts in which they act, without having to infer or simulate what is going on inside their heads.

The developmental literature also specifies that “secondary intersubjective” processes, starting with joint attention in the first year of life, allow for a contextualized understanding of others as we engage with them in pragmatic and social contexts. We begin to understand others by seeing them act in specific circumstances, and by interacting with them in such circumstances.

Later in development, according to IT, communicative and narrative competencies are built on primary and secondary intersubjective processes. Developmental studies of 2-4 year-olds and older children show the importance of communicative interactions and the ability for framing the actions of others in narrative terms (e.g., 32-35). Understanding others along these lines limits the need for mindreading, understood as focused on explaining and predicting behavior based on mental state attribution, as in ToM.

These three approaches – TT, ST and IT – form the basis for ongoing theoretical debates concerning core aspects of social cognition, cutting across philosophy, psychology and neuroscience. Within such debates, questions about psychopathology have been consistently raised. There has been a special focus on autism, because it involves clear deficits in social cognition. Such deficits, however, are also found in schizophrenia (36-38), depression (39), bipolar disorder (40), and other disorders.

AUTISM

First identified by Kanner and Asperger in the 1940s as a distinct clinical entity, autism has presented many enigmas to researchers. One of the most crucial observations was that, while children with autism demonstrated sustained interest in engaging with a variety of objects, they exhibited very little interest in engaging in interaction with the persons in their respective environments.

Kanner reported that individuals with autism engage in repetitive, monotonous activities with numbers or objects. Concerning one individual with autism, he noted that “when taken into a room, he completely disregarded the people and instantly went for objects, preferably those
that could be spun” (41). In more recent research, it is common to speak about a triad of problems, involving socialization, communication, and imagination, as central to autism (42).

**Autism and TT**

The general theoretical approach that many researchers since the 1980s have adopted concerning autism is one that links the impairments to deficiencies in fundamental “mindreading” abilities. In autism, as noticed by Baron-Cohen (43), mindreading and joint attention deficits appear early at the end of the first year of life and are universal for the whole spectrum of the disorder. It is due to such considerations, and to the fact that this particular approach has been able to successfully explain some of the features in all three previously mentioned areas, that autism is often described as “mindblindness” (44).

 Crucial findings by U. Frith, Leslie and Baron-Cohen influenced the way in which the TT approach developed. A false-belief task experiment involving a group of typically developing children, one of children with autism and one of children with Down syndrome successfully established a very solid connection between autism and deficits in social cognition. A large majority of autistic children, in contrast to the typically developing and the Down syndrome groups, failed the false-belief task. Together with the finding that autistic children fail to understand mentalistic stories (45), this led to the conclusion that autism impairs a domain-specific capacity.

The ToM explanation of autism expounded by these researchers suggested that typically developing children from the age of 4 years have an implicit understanding of people as entertaining beliefs and desires that causally influence their behavior. The ability to implicitly or explicitly theorize about mental states in others is lacking or is impaired in children with autism, and the impairments include the inability to attribute true and false beliefs to others (45-48).

In addition, the fact that autistic children do not exhibit cognitive-inferential shortcomings led researchers to infer the existence of a particular, likely modular, “ToM mechanism” for creating and handling meta-representations (47), which some believed was additionally supported by evolutionary psychology (44). Leslie (6) argued that the “ToM mechanism” is domain specific, employs a proprietary representational system, and forms the basis for acquiring a ToM. In cases of childhood autism, the mechanism is damaged, resulting in difficulties acquiring a full-fledged ToM, a form of “mindblindness” which is “the core and possibly universal abnormality of autistic individuals” (43).

Leslie (49) further suggested that individuals with autism have a meta-representational deficit, and that the capacity for pretending (also problematic in autism) draws on the same cognitive mechanism involved in understanding others. Symbolic-pretend play requires “double knowledge” of the situation, otherwise confusion would occur in regard to distinguishing real from pretend (50,51). For example, the child pretends that the banana is a telephone, while keeping in mind that inferences made from this pretense are not valid in real-world belief contexts (52). Leslie’s point was that the same de-coupler mechanism is a central component employed in both pretend play and mindreading, in which the child forms a meta-representation of the mental states of others (5).

On this view, pretend play provides early evidence of a “ToM mechanism” (53,54), which enables mental representation of another’s mental representation (55).

While the connection of deficits in pretend play with deficits in the operation of the meta-representational aspect of the “ToM mechanism” appears productive, a range of theorists have criticized the view. For instance, it has been documented that some high-functioning autistic individuals and children with higher verbal mental ages are able to produce limited symbolic-pretend play. In other words, they show the ability to meta-represent, even if their pretend behaviors are frequently stereotyped. Although they do not engage in pretense spontaneously, when receiving guidance and appropriate prompts, many children with autism are able to engage in symbolic-pretend play (56-59). In addition, it is not entirely clear that pretense necessitates meta-representation (60). Clearly, the child has to be able to distinguish a pretense situation from a real one, but it is not clear to what extent the child has to know exactly how the real situation differs from the imagined one. One could argue that, in order to understand the pretend situation, all one needs to know is what we could call the implied referential ambiguity of pretense: that the pretend situation somehow differs from the real one. Nor is it clear that the child needs to possess knowledge of the real situation in order to evaluate the truth of psychological predicates (60-62).

There are further reasons to doubt that the TT explanation is wholly satisfactory. Some of the criticism is motivated by the fact that between 15 and 60% of individuals with autism actually manage to pass false-belief tasks (42,63). Others have maintained that the ToM deficit may not be primary for every case of autism, but rather a correlated deficit (64). More recently, Apperly (65) concluded that “research on autism does not provide support for the hypothesis that mindreading has a strongly domain-specific cognitive or neural substrate, nor does it provide clear evidence on the causal dependence of mindreading on language and executive function; and, the fact that a significant sub-set of people with autism – who have clinical levels of social impairment – nonetheless pass many standard mindreading tasks should make us cautious about claims that autism is due to a lack of mindreading concepts, or that the presence or absence of these concepts can be straightforwardly diagnosed with laboratory tasks”.

But the TT explanation of autism has also been criticized on different grounds. Hobson (26,66) maintains that Kanner’s (41,67) original emphasis on the emotional nature of the disorder, and the failure of individuals with autism to
engage in affectively charged interactions, have been neglected. The crucial point in Hobson’s work is that autism involves a diminished or lack of capacity to perceive other people as creatures intentionally directed to the world—a capacity that develops in the interactional context of caregiving. Among other sources, Hobson (26) points to the case of severely abandoned and socially deprived children in Romanian orphanages. While social deprivation resulted in profound emotional difficulties and delayed cognitive development, a significant minority also exhibited severe autistic-like behaviors. Roughly put, Hobson argued that the autistic-like behaviors could be explained through the lack of affectively saturated interactions with caregivers. Of course, the conclusion is not that autism is caused by social deprivation, but that any explanation of autism should be more sensitive to affective-interpersonal factors.

Another objection is that there is a risk in the relevant research of equating the possession of a ToM to the capacity to pass false-belief tasks (68). When we take seriously the amazing complexity of the ways in which we understand other human beings, it seems improbable that an explanation of its delayed or impaired development could be achieved by recourse to one particular construct. As Bowler (68) argues, “precisely because the term ‘theory of mind’ can now only be used descriptively, and precisely because the tests used to demonstrate autistic social impairment at different ages and different levels of ability vary radically in terms of their underlying theoretical constructs, we must look elsewhere for an explanation of what confronts the observer as impairment in the social domain”.

**Autism and ST**

Proponents of ST have offered their own accounts of autism. For example, although Goldman maintains that autism is so complex that it is unlikely that one single theory will explain everything, he also thinks that ST may provide a good explanation (2). In particular, he takes the “extreme-male-brain theory of autism” as elaborated by Baron-Cohen (69) to support ST.

The core of Baron-Cohen’s thesis is the existence of two kinds of cognitive activity in normal humans: empathizing and systemizing. Crudely put, autistic individuals exhibit severe deficiencies in empathizing, but not in systemizing. This “would provide strong evidence for ST, because it would show that a major clinical population known to be deficient in mindreading is also deficient in the use of simulation for mindreading” (2). Goldman, and others, equate empathy, mindreading and simulation, and link these capacities to the proper function of mirror neurons. Indeed, Goldman argues that “it is precisely a deficit in interpersonal mental simulation, also called empathizing, that seems to characterize autistic individuals” (2), and he thinks that the link between autism and mirror-neuron dysfunction, suggested by some studies, lends further credibility to an ST account of autism.

But the nature of the link is not entirely clear. It is indeed true that some researchers believe there is a connection between autism and dysfunction of mirror neurons (70,71), but the evidence is indirect (72) and does not clearly establish that autistic subjects are not capable of low-level, automatic simulation. There is also some theoretical resistance to the idea that mirror neurons should be construed as *simulating* in the manner suggested by Goldman (73), and several empirical studies challenge the idea of automatic mirroring, understood as intersubjective matching or simulating (74-76).

Indeed, neither the conventional conception of simulation that involves pretense, nor a redefinition of simulation in terms of matching seems to work as a model for mirror neuron activation (77). For this reason some theorists have proposed a redefinition of simulation in terms of neuronal reuse (78-81). On the latter view, we (re)use motor control mechanisms (the so-called forward model, which allows us to correct our actions as they are in process), to simulate the actions we see others do. One question, however, is how redeployment of such mechanisms, which remain on a low level of effector-related basic movement (reaching and grasping with hand, for example), can deliver an unambiguous understanding of the other’s intention or goal in the social cognition context. That is, a motor control model based on reuse of effector signals may be too low level (too closely tied to effectors) to give us an understanding of anything close to the goal-related meaning of even a simple intentional action (see 82). Furthermore, the neural reuse account of simulation offers an explanation of how simulation mechanisms evolved, but does not offer an alternative account of how those mechanisms work that would differ from the concept of simulation as matching. To be clear, mirror neurons may very well be activated in normal everyday intersubjective interactions, and may be dysfunctional in autistic subjects; what is in question is whether the simulationist interpretation of the mirror system, in terms of pretense, matching or reuse, is accurate or sufficient.

**Autism and IT**

IT theorists have also attempted to account for some of the puzzling characteristics of autism, providing an alternative to the existing TT and ST approaches. These theorists focus on the fact that children with autism display problems on the level of primary intersubjectivity, at a developmental stage before anything like ToM impairments appear (83).

Sensory-motor impairments affecting primary intersubjective functions related to social interaction appear early (during the first year) in infants later diagnosed with autism. Studies that show basic sensory-motor problems in autistic children during the first year (84), as well as between 3 and 10 years (see 85,86), support this general idea. This research
has been recently and dramatically reinforced in studies by Torres and colleagues (87). These studies show, in great detail and across the entire autistic spectrum, disrupted patterns in re-entrant (afferent, proprioceptive) sensory feedback that usually contributes to the autonomous regulation and coordination of motor output. Such feedback supports volitional control and fluid, flexible transitions between intentional and spontaneous behaviors. In autism, there is a disruption in the maturation of this form of proprioception, and this is accompanied by behavioral variability in motor control. In contrast to typically developing individuals, the normalized peak (micro-movement) velocity and noise-to-signal ratios in the movement of all participants with autism, across different ages and across different verbal or non-verbal status, remained in a region corresponding to younger (3-year-old) typically developing children. Noise overpowers signal in the motor systems of individuals with autism. Proprioceptive input is random (unpredictable), noisy (unreliable), and non-diversified. Subjects with autism had difficulty distinguishing goal-directed from goal-less motions in most tasks (87). In effect, central aspects of primary inter-subjectivity, a pervasive and basic component of social interaction, were disrupted.

Because sensory-motor processes are random, noisy and restricted, it is unlikely that individuals with autism can anticipate the consequences of their own impending movements in a timely fashion. It also makes it difficult if not impossible to apply fine-tuned discriminations to the actions and emotional facial expressions of others during real-time social interactions. The use of ToM strategies in high-functioning autistic subjects, then, would be compensatory for the loss of the more primary processes.

Such sensory-motor problems can also explain other aspects of autism. Donnelan et al (88) note that “some people [with autism] rock, repeatedly touch an object, jump, and finger posture while other people come to a standstill in a doorway, sit until cued to move or turn away when someone beckons”. Whereas such patterns are usually interpreted as meaningless and explained away reductively, Donnelan et al argue that they should be taken very seriously. Further, a meta-analysis by Fournier et al (89) confirms such sensory-motor problems in autism and suggests that they constitute a “core element”, which should be reflected in interventions (see also 90,91). Savarese (92) notes that “the tide has clearly shifted with respect to the sensorimotor hypothesis; what was once dismissed out of hand by an earlier generation of autism researchers is now increasingly being taken up for its superior explanatory power”.

SCHIZOPHRENIA

Autism has attracted an increasing interest of researchers involved in both philosophical and psychiatric inquiry on social cognition over the past 20 years, and there are clear positions staked out on the issues involved in this condition. This is not the case with schizophrenia, although a great number of studies have confirmed ToM impairments (and a reduced capacity to engage in communication) in individuals with this disorder.

Schizophrenia and TT

Neither the TT nor the ST has been fully explored to link them to the behaviors of patients with schizophrenia (93). This situation is the result of several factors, but one of them is surely that is has been difficult to establish whether the empirical results do indicate a specific ToM deficit in this disorder. On the one hand, there is some evidence that ToM deficits in schizophrenia are domain specific rather than the result of general cognitive impairments (37,94,95). On the other, there are some doubts as to whether the tests used to assess ToM (false-belief task, story comprehension, etc.) in fact clearly demonstrate this. Park et al (93) argue that the tasks “are not specific to tapping mental state attributions and instead, recruit an assortment of cognitive functions, ranging from working memory and selective attention to semantic memory and pragmatics”. In a somewhat similar way, some suggest that executive and planning deficits may be responsible for some of the ToM disturbances (e.g., 96,97).

C. Frith (98) argued that symptoms associated with schizophrenia could be explained by impairment in mindreading abilities. In particular, he emphasized failures in self-monitoring and recognizing mental states and behavior; accordingly, he proposed to understand schizophrenic symptoms as linked to impaired meta-representation. As to the positive symptoms of schizophrenia, two specific deficits, delusions of control and thought insertion, were highlighted (98-100). The failure to successfully monitor one’s own mental states might lead to such symptoms, while the failure to keep track of the mental states of others could result in a variety of paranoid delusions.

The idea that ToM deficits can explain some psychotic symptoms, however, does not sit well with the dominant models of autism, which link those deficits to autistic symptoms. Frith (98) distinguished between deficits in early-onset and late-onset mentalizing/mindreading. He maintained that in autism the ToM is not operative early in life, which hinders normal development of social skills. In patients with schizophrenia, instead, the ToM is operative early in life, allowing normal development and mastery of deploying mental state concepts to make sense of behavior. Nevertheless, with the onset of the disease, ToM impairments lead to unwarranted inferences about other people’s mental states.

The evidence that patients with schizophrenia fail modified ToM tasks previously used to assess mindreading capacities in autism is consistent with this distinction (94). Patients with schizophrenia demonstrate reduced understanding of false beliefs and have problems inferring intentions of speakers from indirect hints (99,101). Moreover,
individuals with schizophrenia have difficulties comprehending jokes when they require reflection on mental states (101).

Nevertheless, some problems remain for the TT account. If meta-representations are conceptualized as non-modular, then the challenge is to explain why adults with schizophrenia fail the ToM tasks, although they possess conceptual knowledge about the nature of mental states. As Langdon et al (94) note, “many deluded patients with schizophrenia clearly know that beliefs can be false and that other people’s beliefs differ from their own: they simply hold that their own beliefs are true”. Put differently, one problem for TT is that schizophrenic patients do not necessarily lack basic knowledge about mental states, which suggests that they are able to use meta-representation.

Schizophrenia and ST

Those who favor ST start by taking seriously the fact that schizophrenic patients with severely disorganized cognitive, planning and communicative abilities usually perform poorly on ToM tasks, while patients without disorganization symptoms often have preserved ToM skills. Patients with cognitive disorganization are unable to monitor their own thought processes and therefore unable to use their own mental states as a model for simulating others (37,97).

Park et al (93) studied the ability of patients with schizophrenia to imitate behaviors, and found a “fundamental” impairment in imitation skills. The patients exhibited deficits even in imitating simple meaningless manual and oral gestures as well as facial emotional expressions, which has been confirmed in other studies (102). Regardless of the complexity of the task, the patients were less accurate than controls. Although the study did not directly address the relationship between simulation and social cognition, it suggests that a basic deficit in the imitation ability may lead to difficulties in simulation.

Both TT and ST suggest some differentiation among patient groups. Patients with negative symptoms and cognitive disorganization would be most ToM impaired (similar to autistic individuals), and may have difficulty representing mental states at all. Those with paranoid symptoms also have trouble with ToM, overly monitoring the intentions of others, and doing so inaccurately (103-105). Patients with passivity symptoms, however, perform closer to normal on ToM tasks (37,95,106).

A number of factors, however, have complicated empirical studies of ToM performance in schizophrenia. Consider that brain areas involved in ToM (including prefrontal cortex, paracingulate cortex, amygdala and temporal cortex) are frequently abnormal in schizophrenia, although not always, and not exclusively. Cortical connectivity is also an issue (e.g., 107-109). Furthermore, the results of false-belief tests may be complicated by the more general loss of contact with reality characteristic of some schizophrenic processes.

Patients with schizophrenia, for example, not only fail to attribute the correct mental states to others, but also often fail to correctly respond to the reality questions used as a control – e.g., in the Sally-Anne test, “Where is the toy really located?” (100,110).

Schizophrenia and IT

From a critical perspective, IT points to some important limitations involved in the ToM approaches for understanding social cognition in schizophrenia. For example, a study by McCabe et al (111) suggests that, in contrast to the difficulties shown by schizophrenic patients with ToM tasks in the various experimental studies, these patients show no such problems in clinical conversations and interviews. They respond to the clinician on the basis of what the clinician needs to know. They acknowledge and take account of the fact that the clinician can have different beliefs from their own. This points to an important difference between the experimental ToM task and a clinical conversation. In the latter case the patient is interacting with the clinician, whereas, in the typical ToM task, the patient is asked to make observational or third-person judgments about another person’s beliefs.

Frith (106) rightly notes that there is a fundamental difference between the use of mentalizing in discourse and in ToM tasks. In other domains this difference has been characterized as “on-line” versus “off-line” processing (e.g., 112). During discourse, mentalizing is used implicitly and automatically in the service of communicating; in this sense, it is used on-line. In most ToM tasks mentalizing is carried out off-line: the patient is not taking part in the interaction, but must make explicit use of mentalizing to answer questions about an interaction that has been described. This requirement puts more weight on working memory and on meta-cognitive processes (i.e., reflecting on mentalizing).

The typical false-belief test performed with children explores mindreading from an observational rather than interactional perspective. Even in such testing situations, however, the 3-year old child who fails the false-belief test shows no problem in understanding the experimenter, or what the experimenter wants. That is because the child is in a second-person, interactive relation with the experimenter. This is an important difference from the perspective of IT. For IT, the primary process in everyday social encounters is interaction. Taking a reflective, third-person, observational stance is a more sophisticated and derived accomplishment. In this regard, if schizophrenic patients do better in some cases of second-person interaction (as in the clinical setting) than in third-person ToM experiments, this suggests that at the very least the ToM explanations are not giving us the best accounts of their problems.

Given the various problems that people with schizophrenia have with contextual cues, IT suggests that disruptions in abilities associated with secondary intersubjectivity are
involved. Secondary intersubjectivity involves engaging in contextualized activities with others and relying on contextual differences for understanding the meaning of the other’s actions. Schizophrenic patients show impairment in using contextual information in intersubjective situations (94,98). Such problems with contextual perspective are reflected in problems with language (97,113), including problems with communicative pragmatics and narrative competency.

Schizophrenia patients have a tendency to interpret metaphorical speech literally (37,114), show impaired pragmatics (115), and impaired use of context-dependent information when presented with ambiguous verbal material (116). They also show problems in understanding and generating narratives (117-120), which likely interfere with narrative-based false-belief tests (see 99,121). Additional problems with autobiographical memory in schizophrenia (122) are disruptive for the formation of self-narrative. Related to this, Bruner (123) points out that “dnarrativia” (encountered for example in Korsakoff’s syndrome or Alzheimer’s disease) is destructive not only for self understanding generated in narrative (see 124), but also for the ability to understand others’ behavior and their emotional experiences.

OTHER MENTAL DISORDERS

Deficits in social cognition have been reported in many other mental disorders, including depression (39), bipolar disorder (40,125), Alzheimer’s disease (126), and frontotemporal dementia (127). The literature on these disorders is very limited, however.

In a study of Alzheimer’s disease involving mild dementia, 65% of patients failed to understand false-beliefs presented in short stories (127). The same group also had severe deficits on tests of verbal anterograde memory, verbal comprehension, abstract thinking, and naming, compared to patients who passed the test. Further testing would be required to determine whether these are problems that involve a ToM mechanism or problems with narrative competency, and to explore to what extent these are problems encountered in everyday circumstances of “on-line” interactions, rather than simply in the experimental setting.

Similar questions are relevant to studies of ToM which indicate problems in frontal and temporal cortical areas in bipolar disorder (40,125), and the various studies reviewed by Adenzato et al (127) where traditional ToM/false-belief tests were used to test patients with the behavioral variant of frontotemporal dementia. Neuroscientific interpretation framed in terms of TT or ST can complicate the results. Cortical areas involved in studies of frontotemporal dementia – medial prefrontal cortex especially, but also temporoparietal junction, and temporal poles – are associated with ToM functioning, but not exclusively so. Such areas are not specific for intersubjective understanding, since they also serve future planning, abstract representations, evaluation, as well as default mode functions that may or may not involve self-monitoring, self-referential process and self-generated thoughts. In effect, these areas may serve a general evaluative performance over a wide scope of functions (128). The design of mindreading or false-belief experiments may call upon these brain areas only because the tasks are all “off-line” and call for a reflective evaluative rather than on-line social interaction.

One might expect to find problems with intersubjective relations in antisocial personality disorders. Studies designed on the ToM model, however, show that subjects with these disorders do not perform worse than controls on most of the standard ToM tests (129,130). As Frith (106) has noted, however, ToM should not be equated with social cognition more generally. Studies that focus on strict mindreading abilities will only reveal to us a part of the nature of intersubjectivity. Studying intersubjectivity in psychopathologies, therefore, requires going beyond ToM functions and investigating on-line, second-person, social interactions, as well as more general issues about how patients are able to relate to and communicate with others, and the various social problems they may experience.

CONCLUDING REMARKS

The philosophical interest in psychopathology is propelled by the hope of providing a profound understanding of the dimensions of the impairments involved, but also by expectations that studies of psychopathology will help to reveal crucial aspects about the social cognitive processes at stake in non-disordered cases. To the extent that philosophical debates about social cognition can have relevance to psychiatry, then one point to take home is that empirically informed discussions that aim to integrate findings from research on psychopathology cannot afford to ignore the recent research on basic sensory-motor issues and embodied interaction.

More generally, to the extent that TT, ST, and IT offer explanations that capture different aspects, while no one of the theories captures all aspects of social cognition, one good option is to defend a pluralist approach (e.g., 131). Depending on circumstances, we may rely entirely on embodied interactive processes in richly contextualized settings, or fall back on narrative competencies, or we may be required to use theoretical inference or to run simulations. It may also be the case that a person’s social cognitive competencies are disrupted by different psychopathological problems in a number of different ways. That is, some disorders may knock out capabilities for interaction associated with primary intersubjectivity, which can lead to more general social-cognitive problems; other disorders may affect very circumscribed ToM or narrative capabilities, leaving most embodied and interactive processes untouched.

While it is evident that understanding the underlying cognitive and emotional features of social cognition in a range of psychopathologies has important implications for
psychiatry, it is also true that the philosophical and interdisciplinary discussion on social cognition is helpful for achieving explanatory goals. It is likely that whatever form a successful explanatory strategy will take, it will be a “super-hybrid”, one that combines ideas from TT, ST and IT. However, for this to be possible, there are a range of issues that have to be clarified, a number of which we have reviewed in this paper.

We end, however, by noting one central issue that defines a major difference between TT and ST, on one side, and IT on the other. Both TT and ST search for an internalist or individualist solution to problems of social cognition that would identify the proper functioning or, in the case of pathology, a disrupted functioning of a specific mechanism (ToM mechanism, mirror neurons, etc.) located within the individual. In contrast, IT focuses attention on social interaction itself, and it opens the door to the possibility that problems in social cognition may involve more than individual-bound mechanisms. If, as IT argues, social interaction may itself be constitutive of social cognition in some cases (e.g., 15), then some problems with intersubjectivity in psychopathology may involve social and cultural factors, and not just individual ones.

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