Psychotherapy Research, January 2007; 17(1): 106–119

Routledge
Taylor & Francis Group

Understanding minds: Different functions and different disorders? The contribution of psychotherapy research

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(Received 9 June 2005; revised 19 December 2005; accepted 21 December 2005)

Abstract
Disorders in the ability to understand mental states (metacognition) have an important role in psychopathology. Some clinicians talk of a generalised impairment of metacognition and others of malfunctioning of specific aspects. We compare two contrasting hypotheses. We call the first one 'fast running' hypothesis according to which metacognition is a single function, like speed in running. The second one is the 'tennis playing' hypothesis according to which metacognition is composed, like the ability to play tennis, of various, relatively independent skills, which can get impaired selectively. We reviewed the main theories and researches on metacognition and, therefore, we outlined a research programme based on them, describing the contribution made by the research on the psychotherapeutic process to this programme.

> An airliner suddenly experienced turbulence. Many passengers were frightened and expected the plane to crash. Then they watched the cabin staff going quietly about their work and their fear diminished or disappeared. To calm down, the passengers, including 1 of the authors, had to carry out a series of mental operations: Identify the reasons for their fear, identify the cabin staff's emotional state; ascribe their calmness to the belief that there was no danger of crashing; and consider them capable of correctly evaluating the situation and, as a result, use this information to modify their mental state and calm down. Success in these operations indicates good mind-reading skills (Baron-Cohen, 1995).

There is hardly any social action in which humans do not make use of their ability to represent an unsubstantial world of mental objects, such as beliefs, desires, goals, and emotions. This ability to ascribe mental states to oneself and others has been studied in various areas of psychology, each with its own language and research tradition. The wide variety of research sectors dealing with it has led to a certain confusion in concepts. The area studying preschoolers' development of the ability to ascribe mental states and processes to others is known as *theory of mind* (TOM; Baron-Cohen, Leslie, & Frith, 1985; Leslie, 2000; Premack & Woodruff, 1978). Metacognition, in contrast, refers to the development of and knowledge of one's own cognitive processes and to their influence on learning in school-age children (Flavell, 1979). This research deals with both the knowledge that children acquire about their cognitive processes and of the strategies and abilities to regulate and control these processes that they develop. Both TOM and metacognition are based on the ability to create second-order representations (i.e., representations of mental representations by both oneself and others). This ability is termed *metarepresentation* (Frith, 1992; Sperber, 2000). To add to the confusion, as well as their original definition, TOM, metacognition, and metarepresentation all are used to indicate a general inclination to think in terms of mental states. In this sense, the terms indicate a series of operations that can be carried out on mental contents and processes (e.g., understanding beliefs, identifying emotions, finding links between emotions and knowledge, identifying the desires behind outward behavior). With this wide meaning, the authors adhering to TOM use terms like *mind reading* or *understanding mind* to indicate the overall skill. In clinical practice, this overall ability has been termed *mentalization* (Fonagy & Target, 1996; Target & Fonagy, 1996), *metacognition* (Main, 1991; Semerari et al., 2003; Wells, 2000), *metarepresentation* (Frith, 1992), and

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ISSN 1050-3307 print/ISSN 1468-4381 online
DOI: 10.1080/10503300500536953

psychological mindedness (Appelbaum, 1973). In the absence of agreement on the terminology, we use *metacognition* as an expression covering the knowledge of mental processes overall when referring to our own position and use each individual author's terminology when discussing the literature.

Given its importance in adaptation, it is not surprising that damage to such a fundamental ability makes it difficult to live in society. Starting with Fonagy's (1991) observations, clinicians have become ever more aware of the importance of this type of damage in causing and perpetuating several disorders (Bateman & Fonagy, 2004; Dimaggio et al., 2002; Frith, 1992; Liotti, 2002; Perris & Skagerlind, 1998; Ryle, 1997; Semerari, Carcione, Dimaggio, Nicolò, & Procacci, 2004). A poor general ability to self-reflect or difficulties in integrating representations of self and other are typical features of personality disorders (PDs; Livesley, 2003; Perris, 1999; Ryle & Kerr, 2002; Semerari, 1999; Westen & Shedler, 2000).

Nevertheless, clinicians give different descriptions regarding metacognitive disorders as if referring to different phenomena. Some authors stress difficulties in identifying and labeling one's emotions, thoughts, and needs and describe patients as opaque, with relationship problems, an empathy deficit, and difficulties making choices (Dimaggio et al., 2002; Jellema, 2000). Others mention problems in reflecting on and understanding shifts between different mental states (Ryle, 1997) and in integrating multiple and contradictory representations (Liotti, 2002). Fonagy and Target (1996); Target & Fonagy, 1996) consider that a manifestation of mentalization disorder is difficulty distinguishing between inner and outside reality, the result being a tendency to treat fantasies and thoughts as though they were a reflection of the outside world, which reduces one's ability to reflect critically and increases one's tendency to acting out.

These differences raise the question whether these authors are describing a single disorder or different disorders in which specific impairments of patients' metacognitive ability influence their clinical status in different ways. If there are various disorders involving different aspects of metacognition, this implies that the metacognitive function is composed of distinct subfunctions, and clinical research ought to be directed at studying them and treating the various alterations in them. In this article, we are going to examine the following theoretical question: Is metacognition a single function, or is it the result of an integration of separate skills? In other words, is it like the ability to run fast, which allows us to differentiate individuals along one single dimension, so that we can say A is faster than B, who is faster than C, and so on? Alternatively, is it like playing tennis, in which one's skill is the result of an integration of different components, such as finding the proper position, coordinating one's movements, hitting hard, and so on? In the latter case, we could say that "A has a good style, but she is slow, unlike B, who is fast but not precise in her hitting." The tennis playing hypothesis would involve a research program to identify the various subfunctions and impairments to them and create tools for measuring metacognition that take into account its multidimensional structure. This hypothesis foresees specific impairments involving each function, for which the importance, impact on a psychopathology, and particular treatment requirements need to be evaluated. In sum, research, especially into the psychotherapeutic process, can contribute to a greater understanding of the influence of interpersonal relationships on metacognitive functions. Various data suggest, in fact, that the development of these functions depends, to a large extent, on the qualities of these relationships (Carpendale & Lewis, 2004; Fonagy, Gergely, Jurist, & Target, 2002). In the psychotherapeutic process, it is possible to study how, for example, the therapist's metacognitive skills help a patient to reflect on both their mental states or how, on the contrary, specific disorders to a patient's functions can render a therapeutic relationship difficult.

Starting with a description of how children's metacognitve skills develop, we review the arguments and evidence in favor of the hypothesis that metacognition is a complex function, resulting from an integration of various skills (the tennis playing hypothesis), and the potential evolution of psychotherapeutic research in this field.

Metacognition and Its Development

There is much controversy about the origin and development of metacognitive skills or what is commonly called *theory of the mind.* Some theories have an individualistic and nativistic nature and stress how they are the result of the progressive development of hardwired structures in an infant brain, occurring in genetically predetermined stages, even if authors who support this position admit that their emergence is also affected by environmental factors (Baron-Cohen, 1995; German & Leslie, 2000). The alternative position is that the development of theory of mind is broadly linked to social interaction and happens gradually; children do not form it on their own but for the most part learn it progressively in the course of their interactions with adults and peers (see Carpendale & Lewis, 2004, for an extensive discussion on the topic). In this study,

we do not offer a position in favor of one or another of these hypotheses but concentrate instead on the fact that, whichever perspective is adopted, the data seem to support the idea that such ability is not unitary but characterized by different subfunctions.

Many studies suggest that there are three essential stages in the development of metacognition: comprehension of action intentionality, comprehension of pretending, and comprehension of the beliefs on which behavior is based. According to Tomasello (1999), the foundational skill is comprehension of intention. At about the age of 1 year, children realize that action is teleological in nature, and they direct their attention to the intentional dimension rather than to the mechanics of behavior. This is indicated by the fact that, in imitating behavior, children begin to let themselves be guided by the goals of an action and disregard, when necessary, the exact sequence of actions seen. For example, two groups of 14-month-old children were shown an adult turning on a light by pressing a switch with his head. Half saw him performing the action with his hands occupied and half with his hands free. When asked to repeat the action, the children who had seen him with his hands free tended to press the switch with their heads, whereas those who had seen him with his hands occupied tended to use their hands, stressing the implicit goal of the action (turning on the light) rather than the way in which it was carried out (Gergely, Nadasdy, Csibra, & Birò, 1995). Between 12 and 18 months, children are able to share in intentionality and goals and engage in cooperative activities (Tomasello & Rakoczy, 2003). Interaction with adults in joint goal-directed activities is both the result of a child's innate inclination to understand and share in intentionality and a condition for a further development of its metacognition, which depends, therefore, to a great extent on the quality of relationships with caregivers (Fonagy et al., 2002). It is probable that growing up in an environment involving positive experiences of sharing intentionality with adults promotes the emergence, at about 2 years, of the second essential skill: the ability to understand pretend play. In pretend play (Leslie, 1987), an object is treated as though it was something else (e.g., a banana as a telephone). According to Leslie, this involves the ability to distinguish between representations with a reference link to reality ("this is a banana") and representations without it ("this is a telephone"). Understanding pretend play can be considered the first step in the development of the ability to distinguish between and classify representations based on how much they correspond to reality. It is with this ability that we are able to distinguish between dreams, fantasies, hypotheses, beliefs, and so on.

The last skill, among the basic ones needed for mind reading, emerges at about 4 years of age: comprehension of beliefs. The test showing that a child has achieved this skill is the false belief task. There are currently dozens of versions of this test (Wellman, Cross, & Watson, 2001). In the original one (Wimmer & Perner, 1983), children were shown a short scene in which an actor (Maxi) saw some chocolate put in a green box next to an empty blue one. While Maxi is absent, the chocolate gets moved to the blue box. The children are then asked, "Where does Maxi think the chocolate is?" (understanding of belief) and "Where will Maxi look for the chocolate?" (understanding of the beliefs guiding behavior). Autistic children typically fail in this task (Baron-Cohen et al., 1985). Solving the false-belief task is an indicator that a child possesses the basic skills necessary for becoming a good mind reader. Later development, life events, and relationship quality influence the evolution of these skills and either promote their growth to the degree necessary for good adaptation or impair them and thus render an individual vulnerable to psychopathology (Fonagy et al., 2002).

Metacognitive Subfunctions

Our theory is that metacognitive function is, like memory, a single skill split into relatively independent subfunctions. If this is true, three conditions should be found in clinical and research data. The first, and main, condition is that there needs to be an uncoupling of functions, so that one is activated without the others; there need to be pathologies in which one function is impaired while the others are intact. Second, different functions should be based on different neural systems. This condition is not sufficient on its own, because it is theoretically possible that a same skill can be applied through the activation of different neural pathways, but in general different functions are connected to different brain sites. Third, the various skills appear at different stages of development. This condition too is not sufficient on its own, because it is possible that, if two functions appear at different stages, this does not indicate that they are separate but that the one appearing first constitutes a step toward the development of the later one. In general, however, if two functions are modified in a selective manner (functional uncoupling), are based on different neural systems, and appear at different stages of development, they can be considered separate functions. There are data supporting each of the three arguments. The uncouplings of functions that have been noted have led to the proposal of the following principal distinctions: between knowledge of one's

own mental states and that of others; between the ability to monitor mental contents and the ability to reason about them in an integrated manner; and between the ability to be aware of mental states and the ability to manage and regulate them. Moreover, the ability to make a distinction between different types of representation (in particular between representations of fantasies and those with a link to external reality) has been described as specific function.

The Difference Between Reasoning in the First and Third Persons

Nichols and Stich (2001) hypothesize that there is a separation between knowledge of one's own mind and that of others. The authors criticize the theory that a single TOM underlies the understanding of all mental states and maintain that there are two distinct mechanisms: TOM, specializing in ascribing mental states in the third person, and a monitoring mechanism (MM), which does the same in the first person.

Developmental psychology has found a maturational gap supporting this hypothesis. For example, if 3-year-old children are told to look at the contents of a box and are asked, "Do you know what is inside?", they are able to solve the task without any difficulty. However, if they see another looking at the content of the box and the question becomes "Does he or she know or not what's in the box?", then they display a significant level of difficulty (Nichols & Stich, 2001).

Neuroscientific evidence also supports the theory that reading others' minds and one's own are, at least partly, two distinct functions. The monitoring of one's own inner states involves neural pathways developed for regulating homeostasis and providing information about physical states (Damasio, 1994). The understanding of others' mental states involves neural pathways, like those supporting the ability to follow the direction of a gaze (Baron-Cohen, 1995) or those in charge of recognizing the basic emotions in facial expressions (Darwin, 1982/1872; Ekman, 1984), the function of which is to check one's outside environment. Frith and Frith (1999) proposed that the medial prefrontal node maintains representations of the mental state of the self, that the superior temporal sulcus detects the behavior of agents and analyzes the goals and outcomes of this, and that the inferior frontal region maintains representations of actions and goals.

A number of uncouplings between first- and third-person skills have been described in clinical research. Marraffa and Meini (2004) reviewed a series of studies about Asperger's syndrome and schizophrenic patients' mind-reading skills. According to the authors, the data indicate that Asperger's syndrome involves a severe deficiency in the ability to understand others' minds but a lesser impairment in the ability to report one's own thoughts. In schizophrenics, the reverse is true: They perform better than Asperger's syndrome patients in third-person tasks, but, when in an acute phase, they report almost nothing about their inner experiences.

In a single case study, Nicolò, Centenero, Nobile, and Porcari (2002) analyzed 35 transcribed sessions with a patient diagnosed with paranoid PD. Not surprisingly, the patient had clear difficulty understanding others' minds but had no problem in reporting his own inner states.

The fact that knowledge of one's own mind and that of others constitutes two distinct systems raises the question of how they interact and how those processes, which cognitive scientists term *simulation* and clinicians *empathy,* are made possible. The discovery of a system of neurons, termed *mirror*, located mainly in the premotor cortex has created new perspectives for the study of mind-understanding processes (Gallese & Goldman, 1998; Rizzolatti, Fadiga, Gallese, & Fogassi, 1996). These neurons are activated either when watching another's intentional actions or when carrying out an action oneself. In other words, when watching a finalistic action (not a simple movement), the premotor circuits, with which that action is carried out, also become activated, as though one was simulating the carrying out of that action internally (Gallese, Fadiga, Fogassi, & Rizzolatti, 1996). In Gallese's (2000) opinion, this ability to simulate the intention and motor structure of an action is the neural basis for the development of empathy.

The Difference Between Monitoring and Integration

There is a further uncoupling, according to Nichols and Stich (2001), between detecting and reasoning skills. Detecting is the ability to identify specific mental contents in oneself. Reasoning is the ability to draw inferences about mental states and processes. According to Nichols and Stich, one's reasoning skills are used in working out information about one's own mental states and those of others. Detecting, in contrast, is part of the monitoring mechanism, used only in the first person. The authors, therefore, exclude the possibility of an ability to detect directed at others' minds, the knowledge of which is possible only by inferences.

In the opinion of Nichols and Stich, the experiments by Gopnick and Slaughter (1991), with tasks about understanding variations in desire, support the

hypothesis that there is an uncoupling between detecting and reasoning. For example, 3-year-old children are asked, before their snack time, whether they want to eat. They normally reply "yes." However, if, after eating, they are asked whether, at the time of the first question, they wanted to eat, they tend to reply "no," showing that they are basing themselves on their current desire and are unaware of the variation therein. The authors' interpretation is that, although the identification of a current desire depends on a monitoring mechanism, which is already working well at that age, the possibility of recalling past desires and understanding variations depends on working out and reasoning processes, which are not yet working at that age. By this definition, reasoning is the function by which we are able to understand transitions between mental states and arrive at coherent explanations of why we and others possess different and contradictory mental contents. This definition corresponds to what is termed, in clinical literature, *integration.* Nichols and Stich's observations, therefore, seem to indicate that there is a functional uncoupling between monitoring and integration, which we address later.

One aspect of Nichols and Stich's position is, in our opinion, debatable (i.e., the idea that third-person monitoring activity is not possible). This is certainly true regarding proprioception. However, when they exclude third-person monitoring, these authors are considering only the understanding of beliefs and desires, the ascribing of which to others is, intrinsically, of an inferential nature. Certain aspects of the understanding of others' mental states (e.g., identification of emotional expressions [Ekman, 1984] or the intentionality of actions [Tomasello, 1999]), however, are perceived directly with their mentalistic meaning without requiring further inferences. The ability to understand these aspects can thus be considered a form of third-person detecting–monitoring. That understanding the intentions of third persons and understanding their beliefs arise from two separate skills is, moreover, supported by neuroscientific research. Saxe, Carey, and Kanwisher (2004) reviewed neuroimaging research on individuals engaged in different tasks involving understanding others' minds, which showed that there are areas of the brain that are activated in a domain-specific manner; those involved in the representation of beliefs are different from those activated during goal and intention identification tasks. On the basis of these findings, the authors conclude that the difference in development of the ability to identify beliefs and the ability to identify others' intentions demonstrates that there are two distinct neural systems.

Monitoring Disorders

In the clinical field, there are various descriptions of impairments to monitoring. Numerous studies have indicated that, when their symptoms are in an acute phase, schizophrenics perform theory of mind tasks badly (for reviews, see Casacchia, Mazza, & Roncone, 2004; Lee, Farrow, Spence, & Woodruff, 2004). They display an extensive impairment of their metacognitive functions and a cognitive deficit, making it difficult to pinpoint problems with single, specific skills. Nevertheless, even in this case, some research seems to indicate how each different aspect of metacognition has its own impact on the symptoms of schizophrenia. In the opinion of Casacchia et al. (2004), there are three levels of awareness, which can be selectively impaired with specific effects on the symptoms of schizophrenia: awareness of the purposes attached to the actions one carries out during daily life, awareness of one's own intentions, and awareness of others' intentions. These authors consider that poor awareness of the purposes of one's own actions might be connected to the development of negative symptoms, whereas poor awareness of one's own intentions might explain difficulties in recognizing one's actions as one's own and provoke phenomena like *commenting voices*. In a study carried out with a sample of 40 schizophrenics and 21 patients with schizoaffective disorder (Lysaker et al., 2005), it emerged that there are specific links among different aspects of metacognition and patients' symptoms, neurocognition, and social adaptation. Patients with less understanding of their own minds also display poorer neurocognitive functioning. There is a strong tie between a good level of understanding of one's own mental states and symptoms of depression. Social withdrawal seems to be connected with a poor understanding of both one's own and others' minds.

The main monitoring disorder is alexithymia (i.e., difficulty acknowledging one's own emotional contents, together with a tendency toward concrete thinking and lack of imagination Sifneos, 1973; Taylor, Bagby, & Parker, 1997). Alexithymia has been found to be a characteristic trait of psychosomatic and substance-dependent patients (for a review, see Taylor, 2000). It has also been found in narcissistic PD (NPD; Krystal, 1998) and borderline PD (BPD) patients with histories of abuse (Berembaum, 1996). It is correlated, moreover, with avoidant and narcissistic personality traits (Bach, de Zwaan, Ackard, Nutzinger, & Mitchell, 1994). There are other aspects to monitoring disorders beyond the identification of emotions. For example, in NPD, Jellema (2000) reported difficulty acknowledging one's needs for affection and the influence of

relationships on one's mental states. Dimaggio et al. (2002) report on a client with difficulty acknowledging desires not inherent to the grandiose state. Beck, Freeman, and associates (1990) ascribe the poor access of patients with avoidant PD to their inner states to cognitive, emotional, and behavioral avoidance strategies. According to Procacci, Dimaggio, and Semerari (1999), this is due to a difficulty in monitoring one's thoughts and linking them to the causes behind them.

Integration Disorder

There is agreement in the literature on the fact that the self is multiple (Hermans, 1996; Horowitz, 1991; Markus & Nurius, 1986; Muran, 2001; Stiles, 1999). Individuals change their ways of thinking and behaving when different facets of their personality take control of action. There needs to be a function, therefore, giving a subjective feeling of consistency and guaranteeing consistency in behavior. This function, by which individuals are able to arrive at superordinate points of view about themselves, hierarchies ranking multiple goals by importance, and the continuity of action necessary for adaptation, is *integration* (Dimaggio & Semerari, 2004). It has been studied in the narrative psychology field; in the opinion of Bruner (1990), narrative is a form of reasoning that combines significant quantities of information and puts it into structures (i.e., stories) that a person can quickly draw on to solve identity problems and to use as a guide through the ups and downs of life. A life story allows individuals to organize recollective memories (Brewer, 1996) and more abstract knowledge of their past into a coherent autobiographical view. A consistent self-narrative allows people to establish self-continuity and self-understanding (Habermas & Bluck, 2000; Neimeyer, 2004; Pillemer, 1998).

If integration is the function by which we give consistency to our actions, it is not surprising that impairments in it have been found in disorders featuring chaotic thoughts and behavior, in particular BPD (Dimaggio & Semerari, 2004), dependent PD (Carcione & Conti, 2003), and dissociative disorders (Liotti, 2002). The paradigmatic example of integration can, on the contrary, be found in the episode of "Ulysses and the Sirens." The hero pictures his desires to return home and to listen to their song to himself. He is able to grasp that these two desires are, in the real world, incompatible. He is also able to foresee how his mental states will vary in line with environmental influences. He knows that under the effect of their song his only desire will be to get to the Sirens. However, he also knows that, when away from the effect of their song, he will want to return to Itaca again. Thanks to this ability to picture various, incompatible mental states and contents, he is able to work out a practical strategy (tying himself to the mast) to optimize the achievement of his goals.

The distinction between knowledge and mastery. The Ulysses example leads us to another, final, distinction: between knowledge of one's mental states and the working out of strategies for regulating and managing them. Mental states knowledge does not necessarily involve the ability to cope and regulate. The distinction between knowledge on the one hand and regulation and control on the other is common in studies about metacognition (Nelson & Narens, 1990). There are examples of functional uncoupling between these two dimensions also. Metamemory studies of classifying tasks (Cornoldi, 1995) show that grouping sets of objects (e.g., plants or animals) by category is an effective strategy for remembering them. Six-year-old children understand a classifying strategy abstractly, but when faced with a memory test, they are unable to put it into practice (Salatas & Flavell, 1976).

Clinical literature has concentrated on emotional regulation problems. Linehan (1993) considers that an inability to modulate emotional processes is the fundamental alteration underlying BPD. In Livesley's (2003) opinion, difficulty modulating and regulating emotional processes is a feature common to all PDs. In particular, although clinicians agree that an inability to regulate emotions is a trait of histrionic PD (Horowitz, 1991), Bach et al. (1994) found an inverse relationship between histrionic traits and alexithymia. Taken together, these two observations suggest that there is a functional uncoupling, as a result of which histrionic patients are capable of identifying their emotions but unable to regulate them.

Awareness of the distinction between representation and reality. As we have mentioned, children become aware at about 2 years of age that there can be representations detached from the real world. At the same time, they become aware that these are different from representations intended to describe the outside world. They thus develop the ability to differentiate between different types of representation depending on the degree of correspondence with reality that is ascribed to them. Impairments specifically involving this function have been described in clinical literature. Some authors (Bateman & Fonagy, 2004; Fonagy & Target, 1996; Target & Fonagy, 1996) consider that traumatic relations with caregivers can impair the ability to shift between different types of representation and reality, and that

the result in adulthood is a tendency to swing between opposite thought modes: the pretend mode and the equivalent mode. In the pretend mode, an individual feels and acts as though reality was unreal and actions were in the imagination. In equivalent mode, representations are treated as though they were an unadulterated reflection of reality. Rachman (1993; Rachman & Shafran, 1999) has described a disorder in this function in obsessive–compulsive disorder and called it "thought-action fusion" (TAF). TAF takes the form of a belief that the mere fact of thinking about an event can have a direct influence on reality and increase the likelihood that the event will occur, whereas suppressing a thought about a feared event reduces the likelihood of it happening. One problem is that difficulty differentiating between representation and reality is a common phenomenon among psychopathologies, and the forms it takes can be very different from each other. There is, for example, a substantial difference among a BPD patient's difficulty in differentiating, a paranoid PD patient's delusional thoughts, and an obsessive PD patient's TAF. Perhaps further subcategories need to be defined within subfunctions like differentiation.

The contribution of psychotherapy research. With the tennis playing hypothesis, the assessment tools need to measure different specific functions. Moreover, if the hypothesis is true, we would expect that a tool created for identifying disorders in specific subfunctions would reveal two types of functional uncoupling: (a) The same patient might have some functions working normally and others impaired (Type 1 uncoupling); and (b) a group of patients might differ from each other regarding the type of functions impaired (e.g., some might have an impairment of monitoring but not integration and others vice versa [type 2 uncoupling]). Both these uncouplings have been found in research into the psychotherapeutic process performed using the Metacognition Assessment Scale (MAS; Carcione, Falcone, Magnolfi, & Manaresi, 1997; Semerari et al., 2003).

MAS was created to verify the trend in metacognitive functions in what patients say, in particular in psychotherapy session transcripts. There are two main advantages in using the scale in the transcripts of the session. The first is the possibility to follow the process by which the metacognitive functions change during the time. In this way, it is possible to distinguish between the most stable and temporary aspects of the disorders and study the relational factors of the process that influence the positive or negative trend of metacognition. The second advantage is that MAS is based on the multidimensional hypothesis, in that it subdivides metacognition into subfunctions and analyzes the trend in each of them separately. Therefore, the scale allows us to point out some possible functional uncoupling and different profiles of metacognitive impairments.

Table 1. General Structure of Metacognition Assessment Scale

UM	UOM	M
Identification	Identification	First-level strategies
Relating variables	Relating variables	Second-level strategies
Differentiation	Decentration	Third-level strategies
Integration		

Note. UM = understanding of one's own mind; UOM = understanding of others' mind; M = mastery.

The scale is split into three sections: understanding of one's own mind (UM), understanding of other's mind (UOM), and mastery (M; Table 1). The UM section includes three parts: monitoring, differentiation, and integration. The monitoring part includes three items: identifying emotions, identifying thoughts, and identifying the relationships between variables (e.g., between thoughts and emotions ["I was frightened because I thought I was going mad"] or between outside events and inner states ["His coldness made me feel lonely"]). This makes it possible to pinpoint clinical phenomena like difficulties identifying emotions (Krystal, 1998; Taylor et al, 1997), reporting one's thoughts (Beck et al., 1990; Procacci et al., 1999), and linking one's inner states to relational events (Dimaggio et al., 2002; Jellema, 2000). The differentiation concept comes from observations by Fonagy and Target (1996); Target & Fonagy, 1996) about difficulties distinguishing between imaginary representations and those with a reference link to reality and is defined as the ability to differentiate between different categories of representation (dreams, fantasies, hypotheses, beliefs) and representation and reality. Integration is defined as the ability to reflect on states and mental contents with a view to giving them an order or ranking them by importance, so that behavior has the consistency necessary for adaptation and the pursuit of goals. Based on this definition, the various disorders described in clinical literature as being both nonintegration between mental states (Kernberg, 1975; Ryle, 1997) and nonintegration within a single mental state (Dimaggio & Semerari, 2004; Liotti, 2002) can be included in integration deficiencies. The UOM section comes from the distinction by Nichols and Stich (2001) between knowledge of one's own mind and that of others. This section is split into two parts: monitoring and decentering. In a previous version of the MAS, there was a greater similarity between understanding of own mind and understanding of others'

minds (Semerari et al., 2003), because it included differentiation and integration in UOM also. However, it was then decided to include third-person differentiation in the ability to differentiate in the first person because it was a variant thereof, whereas third-person integration was found to overlap with decentering. The authors, therefore, simplified the scale by eliminating these two items.

The monitoring part includes the ability to perceive others' emotions, make plausible inferences about their thoughts, and understand what factors influence their mental state. Decentering refers to the ability to see the perspective from which others relate to the world and to realize that others may act on the basis of values and goals different from one's own and independent from the relationship with oneself. The M section was introduced to take account of the distinction between knowledge and regulation of mental states (Nelson & Narens, 1990). It covers the use of problematic mental state coping strategies. These strategies are split into three levels based on the level of metacognitive complexity they require. The first level involves behavioral-type strategies, which do not require a metarepresentative awareness (e.g., taking action on one's bodily state and avoiding problematic situations). The second level involves mental-type strategies not requiring a particular knowledge of mental states (e.g., regulating one's conscious attention by diverting one's mind from some problematic mental contents). The third level encompasses strategies requiring metarepresentative skills (e.g., adopting a critical distance from a belief underlying a problematic state).

The scale is equipped with a manual for measuring how often patients successfully use a function and how often they fail to use it. Consequently, successes and failures are evaluated separately for each function. MAS interrater agreement is good. In the first study performed by Semerari et al. (2003), three raters independently evaluated successes and failures in the various functions using two sample sessions with two different patients. Kendall's $W =$ .968 for the first patient and .942 for the second patient. In the retest, both Ws $=.967$ ($p < .01$).As regards concurrent validity, the MAS was compared (Lysaker et al., 2005) with the Scale to Assess Unawareness of Mental Illness (SUMD; Amador et al., 1995), which measures the insight of people into a specific aspect of their existence (awareness of disease). The results showed the expected positive and significant correlation between MAS–UM and SUMD ($r = .27$, $p < .05$).

MAS has been compared with session transcript analysis tools measuring theoretically correlated constructs, such as the Assimilation of Problematic Experience (APES; Stiles et al., 1990) and the Therapeutic Cycle Model (TCM; Mergenthaler & Bucheim, 2000). The APES measures the ability to identify and comprehend those mental experiences of one's own that are a source of suffering and the ability to cope with them. It is expected to vary with the MAS–UOM subscale. The TCM measures patients' ability to access their emotional experience and reflect on it. Glick, Salvi, Stiles, and Greenberg (2004), Mergenthaler (2004), and Carcione et al. (2004) analyzed 12 psychotherapy sessions of a patient suffering from major depression with APES, TCM, and MAS. There was substantial concordance between the three methods: Low scores on the APES and low levels of emotionality (indicated by low numbers for the variable connecting) on the TCM coincided with greater difficulty at self-reflection observed by MAS.

Examples of failures in specific metacognitive functions. To help understand the clinical meaning of the differences between disorders in the various subfunctions, we now present several examples of failures in them. The following is an example of monitoring failure:

P: I went to the university. (silence)
T: How did you get on?
P: Well . . . (silence)
T: How did you feel?
P: My hands were trembling.

The patient describes her somatic state instead of describing her emotional condition.

T: It must have been difficult. Do you remember what you were thinking about?
P: I was nervous.
T: What were you thinking about at the time?
P: Nothing, maybe I looked odd.

The patient's difficulty in describing her own thoughts changes into a sort of external observation of what she looks like. Her mental state is opaque, and a reader is unable to grasp what thoughts and emotions are driving her behavior. The questions posed by the therapist do not help her to improve her access to her inner state. And now there is a failure to differentiate:

P: I had dinner at some friends of A [girlfriend]. We got there and one of A's ex-boyfriends was there too. You know which one . . . I can't even tell you how I felt! I remained with my coat on at the door. I wanted to throw up. My head was spinning, as if it was unscrewing itself from my neck . . . like a screw, a pain in my arm. I was

confused . . . I thought of you [indicates the therapist]. I decided to stay. He left after 40 minutes. I wasn't present. I wasn't present all evening long . . . I didn't join in.

T: Do you remember what you were thinking?

P: That my relationship with A was over. Everything was finished. I felt terrible. In the morning—I had hardly slept—I was really pissed off. I started having a go at A. I wanted to destroy everything I had given her during our time together. I tore up her clothes. I didn't want to hit her. I knew that I mustn't hurt her. I didn't hurt her.

T: Do you remember when you started tearing her clothes? What was it that made you do it? What were you feeling? What were you imagining?

P: No, I don't remember.

T: Try!

P: I couldn't remember the night before . . . where they were sitting. Now I know that they were sitting opposite each other [indicates the positions]. He was there and she was here. But that morning I couldn't remember . . . I saw them close to each other, talking, and I was left out. I was the betrayed one. This was something that made me really angry. That woman doesn't talk. She didn't respond. It was as if that silence was an approval of the situation. I was furious. In my hand I had a watch that I had given her once. I broke it . . . Hold on, I remember that she was putting on her make-up in front of the mirror. I think she did that after the betrayal. I felt terrible.

In the session, the patient recalls the evening in a completely different way to the fantasizing about being deceived and excluded that he had during his problematic state. In the session, he knows that they were sitting opposite each other and thinking that they were having an affair was in his imagination. Nevertheless, at the critical moment, that morning, he lost all ability to distinguish what he imagined from what really happened the evening before. Even the idea that his girlfriend was making herself up after being adulterous gets treated as a true fact, even though the patient spent all evening and night with her and, consequently, has all the information necessary for knowing that it was in his imagination. However, note the difference with the previous example. The patient describes his inner state accurately, and the reader has no difficulty perceiving his thoughts, emotions, links between mental variables, and communicational intention.

Lastly, here is a failure to integrate various representations of self with other:

P: Eleonora asked me to go with her. We went by car. I'm coming to realize that I've stopped taking either buses or the metro. Not even with other people. I thought, "I haven't managed to do this and I'm not going to manage to do anything," and I felt annoyed with my father. I can't stand anything he does or says. I feel I'm not very coherent when I talk . . . I don't know. I felt very much to blame. I've just thought about my mother and how I can't manage to please her.

This narrative is crowded with multiple emotions and thought themes, without the patient being capable of putting them into any order or ranking by importance, to the extent that it becomes difficult to say what might be the focus of an intervention by the therapist. The passage is likely to cause a sensation of confusion and chaos, but not opaqueness, in a reader. However confused and chaotic her thoughts and emotions might be, when the patient relates them she gives us access to the contents of her mind.

Research Using MAS

The research carried out using the MAS has brought to light both Type 1 functional uncouplings, with some functions impaired and others healthy in the same patient, and Type 2 uncouplings, with differences in the type of function impaired between various patients. The study by Semerari et al. (2003) compared the metacognitive profile of a patient diagnosed with BPD with that of a patient diagnosed with NPD. In both cases, all the sessions during the first year of psychotherapy were analyzed by MAS. The BPD patient had a severe alteration in her differentiation and integration. As regards differentiation, in all but 4 of 37 sessions from the period considered, failures exceeded successes in the function. Her problems with integration were just as clear: In only 2 sessions were there more successes versus failures. Nevertheless, the patient almost always carried out monitoring successfully and showed that she was capable of reporting her thoughts and emotions and of perceiving relationships between variables. There was thus a functional uncoupling between monitoring and integration in the same patient. The NPD patient, alternatively, had a clear monitoring deficiency. As regards relationships between variables in particular, failures exceeded successes in the first 25 of the 38 sessions

of the period analyzed. This trend was inverted in the last part of the period; some sessions had an equal number of successes and failures, and others had a prevalence of successes. In differentiation, unlike the BPD patient, successes systematically exceeded failures. Integration too, even if she had some problems, was less impaired, with a prevalence of failures only in the first 12 sessions. Both patients displayed difficulty mastering problematic states, as shown by a prevalence of failures over successes in mastery, which remained constant throughout the period (BPD) or in which there was an inversion to the trend only from Session 25 (NPD). The 2 patients, therefore, displayed radically different profiles as regards two functions, monitoring and differentiation, the former either working (BPD) or impaired (NPD) and the latter either impaired (BPD) or working (NPD).

It should be noted that, although the better trend in integration and mastery in the NPD patient can be ascribed to her illness being less serious and her responding better to treatment, the monitoring (BPD) and differentiation (NPD) functions were working well from the first session. The difference between the two patients, therefore, exists when treatment starts and is not a result of their therapies. In a second study (Semerari et al., 2005), own mental state knowledge operations were measured in the first year's psychotherapy sessions with four patients diagnosed with BPD. They had a similar profile to the BPD patient in the previous study. Three patients had hardly any monitoring failures throughout the period analyzed. Only one had a significant number of failures in the function, even if in only one session did they exceed successes. In all four cases, the differentiation and integration functions were impaired, even if to different degrees. With all the patients, failures exceeded successes in the first part of therapy. In one case, one sees an inversion in the trend in the last third of the period, with a consistent prevalence of successes in both differentiation and integration. In two cases, the second half of the period is marked by swings between periods of three to four sessions with a prevalence of successes and others of a similar length with a prevalence of failures. In the last case, failures are consistently in the majority. Overall, therefore, these findings confirm that there is a functional uncoupling between monitoring on the one hand and differentiation and integration on the other.

Further research (Dimaggio et al., 2005) analyzed own mental state knowledge operations in the first year's psychotherapy sessions with four patients: two diagnosed with NPD and two with APD. One of the APD patients had an overall good functioning profile; successes regularly exceeded failures in all functions. The two narcissistic patients and the other avoidant patient displayed a monitoring disorder; in all cases, failures exceeded successes in the first half of the period considered. This trend was inverted in the second half of the period with the NPD patients but not the APD patient, who continued to have difficulty throughout the period in monitoring his inner states. As regards differentiation, all the patients consistently had more successes than failures (except for one session with 1 NPD patient). One of the NPD patients displayed a good functioning of integration. This patient thus had an uncoupling symmetrical to that found in the BPD patients: monitoring impaired and differentiation and integration working. The other narcissistic patient had a majority of failures in integration in the first part of his therapy, and then there was an inversion in his situation in the second half, whereas the APD patient was deficient throughout. Taken together, these studies found both types of functional uncoupling foreseen by the tennis playing hypothesis. There are cases in which only certain subfunctions are selectively impaired and the others work well. There are also clear differences between different patients regarding the type of function impaired.

Discussion

The data on the development of metacognition show that the various distinct skills evolve at different times. Children's recognition of desires and intentions precedes that of beliefs (Tomasello, 1999), tasks involving understanding own mental states are performed before similar third-person tasks (Nichols & Stich, 2001), the ability to monitor own beliefs and desires appears before the ability to reflect on variations in them, and the knowledge of own cognitive processes may come before the ability to regulate them and to act actively on them (Cornoldi, 1995).

Moreover, research using neuroimaging techniques seems to indicate that at least some of the various metacognitive skills depend on different neural circuits (Saxe et al., 2004). Furthermore, clinical evidence suggests that there are specific disorders in distinct subfunctions, and data from research on the psychotherapeutic process demonstrate how an individual patient can be impaired in only certain subfunctions and have others working well, and that there are different function disorder profiles for different patients. These functional uncouplings all speak in favor of the tennis playing hypothesis, which can be summed up in the following assertion: Knowledge of mental states arises from a set of correlated but distinct functions, which mature at different times and can get impaired in

different ways by a psychopathology, and these impairments, in turn, influence clinical manifestations and social skills differently.

From the tennis playing hypothesis perspective, there are a number of questions for psychotherapy. The first concerns the level of contribution from clinical research. If there is substantial evidence that metacognitive disorders have a role in some serious pathologies, the concept that there are specific disorders in particular subfunctions is based solely on clinical observation and on some research into a few cases. This makes it difficult to reach general conclusions and to understand the real significance of results and is particularly evident if, based on the few cases we have analyzed, we wanted, for example, to draw up a prototypical metacognitive dysfunction profile for each PD. Nevertheless, these considerations do not apply to the problem that we are discussing and which we have exemplified with the contest between the two tennis playing and fast running hypotheses. A few individual cases can have a falsifying affect on a general hypothesis. As Popper pointed out, all you need to do is see a black swan to show that the hypothesis that all swans are white is false. If a function were always one and the same, any impairments in it ought to be unvarying in all their aspects. However, our examples show that this is not always so. The functional uncoupling cases found by MAS (Dimaggio et al., 2005; Semerari et al., 2005) are enough to show that the fast running hypothesis is false. A second possible objection concerns not so much that there are separate disorders in individual subfunctions as the clinical importance of this. If we accept that there are different functions, do the differences influence a clinical situation in ways so different from each other as to justify a research effort into identifying the various disorders in the different functions? Some data indicate that disorders in different areas of metacognition influence a clinical situation differently. First, certain data reported previously here suggest that, at least as regards schizophrenia, impairments of different aspects of metacognition are linked to different symptoms (Casacchia et al, 2004; Lysaker et al., 2005). In PD psychotherapy, the therapeutic relationship can be affected differently by specific metacognitive impairments. A qualitative analysis was made of the therapies examined using the MAS to see whether there was a correspondence between different metacognitive disorders and different therapist–patient relationship problems. In this regard, the therapists were questioned directly about their reactions to the various patients. This analysis (see Dimaggio, Semerari, Carcione, Nicolò, & Procacci, in press) showed that patients with monitoring disorders, for example, provoke therapist reactions that we might define overall as being *withdrawal,* featuring states involving boredom, irritation at the idea of wasting time, lack of interest, and a tendency to become distracted during sessions and to disengage oneself mentally from the therapeutic task. Patients with integration disorders tend, on the contrary, to arouse states of hyperinvolvement, in which therapists have strong feelings, both positive and negative. Another aspect of the clinical importance of the tennis playing hypothesis is the question as to whether a specific disorder needs to be treated in a specific way. Research into this has barely started, but the data seem to indicate that some treatments have different effects on different areas of metacognition. For example, Lysaker, Davis, and Hunter (in press) have shown that schizophrenic patients treated with cognitive–behavioral and vocational rehabilitation therapy improve their metacognitive functioning, as measured by MAS, significantly more than a control group. The data, however, show that this improvement was ascribable solely to significant variations in the UM area and not the UOM and M areas.

The main limit to these studies is that with neither the MAS nor tools evaluating the ability to understand mental states in a clinical environment in general has an analysis been done with a normal population, so that the fact that there is a disorder is indicated exclusively by patients failing more than they succeed in using a subfunction correctly. Moreover, the identifying of disorders in these skills on its own tells us nothing about the crucial clinical question of how much a dysfunction points to a true and proper impairment of a function. For example, poor access to an inner state might be due to either a metacognitive dysfunction or to defensive operations (e.g., repression). In both cases, the outcome appearing in the texts is the same. The same impairment might also be due to an interaction between the two factors: the use of defense mechanisms limiting access to psychological phenomena, resulting in a patient being unable to exercise him- or herself in his or her knowledge of them. It is likely that defense and metacognitive disorders interact in a complicated way. Some additional empirical studies are necessary to explain their relationship.

Another important limit to the research performed with the MAS is that, because it requires a large number of observations of each individual case, only a small number of cases can be examined. The fact that this type of assessment of metacognition is relatively new and that research into its principles involves a very limited number of cases means that the split between subfunctions and between disorders therein presented in this work is to be considered solely a research hypothesis. A more accurate

evaluation of the psychometric properties of the MAS, to verify how much the subfunctions are independent from each other and do not depend on a quirk in how the tool is put together, could make an important contribution to this question. There will, moreover, need to be surveys of a wider patient population. In this regard, the use of the MAS made by Lysaker et al. (2005), in press), who apply it to semistructured interviews at the assessment stage, seems to be an effective strategy.

There are still many completely open questions requiring detailed research work. Some concern problems evaluating and measuring the various functions and the degree to which they are functionally and psychometrically independent from each other or influence each other. Beyond the theory, we do not currently have research data allowing discussion on this. Another is their architecture: If it makes sense to think that some of them make use of other subfunctions (e.g., that for integration to work it needs monitoring to be healthy, and relating variables needs identification to be working), there is no empirical support for these assertions. Another interesting issue is to what extent some subfunctions are modular and act on highly domain-specific information or are, instead, domain general and collect information arising from various sources. Finally, there has been no speculation about whether there is a general metacognition factor (like the G factor in intelligence) or a simple indicator of an individual's metacognitive skills (e.g., an item in the scale appearing particularly correlated to his or her general trend in metacognition). Finding such an indicator would be important both empirically and clinically. It could, in fact, be a marker to look for in studies of large samples, in which it would be impossible to use the MAS in its entirety and, at the same time, provide a clinician with rapid information about the overall metacognitive skill level of a patient under consideration.

Further open questions involve more strictly clinical issues, such as the links between specific metacognitive disorders and particular symptoms or difficulties in adapting. For example, clinical data seem to indicate that monitoring disorders are linked to difficulties in forming close relationships, whereas with integrating disorders such relationships are formed but they are unstable and chaotic. Another issue warranting deeper study is the fact that, during treatment, there can be fluctuations, with alternations between moments when there is a serious deficit and moments when metacognition functions well, as shown by research into the psychotherapeutic process (Semerari et al., 2005). This poses the question as to what occurs when there is a switch between malfunctioning and good functioning and vice versa. A study of recorded sessions could show how much a therapist contributes to such variations. It is likely, moreover, that, like many clinical variables, the evolution in a patient's metacognition is also affected by his or her therapist having specific qualities, including the latter's metacognitive skills. It is possible, for example, that an evaluation, in the initial sessions of a therapy, of a therapist's metacognitive abilities could be a good indicator of its outcome. Another question is whether therapies dealing directly with specific disorders obtain better results than those that do not involve this option. The study of this hypothesis is currently at the stage of assembling the tools for evaluating the suitability of a therapist's interventions to the specific metacognitive disorders present, to verify, for example, whether, when faced with a patient with impaired monitoring, a therapist should act by encouraging access to inner states rather than making an interpretation aimed at tracing the patient's prevailing interpersonal schemas (Fiore et al., 2004).

In summary, the clinical and research data seem to support the tennis playing hypothesis and point to the need for further research efforts in order to identify more precisely the nature of the metacognitive disorders, their clinical consequences, and the prospects for their treatment.

Acknowledgements

The authors' research is supported by Foundation Anna Villa and Felice Rusconi.

References

Amador, X. F., Flaum, M., Andreasen, N., Strass, D. H., Yale, S. A., Clark, S. C., & Gorman, J. M. (1995). Awareness of illness in schizophrenia and mood disorders. *Archives of General Psychiatry*, *51*, 826–836.

Appelbaum, S. A. (1973). Psychological mindedness. Work, concept, and essence. *International Journal of Psychoanalysis*, *54*, 35–46.

Bach, M., de Zwaan, M., Ackard, D., Nutzinger, D. O., & Mitchell, J. E. (1994). Alexithymia: Relationship to personality disorders. *Comprehensive Psychiatry*, *35*, 234–243.

Baron-Cohen, S. (1995). *Mindblindness*. Cambridge MA: MIT Press.

Baron-Cohen, S., Leslie, A., & Frith, U. (1985). Does the autistic child have a "theory of mind"? *Cognition*, *21*, 37–46.

Bateman, A., & Fonagy, P. (2004). *Psychotherapy for borderline personality disorder*. Oxford, UK: Oxford University Press.

Beck, A. T., Freeman, A., & associates (1990). *Cognitive therapy of personality disorder*. New York: Guilford Press.

Berenbaum, H. (1996). Childhood abuse, alexithymia and personality disorder. *Journal of Psychosomatic Research*, *41*, 585–595.

Brewer, W. F. (1996). What is recollective memory? In D. C. Rubin (Ed.), *Remembering our past: Studies in autobiographical memory* (pp. 19–65). Cambridge, UK: Cambridge University Press.

Bruner, J. (1990). *Acts of meaning*. Harvard, MA: Harvard University Press.

Carcione, A., & Conti, M. L. (2003). Il disturbo dipendente di personalità. Modello clinico [The Dependent Personality Disorder. Clinical model]. In G. Dimaggio & A. Semerari (Eds), *I Disturbi di Personalità. Modelli e Terapia.* [Personality Disorders. Models and Treatment]. Rome: Laterza.

Carcione, A., Dimaggio, G., Fiore, D., Nicolò, G., Pedone, R., & Procacci, M. (2004, June). *Analysis of the case 306 by Metacognition Assessment Scale*. Paper presented at the 35th Annual Meeting of the Society for Psychotherapy Research, Rome, Italy.

Carcione, A., Falcone, M., Magnolfi, G., & Manaresi, F. (1997). La funzione metacognitiva in psicoterapia: Scala di valutazione della Metacognizione. [Metacognitive function in psychotherapy: The metacognition assessment scale]. *Psicoterapia*, *9*, 91–107.

Carpendale, J. I. M., & Lewis, C. (2004). Constructing an understanding of mind: The development of children's social understanding within social interaction. *Behavioral and Brain Sciences*, *27*, 79–96.

Casacchia, M., Mazza, M., & Roncone, R. (2004). Theory of mind, social development and psychosis. *Current Psychiatry Reports*, *6*, 183–189.

Cornoldi, C. (1995). *Metacognizione e apprendimento*. Bologna, Italy: Il Mulino.

Damasio, A. (1994). *Decartes' Error: Emotion reason and human brain*. New York: Putnam.

Darwin, C. (1982). *L'espressione delle emozioni negli animali e nell'uomo*. [The expression of emotions in man and animals] Torino, Italy: Bollati Boringhieri. (Original work published 1872)

Dimaggio, G., Procacci, M., Nicolò, G., Popolo, R., Semerari, A., & Carcione, A. (2005). *Metacognitive malfunctioning in narcissistic and avoidant personality disorders*. Manuscript submitted for publication.

Dimaggio, G., & Semerari, A. (2004). Disorganized narratives: The psychological condition and its treatment. How to achieve a metacognitive point of view restoring order to chaos. In L. Angus & J. McLeod (Eds), *Handbook of narrative psychotherapy: Practice, theory and research* (pp. 263–282). Thousand Oaks, CA: Sage.

Dimaggio, G., Semerari, A., Carcione, A., Nicolò, G., & Procacci, M. (in press). *Psychotherapy of personality disorder: Metacognition, states of mind and interpersonal cycles*. London: Routledge.

Dimaggio, G., Semerari, A., Falcone, M., Nicolò, G., Carcione, A., & Procacci, M. (2002). Metacognition, states of mind, cognitive biases and interpersonal cycles. Proposal for an integrated model of narcissism. *Journal of Psychotherapy Integration*, *12*, 421–451.

Ekman, P. (1984). Expression and nature of emotions. In K. Scherer & P. Ekman (Eds), *Approaches to emotions* (pp. 319–344). Hillsdale: Erlbaum.

Fiore, D., Pedone, R., Petrilli, D., Popolo, R., Carcione, A., & Nicolò, G. (2004, June). *Interventions Metacognition Scale (I.Me.S.): A pilot study*. Paper presented at the 35th Annual Meeting of the Society for Psychotherapy Research, Rome, Italy.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, *34*, 906–911.

Fonagy, P. (1991). Thinking about thinking: Some clinical and theoretical considerations in the treatment of borderline patient. *International Journal of Psycho-Analysis*, *72*, 639–656.

Fonagy, P., Gergely, G., Jurist, E. L., & Target, M. (2002). *Affect regulation, mentalization, and the development of the self*. New York: Other Press.

Fonagy, P., & Target, M. (1996). Playing with reality: I. Theory of mind and the normal development of psychic reality. *International Journal of Psychoanalysis*, *77*, 217–233.

Frith, C. D. (1992). *The cognitive neuropsychology of schizophrenia*. Hove, UK: Erlbaum.

Frith, C. D., & Frith, U. (1999). Interacting minds: A biological basis. *Science*, *286*, 1692–1695.

Gallese, V. (2000). The acting subject: Towards the neural basis of social cognition. In T. Metzinger (Ed.), *Neural correlates of consciousness* (pp. 325–334). Cambridge, MA: MIT Press.

Gallese, V., Fadiga, L., Fogassi, L., & Rizzolatti, G. (1996). Action recognition in the premotor cortex. *Brain*, *119*, 593–609.

Gallese, V., & Goldman, A. (1998). Mirror neurons and the simulation theory of mind-reading. *Trends in Cognitive Sciences*, *12*, 493–501.

Gergely, G., Nadasdy, Z., Csibra, G., & Birò, S. (1995). Taking the intentional stance at 12 months of age. *Cognition*, *56*, 156–193.

German, T. P., & Leslie, A. M. (2000). Attending to and learning about mental states. In P. Mitchell & K. J. Riggs (Eds), *Children's reasoning and the mind* (pp. 229–252). Hove, UK: Taylor & Francis.

Glick, M. J., Salvi, L. M., Stiles, W. B., & Greenberg, L. S. (2004, June). *When voices listen: An assimilation analysis of Lisa's problematic experiences.* Paper presented at the 35th Annual Meeting of the Society for Psychotherapy Research, Rome, Italy.

Gopnik, A., & Slaughter, V. (1991). Young children understanding of changes in their mental states. *Child Development*, *62*, 98–110.

Habermas, T., & Bluck, S. (2000). Getting a life: The emergence of the life story in adolescence. *Psychological Bulletin*, *126*, 748–769.

Hermans, H. J. M. (1996). Voicing the self: From information processing to dialogical interchange. *Psychological Bulletin*, *119*, 31–50.

Horowitz, M. J. (1991). *Hysterical personality style and histrionic personality disorder*. New York: Jason Aronson.

Jellema, A. (2000). Insecure attachment states: Their relationship to borderline and narcissistic personality disorders and treatment process in cognitive analytic therapy. *Clinical Psychology and Psychotherapy*, *7*, 138–154.

Kernberg, O. F. (1975). *Borderline conditions and pathological narcissism*. New York: Jason Aronson.

Krystal, H. (1998). *Affect regulation and narcissism: Trauma, alexithymia and psychosomatic illness in narcissistic patients*. In E. F. Ronningstam (Ed.), *Disorders of narcissism: Diagnostic, clinical, and empirical implications* (pp. 299–326). New York: American Psychiatric Press.

Lee, K. H., Farrow, T. F. D., Spence, S. A., & Woodruff, P. W. R. (2004). Social cognition, brain networks and schizophrenia. *Psychological Medicine*, *34*, 1273–1284.

Leslie, A. M. (1987). Pretense and representation: The origin of "theory of mind". *Psychological Review*, *94*, 412–426.

Leslie, A. M. (2000). "Theory of mind" as a mechanism of selective attention. In M. S. Gazzaniga (Ed.), *The new cognitive neurosciences* (pp. 1235–1247). Cambridge, MA: MIT Press.

Linehan, M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York: Guilford Press.

Liotti, G. (2002). The inner schema of borderline states and its correction during psychotherapy: A cognitive-evolutionary approach. *Journal of Cognitive Psychotherapy*, *16*, 349–366.

Livesley, W. J. (2003). *Practical management of personality disorder*. New York: Guilford Press.

Lysaker, P. H., Carcione, A., Dimaggio, G., Johannesen, M. S., Nicolò, G., Procacci, M., & Semerari, A. (2005). Metacognition amidst narratives of self and illness in schizophrenia: Associations with insight, neurocognition, symptom and function. *Acta Psychiatrica Scandinavica*, *112*, 64–71.

Lysaker, P. H., Davis, W. L., & Hunter, N. (in press). *Effects of cognitive behavioural therapy and vocational rehabilitation on metacognition and coping in schizophrenia*.

Main, M. (1991). Metacognitive knowledge, metacognitive monitoring and singular (coherent) vs multiple (incoherent) models of attachment. Findings and directions for future researches. In C. M. Parkes, J. Stevenson-Hinde & P. Marris (Eds), *Attachment across the life cycle* (pp. 127–159). New York: Routledge.

Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist*, *41*, 954–969.

Marraffa, M., & Meini, C. (2004). Verso una psichiatria cognitiva. *Sistemi Intelligenti*, *16*, 159–183.

Mergenthaler, E. (2004, June). *Emotional cognitive and behavioral changes in a single case study: An application of the therapeutic cycles model.* Paper presented at the 35th Annual Meeting of the Society for Psychotherapy Research, Rome, Italy.

Mergenthaler, E., & Bucheim, A. (2000). The relationship among attachment representation, emotion-abstraction patterns, and narrative style: A computer-based text analysis of the adult attachment interview. *Psychotherapy Research*, *10*, 390–407.

Muran, J. C. (2001). An introduction: Contemporary constructions and contexts. In J. C. Muran (Ed.), *Self-relations in psychotherapy* (pp. 1–41). Washington, DC: American Psychological Association.

Neimeyer, R. A. (2004). Fostering posttraumatic growth: A narrative contribution. *Psychological Inquiry*, *15*, 53–59.

Nelson, T. O., & Narens, L. (1990). Metamemory: A theoretical framework and new findings. In G. Bower (Ed.), *The psychology of learning and motivation* (pp. 125–141). New York: Academic Press.

Nichols, S., & Stich, S. (2001). *Mindreading*. Oxford, UK: Oxford University Press.

Nicolò, G., Centenero, E., Nobile, S., & Porcari, F. (2002). Disturbo paranoideo di personalità: Ricerca su caso singolo. *Ricerca in psicoterapia*, *5*, 89–107.

Perris, C. (1999). A conceptualization of personality-related disorders of interpersonal behaviour with implications for treatment. *Clinical Psychology and Psychotherapy*, *6*, 239–260.

Perris, C., & Skagerlind, L. (1998). An integrated, multilevels, metacognitive approach to the treatment of patients with a schizophrenic disorder or a severe personality disorder. In C. Perris & P. D. McGorry (Eds), *Cognitive psychotherapy of psychotic and personality disorders* (pp. 197–211). Chichester, UK: Wiley.

Pillemer, D. B. (1998). *Momentous events, vivid memories*. Cambridge, MA: Harvard University Press.

Popper, K. R. (1970). Logica della scoperta scientifica [The logic of scientific discovery] Einaudi, Torino, 1970. (Original work published 1934).

Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences*, *4*, 515–526.

Procacci, M., Dimaggio, G., & Semerari, A. (1999). El deficit de compartir y de pertenencia en los trastornos de la personalidad; clinica y tratamiento. *Boletin de Psicologia*, *65*, 75–100.

Rachman, S. (1993). Obsession, responsibility, and guilt. *Behaviour Research and Therapy*, *31*, 149–154.

Rachman, S., & Shafran, R. (1999). Cognitive distortions: Thought-action fusion. *Clinical Psychology & Psychotherapy*, *6*, 80–85.

Rizzolatti, G., Fadiga, L., Gallese, V., & Fogassi, L. (1996). Premotor cortex and recognition of motor actions. *Cognitive Brain Research*, *3*, 131–141.

Ryle, A. (1997). *Cognitive analytic therapy and borderline personality disorder: The model and the method*. Chichester, UK: Wiley.

Ryle, A., & Kerr, I. B. (2002). *Introducing cognitive analytic therapy. Principles and practice*. Chichester, UK: Wiley.

Salatas, H., & Flavell, J. H. (1976). Behavioural and metamnemonic indicators of strategic behaviours under strategic instructions in first grade. *Child Development*, *37*, 81–89.

Saxe, R., Carey, S., & Kanwisher, N. (2004). Understanding other minds: Linking developmental psychology and functional neuroimaging. *Annual Reviews of Psychology*, *55*, 87–124.

Semerari, A. (Ed.). (1999). *Psicoterapia cognitiva del paziente grave. Metacognizione e relazione terapeutica*. Milan, Italy: Raffaello Cortina Editore.

Semerari, A., Carcione, A., Dimaggio, G., Falcone, M., Nicolò, G., Procacci, M., & Alleva, G. (2003). The evaluation of metacognitive functioning in psychotherapy: The Metacognition Assessment Scale and its applications. *Clinical Psychology and Psychotherapy*, *10*, 238–261.

Semerari, A., Carcione, A., Dimaggio, G., Nicolò, G., & Procacci, M. (2004). A dialogical approach to patients with personalità disorders. In H. J. M. Hermans & G. Dimaggio (Eds), *The dialogical self in psychotherapy* (pp. 220–234). New York: Brunner-Routledge.

Semerari, A., Carcione, A., Dimaggio, G., Nicolò, G., Pedone, R., & Procacci, M. (2005). Metarepresentative functions in borderline personality disorder. *Journal of Personality Disorders*, *19*, 690–710.

Sifneos, P. E. (1973). The prevalence of alexithymic characteristics in psychosomatic patients. *Psychotherapy and Psychosomatic*, *26*, 65–70.

Sperber, D. (Ed.). (2000). *Metarepresentation*, Oxford, UK: Oxford University Press.

Stiles, W. B. (1999). Signs and voices in psychotherapy. *Psychotherapy Research*, *9*, 1–21.

Stiles, W. B., Elliot, R., Lewelyn, S. P., Firth-Cozens, J. A., Margison, F. R., Shapiro, D. A., & Hardy, G. (1990). Assimilation of problematic experiences by clients in psychotherapy. *Psychotherapy*, *27*, 411–420.

Target, M., & Fonagy, P. (1996). Playing with reality: I. The development of psychic reality from a theoretical perspective. *International Journal of Psychoanalysis*, *77*, 459–479.

Taylor, G. J. (2000). Recent development in alexithymia theory and research. *Canadian Journal of Psychiatry*, *45*, 134–142.

Taylor, G. J., Bagby, R. M., & Parker, J. D. A. (1997). *Disorders of affect regulation. Alexithymia in medical and psychiatric illness*. Cambridge, MA: Cambridge University Press.

Tomasello, M. (1999). *The cultural origins of human cognition*. Cambridge, MA: Harvard University Press.

Tomasello, M., & Rakoczy, H. (2003). What makes human cognition unique? From individual to shared to collective intentionality. *Mind and Language*, *18*, 906–921.

Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development*, *72*, 655–684.

Wells, A. (2000). *Emotional disorders and metacognition. Innovative cognitive therapy*. Chichester, UK: Wiley.

Westen, D., & Shedler, J. (2000). A prototype matching approach to diagnosing personality disorders: Towards the DSM-V. *Journal of Personality Disorders*, *14*, 109–126.

Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition*, *13*, 257–270.