



## The development of the Metacognition Assessment Interview: Instrument description, factor structure and reliability in a non-clinical sample

Antonio Semerari<sup>a,\*</sup>, Michele Cucchi<sup>b</sup>, Giancarlo Dimaggio<sup>a</sup>, Daniele Cavadini<sup>b</sup>, Antonino Carcione<sup>a</sup>, Vittoria Battelli<sup>b</sup>, Giuseppe Nicolò<sup>a</sup>, Roberto Pedone<sup>a,c</sup>, Tomaso Siccardi<sup>b</sup>, Stefania D'Angerio<sup>a</sup>, Paolo Ronchi<sup>b</sup>, Cesare Maffei<sup>b</sup>, Enrico Smeraldi<sup>b</sup>

<sup>a</sup> Terzo Centro di Psicoterapia Cognitiva—Scuola di Psicoterapia Cognitiva (SPC), Training School in Cognitive Psychotherapy, via Ravenna 9/c, 00161 Rome, Italy

<sup>b</sup> Department of Clinical Neurosciences, Scientific Institute and University Vita-Salute San Raffaele, Via Stamira D'Ancona 20, 20127 Milan, Italy

<sup>c</sup> Department of Psychology, University of Naples II, Italy

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### ABSTRACT

**Background:** Metacognition is a multi-facet psychological construct; deficits in metacognitive abilities are associated to low social functioning, low quality of life, psychopathology, and symptoms. The aim of this study was to describe and develop a valid and reliable interview for assessing metacognition.

**Methods:** The semi-structured interview, based on the author's theory model of the metacognition construct, is described. The Metacognition Assessment Interview (MAI) is an adaptation of the Metacognition Assessment Scale (MAS) and evaluates how the subject is interviewed used metacognition during his own real life experiences elicited by the interviewer. A user manual was developed to assist the interview and scoring procedure.

**Results:** Exploratory factor analysis and confirmatory factor analysis revealed preliminary evidence of a two factor-hierarchical structure, with two lower-order scales, representing the two main theoretical domains of the metacognitive function, "the Self" and "the Other", and one single higher-order scale that we labelled metacognition. Contrary to the authors' prediction the existence of the four distinct dimensions under the two domains was not confirmed. The MAI and its two domains demonstrated acceptable levels of inter-rater reliability and internal consistency.

**Conclusions:** The MAI appears to be a promising instrument for assessing metacognition. Future psychometric validation steps and clinical directions are discussed.

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## 1. Introduction

Research investigating the metacognitive construct has advanced rapidly over the past decade. Metacognition, as formulated by Semerari (Semerari et al. 2003; Carcione et al. 2008), refers to a broad set of cognitive and affective skills which allow people to identify mental states, reasoning about them, and ascribing them to themselves and others. These skills allow us to recognize the reason why a person reacts psychologically according to some regularities and constructs personal meaning over their lifespan.

Several authors refer to the same concept with different meanings. Wells (2000), for example, views metacognition as a set of beliefs about one's own mental content that helps people to regulate their attentive processes and that, in some cases, could induce the maintenance of dysfunctional attentive processes such

as worry. There is a terminological confusion over metacognition and this is also due to the fact that mind-reading abilities have been traditionally investigated by researchers belonging to different theoretical backgrounds and research fields, each of them with their own lexicon (Flavell, 1976; Fonagy, 1991; Baron-Cohen, 1995; Frith and Happé, 1999; Frith and Frith, 2006).

Metacognition, as considered by Semerari et al. (2003), partially overlaps with similar constructs such as theory of mind (ToM) (Baron-Cohen et al., 1985) and mentalization (Bateman and Fonagy, 2004; Allen et al., 2008), but with some differences. Compared to ToM, as described below, metacognition usually includes more complex mental functions. Additionally, metacognition also refers to emotional understanding, while ToM mainly focuses on cognitive attribution. Compared to the general definition of mentalization given by Bateman and Fonagy (2004), Semerari's concept differs since it considers mind-reading to be a general ability created by different subfunctions that interact with each other and that can be selectively impaired. Dysfunctions in metacognition are associated with low social functioning, low quality of life, psychopathology and symptoms of several psychiatric and personality disorders, and

\* Corresponding author.

E-mail address: [semerari@terzozeno.it](mailto:semerari@terzozeno.it) (A. Semerari).

seem to predict worst treatment response (Semerari et al., 2007; Lysaker et al., 2010a, 2010b; Carcione et al., 2011; Lysaker et al., 2011a; Ogrodniczuk et al., 2011).

However, the lack of a reliable and valid instrument for measuring metacognition has limited progress in this field, especially for developing clinical applications. Assessments of psychological constructs such as social cognition mostly rely on self-report instruments, laboratory tasks and structured interviews, and each has its own pros and cons. Interviews have unique advantages such as avoiding bias in self-ratings, especially if one is called upon to use a skill such as self-reflection, which in itself is supposed to be compromised; they also ask the person to reason about mental states in the context of personally relevant matters, i.e. the ones in which it is most important to be able to fully and swiftly understand the mental states of oneself and others. Therefore it is likely that metacognition as measured from interviews provides more clinician-friendly information that can directly affect treatment protocols (Lysaker et al., 2010a, 2011b).

The aim of the present study was to investigate the reliability, internal consistency and structure of a semi-structured interview for assessing metacognition: the Metacognition Assessment Interview (MAI). The MAI is an adaptation of the Metacognitive Assessment Scale (MAS) (Semerari et al., 2003; Carcione et al., 2008; Carcione et al., unpublished), a rating scale assessing the construct as manifest in individual verbalization in psychotherapy transcripts. The common theoretical framework which underlines both the MAS and the MAI is that metacognition is made of specific and relatively independent subfunctions, each of them likely to be selectively damaged in clinical populations. The MAS is therefore divided into three scales: understanding one's own mind, understanding others' minds and mastery. Each scale is further composed of different subfunctions. The subfunction scales of understanding one's own mind and understanding others' minds are included in the MAI and they will be described in detail in Section 2. Work on an interview to investigate the third scale, mastery, is still in progress.

The MAS and its subscales demonstrated acceptable levels of factorial validity, inter-rater agreement, internal validity and test–retest stability (Semerari et al., 2003, 2005; Lysaker et al., 2005; Carcione et al., 2008; Dimaggio et al., 2009; Lysaker et al., 2010b, 2011a, 2011b) and were related to executive functions and treatment outcomes (Lysaker et al., 2005; Semerari et al., 2005; Carcione et al., 2008; Lysaker et al., 2008). Studies on patients with personality disorders showed different profiles of metacognitive impairments in patients with different diagnoses (Semerari et al., 2003, 2005, 2007; Dimaggio et al., 2009). Furthermore, specific function impairment correlated with different symptoms in patients with schizophrenia (Lysaker et al., 2005).

However, the MAS does not allow metacognitive functions to be directly stimulated through specific questions. Therefore, when the therapist does not directly investigate one specific subfunction, perhaps during a psychotherapy session, it is impossible to define whether the lack of use of this subfunction is due to impairment of it or simply to a lack of use of it in that specific circumstance. However, the direct investigation of a specific subfunction through specific questions, along with the weak answers that patients might give, highlights more clearly specific impairments in the metacognitive domains.

For this reason, we aimed to develop a new tool that is capable of directly measuring metacognition and is less time-consuming than the MAS: the MAI (Semerari et al., 2008). Our hypotheses were (a) that metacognition could be elicited by such an interview and reliably scored; (b) that metacognition has a two-factor structure, with two separate domains, one for understanding the mental states of the self and one for understanding the mental states of others.

## 2. Methods

### 2.1. Construct description

The MAI refers to the description of emotions and cognitions, and assesses how people are able to identify their own and others' recurrent patterns of thinking, feeling and dealing with social problems. The interview evaluates two main functional skill domains of metacognition, 'the Self' and 'the Other', each one composed of two dimensions: monitoring and integrating for the Self, differentiating and decentring for the Other.

To identify the 16 basic facets of which the dimensions are composed (four facets for each dimension) the authors took into account the clinical literature that describes deficit in the ability to know and regulate mental states, theoretically based on the literature on mentalization and attachment theories (Fonagy, 1991; Main, 1991; Fonagy and Target, 1997, 2006; Allen et al., 2008), theory of mind (Baron-Cohen et al., 1985; Premack and Woodruff, 1978a, 1978b, 1978c; Wellman, 1990), metacognition (Wellman, 1990; Wells, 2000) and, more generally, meta-representation (Frith, 1992; Sperber, 2000).

The Self domain comprises the 'monitoring' and 'integrating' dimensions and describes the way in which a person has explicit access to his own mental states (cognitive and emotional) in relation to behaviour. 'Monitoring' (MON) is referred to as the ability to distinguish, recognize and define one's own inner states (emotions and cognitions) and following behaviours during the 'here and now' of the described real-life episode. MON is composed of four facets: (a) the ability to recognize one's own representations (thoughts and beliefs); (b) the ability to recognize and verbalize one's own emotions; (c) the ability to establish relations among the separate components of a mental state; and (d) the ability to establish relations between the components of mental states and behaviour. MON evaluates how a subject explains his/her own behaviour in terms of causes and/or motivations. If there is a deficit, he/she is unable to discern the reasons for his/her behaviour, and he/she cannot recognize or verbalize emotions or other mental states. Examples of questions stimulating MON are 'What do you feel?', 'What do you think?' and 'What was your aim?'

'Integrating' (INT) is the second dimension of Self domain and involves the ability to produce coherent descriptions of people's mental processes and states over time. INT refers to the ability to reflect on mental states and contents, putting them in a logical order and ranking them by relevance. Using INT abilities the subject is able to understand the link between his/her own mental states and different behaviours in different situations, decoding his/her mental, functional and dysfunctional habits and forming a consistent account of how his/her mental life has changed over his/her lifespan.

INT comprises four skills: (a) the ability to describe understandable and coherent links among thoughts, events, actions and behaviours; (b) the ability to describe transitions among different mental states and explain the reasons why; (c) the ability to form generalized representations of his/her mental functioning, taking into account continuity over time of patterns of thinking and feeling; and (d) the ability to reconstruct and describe to the interviewer one's own mental functioning, providing enough information, without giving irrelevant and out-of-focus details, and giving a sense of order and coherence to the discourse. Examples of questions stimulating INT are 'So, you have found yourself reacting by... [the interviewer refers to the described behaviour], and feeling... [the interviewer refers to the mentioned emotion]. Does feeling/thinking and behaving like this happen frequently to you?' 'You might also react in a different way, with different emotions or thoughts, in circumstances like the one described. Can you remember a specific episode?'

The Other metacognition domain comprises the 'differentiating' and the 'decentring' dimensions.

Differentiating (DIF) concerns the ability to recognize the representational nature of one's own and other individuals' thoughts, the ability to differentiate between classes of representations, such as imagination, evaluation and expectation, and to distinguish between representation and reality. Using DIF abilities, the interviewee is able to consider his/her own opinion as a hypothesis and not as a matter of fact; DIF abilities allow one to consider representations as mental phenomena, separate from but related to reality. Good DIF functioning makes people flexible in formulating opinions and points of view, and causes mental states to change depending on the communicative acts and on the availability of salient information. DIF comprises four skills: (a) the ability to consider one's own representation of the world as subjective and questionable; (b) the ability to give plausible interpretations of events; (c) the ability to reflect on and evaluate events (as opposed to a tendency to act impulsively); and (d) the ability to distinguish between different modes of thoughts such as dreaming, fantasizing and imagining. Examples of questions stimulating DIF are 'You said you have thought that... [the interview refers to the reported episode]. In that moment, how did you subjectively believe it and how did you consider other options?' 'Did you take into consideration alternative interpretations of the events?' 'During the episode how much did you feel confused or clear-headed? Have you ever experienced such levels of confusion, or not been able to remember whether something really happened, or felt dreamy, unreal, like brain fog?'

'Decentring' (DEC) refers to the ability to infer others' mental states in a plausible manner and adopt their perspective, recognizing that it is distinct from

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