



## Review

## The neuropsychology of self-reflection in psychiatric illness



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## ABSTRACT

The development of robust neuropsychological measures of social and affective function—which link critical dimensions of mental health to their underlying neural circuitry—could be a key step in achieving a more pathophysiologically-based approach to psychiatric medicine. In this article, we summarize research indicating that self-reflection (the inward attention to personal thoughts, memories, feelings, and actions) may be a useful model for developing such a paradigm, as there is evidence that self-reflection is (1) measurable with self-report scales and performance-based tests, (2) linked to the activity of a specific neural circuit, and (3) dimensionally related to mental health and various forms of psychopathology.

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## 1. Introduction

A major goal in psychiatric medicine is to develop a system of diagnosis and treatment that is pathophysiologically-based (Insel et al., 2010). At present, psychiatric patient assessments are primarily based on clinical observation of overt behavior and patient self-report, without corresponding evaluation of underlying biological mechanisms of dysfunction. By contrast, other medical specialties routinely use biological and physiological assays to inform diagnosis and treatment. For example, in the field of cardiology, objective measurements of physiological parameters (e.g., pulse, blood pressure, cholesterol levels, EKG) are standard, and the prescribed interventions (e.g., dietary changes, exercise programs, drug regimens, surgical procedures) are tailored to address specific aspects of the underlying pathophysiology.

In psychiatric disorders, the pathophysiology is rooted in the brain. Thus, a key step toward developing a new system of diagnosis and treatment in psychiatry is to identify specific and objectively measurable domains of psychological or behavioral dysfunction that are related to particular aspects of brain structure

and/or function. Neuropsychology offers a promising approach in this regard. For certain cognitive functions, extensive neuropsychological batteries of performance-based tests have long been established. For example, in the domain of memory, there are standardized performance-based tests that probe the integrity of specific competencies (e.g., verbal vs. non-verbal, short-term vs. long-term memory). Similar batteries of performance-based psychometric tests have been developed to probe aspects of language, perception and executive function. Performance on these measures has been associated with the integrity of specific neural systems (e.g., the link between declarative memory and the medial temporal lobe), and these brain–behavior links are guiding translational research in memory disorders, such as Alzheimer's disease.

Although significant advances have been made in our understanding of the neural correlates of affective and social functions, this has not yet translated into an analogous battery of well-validated performance-based clinical measures. Self-reflection is an example of a particular domain of psychological dysfunction that (1) is routinely disrupted in psychiatric illness and cuts across traditional diagnostic categories, (2) is measurable with self-report scales and performance-based tests and (3) can be dimensionally linked to activity within a particular neural circuit. In this article, we review relevant literature, identify outstanding questions, and propose an agenda of research that would support the use of neuropsychological measures of self-reflection combined with

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neuroimaging to serve as model for establishing a neuro-psychopathophysiological basis for mental healthcare.

## 2. Self-reflection and psychiatric illness

The ability to self-reflect—to turn our attention inward to consider our own thoughts, memories, feelings, and actions—is a fundamental aspect of human cognition. Interpersonally, self-reflection can help us to perceive social cues (Eisenberger and Lieberman, 2004; Lombardo et al., 2010) and generate social emotions (e.g., guilt) (Beer et al., 2003; Tracy and Robins, 2004), which can promote prosocial behavior and enhance relationships (Baumeister et al., 1994; Keltner, 1995). Self-reflection can also contribute to emotion regulation (Leary, 2003), self-awareness (Duval and Wicklund, 1972), and self-insight (Beck et al., 2004)—processes that are essential for successful psychotherapy outcomes (Mansell, 2011). However, maladaptive levels of self-reflection, such as ruminative, self-critical thought in depression, can have detrimental consequences for health and well-being. In fact, a prominent psychological theory proposes that heightened self-focused attention is a common feature across several mental illnesses (Ingram, 1990). While there is substantial evidence to support heightened self-focus in certain types of mental illness, in this article we suggest that *both* heightened and diminished self-reflection may contribute to mental illness. Thus, the premise of the present article is that self-reflection may be a critical transdiagnostic dimension of social and affective function in mental illness; whereas moderate levels of self-reflection support normal social and affective functioning, significant deviations in the engagement of self-reflection (either elevated or diminished) may be associated with distinct forms of psychopathology.

### 2.1. Excessive self-reflection in mood and anxiety disorders

Heightened self-reflection is a central feature of mood and anxiety disorders (American Psychological Association, 2000; Clark and Wells, 1995; Nolen-Hoeksema, 2000; Nolen-Hoeksema et al., 2008). Depression and anxiety are associated with pathological levels of rumination and worry. Although rumination and worry are not necessarily or exclusively self-focused in nature, they often consist of perseverative self-focused thoughts including feelings of guilt, self-blame, and negative self-appraisal (Clark and Wells, 1995; Nolen-Hoeksema et al., 2008). Consistent with these clinical descriptions, numerous empirical studies have found elevated levels of self-focused thought in depression, social anxiety, and social phobia (Ingram et al., 1987; Woodruff-Borden et al., 2001). For instance, self-report measures of self-reflection have been used to associate depression, social anxiety, and social phobia with heightened self-reflection and self-consciousness (Hope and Heimberg, 1988; Jostes et al., 1999; Smith et al., 1985). Additionally, a sentence completion task has also been used to demonstrate increased self-focused thought in depression and anxiety disorders (Ingram et al., 1987; Woodruff-Borden et al., 2001). Heightened self-reflection is also evident in social situations, where depressed patients have been shown to refer to themselves more frequently during conversation, even when unsolicited (Jacobson and Anderson, 1982). Such self-focused cognition tends to prolong negative affect, predict and maintain psychopathology, and engender social isolation (Just and Alloy, 1997; Mor and Winquist, 2002; Nolen-Hoeksema et al., 2008). For example, in depression, chronic self-focused rumination can lead to diminished social support and perceived social conflict with others (Nolen-Hoeksema et al., 2008). Similarly, self-focused cognition in social anxiety and social phobia has been linked to deficits in social perception (e.g., perceiving neutral facial

expressions as critical) (Clark and Wells, 1995; Smith and Sarason, 1975). In sum, elevated levels of self-reflection in depression and anxiety are evident clinically and experimentally, and appear to be associated with impairments in social and affective functioning and overall morbidity.

### 2.2. Diminished self-reflection in autism and psychopathy

In contrast to mood and anxiety disorders, autism and psychopathy are examples of disorders where levels of self-reflection may be pathologically low. Although autism has been associated with alterations in several different aspects of self-related cognition (i.e., autobiographical memory, emotional awareness) (e.g., Klein et al., 1999; Lombardo et al., 2007), we focus here on self-reflection. It is also important to note that although autism and psychopathy may share impoverished self-reflection as one dimension of dysfunction, these disorders are vastly different across many other behavioral and psychological domains. In autism, diminished self-reflection is thought to contribute to impairments in empathy, theory of mind, and social communication (Frith, 2003; Lombardo et al., 2007). Consistent with this hypothesis, significantly reduced levels of self-reflection (on both performance-based and self-report measures) have been observed in individuals with autism and Asperger syndrome (Lee and Hobson, 1998; Lee et al., 1994; Lombardo et al., 2007). For example, reduced self-reflection was demonstrated in children and adolescents with autism in the diminished use of first-person pronouns (“I”, “me”, “my”) in an experimental setting, and the use of fewer self-referents in a social context (Lee and Hobson, 1998; Lee et al., 1994). Moreover, diminished self-reflection is predictive of lower empathy and higher autism spectrum quotient scores (Lombardo et al., 2007). Given the clinical heterogeneity across autism spectrum disorders (Georgiades et al., 2013; Pelphrey et al., 2011), future research is warranted to investigate self-reflection in ASD in individuals with different levels of functioning. In psychopathy, deficient self-reflection may similarly explain the hallmark affective characteristics of the disorder (callous lack of empathy and guilt), as well as laboratory findings indicating a reduced tendency to pause and consider the negative consequences of their actions (Koenigs et al., 2010; Newman and Lorenz, 2003). Further work is necessary in psychopathy, as few studies have directly examined the relationship between self-reflection and social or affective features of the disorder.

### 2.3. Altered self-reflection in other psychiatric disorders

In addition to the psychiatric illnesses mentioned above, there is evidence for alterations in self-reflection in other psychiatric disorders. Two notable examples are schizophrenia and anorexia nervosa. In schizophrenia, empirical studies have found evidence for both diminished (e.g., Bedford et al., 2012; Holt et al., 2011) and heightened (e.g., Exner, 1973; Morrison and Haddock, 1997; Puentf and Morrisey, 1981) self-reflection. Some researchers have suggested that diminished self-reflection in schizophrenia and other psychotic disorders may contribute to well-known impairments in self-insight, self-monitoring, and self-agency (Beck et al., 2004; Dimaggio et al., 2009; van der Meer et al., 2013). However, self-reflection cannot fully explain these impairments and symptoms in schizophrenia. For example, other cognitive processes, including executive functions, have been associated with poor self-insight in schizophrenia (Cooke et al., 2010). In anorexia nervosa, similar to depression and anxiety, elevated self-reflection is a common symptom, characterized by increased negative evaluation of one's own body weight or appearance (American Psychological Association, 2000).

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