



# A meta-analysis of metacognitive beliefs as implicated in the self-regulatory executive function model in clinical psychosis

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## ABSTRACT

This meta-analysis investigated whether the five metacognitive beliefs implicated in the Self-Regulatory Executive Function (S-REF) model (Wells and Matthews, 1994; Wells and Matthews, 1996) are elevated in people with clinical psychosis compared to people with emotional disorder and non-psychiatric controls. The review followed guidance set-out in the PRISMA statement. Primary analyses compared summary effect sizes on each sub-scale of the Metacognitions Questionnaire (MCQ) for people with psychosis and non-psychiatric controls; and people with psychosis and people with emotional disorder. Eleven eligible studies were identified comprising of 568 psychosis participants, 212 emotional disorder participants and 776 non-psychiatric controls. Findings indicated that people with psychosis had higher scores on all sub-scales of the MCQ compared to non-psychiatric controls; and higher scores on the positive beliefs about worry sub-scale compared to people with emotional disorder. This suggests metacognitive beliefs may be associated with the presence of psychological disorder and distress in general, rather than specific diagnoses. Implications for models of psychosis and treatment are discussed.

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## 1. Introduction

In recent years there has been an increase in research investigating metacognition in psychosis. The term metacognition describes “thinking about thinking” (Papaleontiou-Louca, 2003) and refers to “any knowledge or cognitive process that is involved in the appraisal, monitoring or control of cognition” (Wells, 2000, p. 6). Within the psychosis literature, metacognition has been investigated in different ways. Lysaker and colleagues use of the term metacognition reflects an individual's ability to form and understand complex representations about themselves, others, and the world (Lysaker et al., 2010). Moritz and colleagues have carried out numerous studies investigating metacognitive training that focuses on cognitive biases associated with attributional style and jumping to conclusions (Moritz, Vitzthum, Randjbar, Veckenstedt, & Woodward, 2010). There have been previous reviews relating to these definitions (Lysaker et al., 2013; van Oosterhout et al., 2016). Another influential line of research has focused on the metacognitive factors implicated in the Wells and Matthews Self-Regulatory Executive Function (S-REF) model (Wells & Matthews, 1994; Wells and Matthews, 1996). This approach emphasises metacognitive beliefs and strategies that are proposed to maintain

unhelpful thinking styles and distress across disorders, and there is accumulating evidence that the metacognitive beliefs implicated in this model may be related to distressing experiences of psychosis. Currently, the specific nature of this relationship requires further clarification.

The S-REF model (Wells and Matthews, 1996) focuses on unhelpful metacognitive beliefs and emotional self-regulation strategies that lead to biased information processing of threatening stimuli. Such strategies include enhanced verbal processing in the form of worry and rumination, attentional biases in the form of threat monitoring, and attempts to control thoughts and other internal events. These responses constitute a style of thinking known as The Cognitive Attentional Syndrome (CAS) that is proposed to maintain unhelpful thinking patterns and distress. The CAS arises from unhelpful metacognitive beliefs that are positive and negative in content. Positive metacognitive beliefs reflect the usefulness of worry, rumination, threat monitoring, and other similar strategies (Wells, 2009). They include beliefs such as “focussing on danger will keep me safe” or “if I worry I will be prepared” and promote the implementation of unhelpful coping responses. Negative metacognitive beliefs reflect beliefs concerning the danger or uncontrollability of particular thoughts and affect how thoughts and thought processes are appraised (Wells, 2009). They include beliefs such as “thoughts can make bad things happen” or “my worrying is uncontrollable”. The co-occurrence of positive and negative metacognitive beliefs is thought to be related to greater pathology (Wells, 2000).

Consistent with these assumptions, research has found evidence of a positive relationship between unhelpful metacognitive beliefs and

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emotional disorder. A greater endorsement of negative metacognitive beliefs has been associated with anxiety (Davis and Valentier, 2000; McEvoy and Mahoney, 2013), depression (Papageorgiou and Wells, 2001) and obsessive compulsive disorder (Wells and Papageorgiou, 1998). In addition prospective cohort studies have found that higher levels of unhelpful metacognitive beliefs at baseline predict subsequent severity of anxiety and depression (Hjemdal et al., 2013; Papageorgiou and Wells, 2009; Yilmaz et al., 2011). Metacognitive beliefs have also been found to mediate relationships between symptoms and distress (Dragan and Dragan, 2014; Irak and Tosun, 2008).

The application of the metacognitive model to psychosis has also received support from cross-sectional and cohort studies. For example, research using non-clinical samples suggests that people with higher proneness to hallucinations and delusions tend to have an increased number of both positive and negative metacognitive beliefs (Laroi and Van der Linden, 2005; Morrison et al., 2000). Research using samples of people at risk of developing psychosis suggests that at risk mental state (Morrison et al., 2006) and subsequent transition to first episode psychosis (Barbato et al., 2013; Morrison et al., 2002a,b) is associated with a greater endorsement of negative metacognitive beliefs. A higher number of negative beliefs has also been related to increased distress (Barbato et al., 2013; Brett et al., 2009; Oosterhout et al., 2013) and a more severe and chronic course of illness (Austin et al., 2015).

Currently, the specific role of metacognitive beliefs in psychosis is unclear. A previous meta-analysis (Varese and Bentall, 2011) found limited evidence that metacognitive beliefs have a causal role in specific symptoms of psychosis (i.e. auditory hallucinations) as previous models suggested (Morrison et al., 1995). Instead there is emerging evidence that metacognitive beliefs may be a general vulnerability factor to psychological disorder and that metacognitive beliefs (and associated CAS activity) may influence symptom maintenance, help-seeking and distress (Hill et al., 2012; Varese et al., 2011).

To test the prediction that metacognitive beliefs are associated with psychological disorder and unhelpful thinking styles in general rather than specific diagnoses, this meta-analysis will use quantitative methods to compare levels of unhelpful metacognitive beliefs in people with clinical psychosis, people with emotional disorder and people with no psychiatric diagnosis. The following research questions will be addressed: (i) Do people with psychosis have elevated levels of unhelpful metacognitive beliefs compared to non-psychiatric controls? (ii) Do people with psychosis have elevated levels of unhelpful metacognitive beliefs compared to people with emotional disorder?

## 2. Method

The review followed guidance set out in the Preferred Reporting Items for Systematic reviews and Meta-Analyses (Moher et al., 2009).

### 2.1. Operationalization of concepts

To minimise ambiguity in study inclusion the following operationalization of key concepts were used:

**Psychosis:** A diagnosis of psychotic disorder according to the Diagnostic Statistical Manual of Mental Disorders fourth edition (American Psychiatric Association, 2000) or International Classification of Diseases tenth edition (World Health Organisation, 1993); or meets threshold for early intervention in psychosis using the Positive and Negative Syndrome Scale (Kay et al., 1987) defined as a score of four on hallucinations or delusional beliefs or a score of five on paranoid ideation. People with a diagnosis of Bipolar Disorder were not considered eligible.

**Emotional disorder:** A diagnosis of a depression or anxiety disorder (such as panic disorder, generalised anxiety disorder, obsessive compulsive disorder) according to the Diagnostic Statistical Manual of Mental Disorders fourth edition (American Psychiatric Association, 2000) or International Classification of Diseases tenth edition (World Health

Organisation, 1993). The emotional disorder groups were extracted from eligible studies that included a psychosis sample.

**Non-psychiatric controls:** No formal diagnosis of a psychiatric disorder. The non-psychiatric controls were extracted from eligible studies that included a psychosis sample.

**Metacognitive beliefs:** Metacognitive beliefs were restricted to those captured by the Meta-Cognitions Questionnaire (MCQ) and its variants (Cartwright-Hatton and Wells, 1997; Wells and Cartwright-Hatton, 2004). The MCQ was designed specifically to measure the five metacognitive beliefs implicated in the S-REF model. Previous studies have identified alternative measures of metacognitive beliefs specific to experiences of psychosis, such as the Beliefs about Paranoia Scale (Morrison, 2005) and the Interpretation of Voices Inventory (Morrison, Wells, & Nothard, 2002). However, given that the present review aims to quantify the magnitude of the relationship between those beliefs implicated in emotional regulation across a range of psychological disorders, metacognitive beliefs were restricted to those central to this model. In addition, these alternative measures may be less relevant to our control groups.

The MCQ-65 (Cartwright-Hatton and Wells, 1997) and MCQ-30 (Wells and Cartwright-Hatton, 2004) yield five sub-scales consisting of “positive beliefs about worry” reflecting the belief that worry can help to solve problems; “negative beliefs including the uncontrollability and danger of thoughts” reflecting the belief that thoughts must be controlled in order to function well; “cognitive confidence” capturing the extent to which an individual has confidence in their memory and attentional capabilities; “negative beliefs including responsibility and superstition” reflecting superstitious themes that certain thoughts can cause negative outcomes, and feelings of responsibility for preventing these outcomes; and “cognitive self-consciousness” reflecting the extent to which an individual engages in monitoring their own thought processes. Higher scores on each sub-scale indicate a greater endorsement of unhelpful beliefs. The MCQ-SAM (Lobban, 1998) is a modified and shortened version of the MCQ-65 that contains two additional sub-scales. Factor analysis indicates that the first four sub-scales reliably capture positive beliefs about worry, negative beliefs including uncontrollability and danger, cognitive confidence and cognitive self-consciousness. The two remaining sub-scales of the MCQ-SAM will be excluded from analyses because they do not form part of the S-REF model.

### 2.2. Search strategy

A comprehensive and systematic review of the literature was carried out in three stages. First, studies were identified by searching PsychInfo, PubMed and EMBASE. Medical Subject Headings (MeSH) “psychosis” and “metacognition” were supplemented with text word searches (psychos\* or psychoti\* or schizo\* or paranoi\* or delu\* or hallucinat\*) and (metacog\* or self-focus\* or “cognitive attentional syndrome” or worry or ruminat\* or “thought suppress\*” or “thought control” or “meta-worry”) and combined. Second, an inspection of eligible study reference lists was carried out to identify any relevant studies missed through database searching (forward and backward tracking). Finally, citations of the original validation papers of the MCQ-30 and MCQ-65 were identified using SCOPUS and cross-checked against our database search results. Searches were updated and completed in September 2015.

### 2.3. Eligibility screening

Studies were eligible for the meta-analysis if (i) the study investigated the relationship between metacognitive beliefs and psychosis; (ii) participants met diagnostic or early intervention criteria for a psychotic disorder; (iii) the study utilised a comparison group of people with a diagnosis of emotional disorder or non-psychiatric controls; (iv) the study contained sufficient statistical information for extraction or sufficient data could be retrieved from authors. Studies were not included in the review if they were not reported in English. Eligibility was assessed in a three stage procedure by the first author (first by title, then by abstract

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