



# Metacognitive beliefs moderate the relationship between catastrophic misinterpretation and health anxiety



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## ABSTRACT

Catastrophic misinterpretations of bodily symptoms have a central role in cognitive-behavioural models of health anxiety. However, the metacognitive (S-REF) model postulates that psychological disturbance is linked more to beliefs about thinking i.e., metacognition. Equally the relationship between catastrophic misinterpretation and health anxiety should be moderated by metacognition, in particular negative beliefs about the uncontrollability and danger of thinking (MCQNeg). Participants ( $N = 351$ ) completed measures to examine the relationship between these variables. Results indicated positive relationships between metacognition, catastrophic misinterpretation, and health anxiety. Moderation analysis showed that the effect of catastrophic misinterpretations on health anxiety was explained by the proposed interaction with metacognition. Follow-up regression analysis demonstrated the interaction term explained variance in health anxiety when controlling for other variables, and was a stronger unique predictor of health anxiety than catastrophic misinterpretation. Metacognition appears to be an important factor in the relationship between catastrophic misinterpretation and health anxiety, and would have important implications for existing models and treatment.

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## 1. Introduction

A key tenet of cognitive-behavioural models of disorder is that distress is caused by the biased interpretation of events (Beck, 1976). In health anxiety the interpretations of importance consist of catastrophic misinterpretations of bodily signs and symptoms; an attributional process considered central in panic disorder, (Clark, 1986) and in models of health anxiety (Barsky & Wyshak, 1990; Salkovskis, 1989; Warwick & Salkovskis, 1990).

According to these theories biased appraisals tend to be the result of an individual's dysfunctional beliefs regarding illness, health and physiological sensations (Barsky, 1992; Salkovskis & Warwick, 1986). Considerable empirical support exists that individuals with health anxiety hold dysfunctional illness related beliefs (e.g., Fergus, 2014; Hitchcock & Mathews, 1992; Marcus, 1999; Marcus & Church, 2003; Norris & Marcus, 2014; Rief, Hiller & Magraf, 1998). A central theme in these beliefs tends to relate to the severity and occurrence of perceived illness (Marcus & Church, 2003), and the concept that unexplained symptoms are usually serious (Barsky, Coeytaux, Sarnie, & Cleary, 1993). Furthermore,

such individuals are more likely to interpret bodily symptoms as catastrophic when compared with individuals low in health anxiety, those with anxiety disorders and control groups (Haenen, de Jong, Schmidt, Stevens, & Visser, 2000; Hitchcock & Mathews, 1992; Marcus, 1999; Norris & Marcus, 2014; Rief et al., 1998; Weck, Neng, Richberg, & Stangier, 2012).

Studies of misinterpretations have typically involved presenting participants with ambiguous scenarios and asking them to indicate an illness that the symptoms may relate to if they had them, or involve rating the likelihood of serious illness based on a set of symptoms. Consistently, these studies have shown that those high in health anxiety misinterpreted symptoms as indicative of serious illnesses and tended to dismiss minor illnesses and normalising explanations, compared to those in other groups.

Two meta-analyses (Marcus, Gurley, Marchi, & Bauer, 2007; Norris & Marcus, 2014) have added further evidence supporting the role of catastrophic misinterpretations in cognitive models. However, it has also been noted that conceptual overlap exists between items in the measures of catastrophic misinterpretation and items in outcome measures of health anxiety. Consequently the true value of catastrophic misinterpretations as direct predictors of health anxiety may be unclear. Additionally, these reviews point to recent data on other cognitive factors and processes that may be important in health anxiety, specifically; anxiety sensitivity (Berrocal, Moreno, & Cano, 2007), feature positive affect

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(Rassin, Muri, Franken, & van Straten, 2008), pessimistic cognitive style (Schwenzer & Mathiak, 2011) and intolerance of uncertainty (Fergus & Valentiner, 2011). In the latter study intolerance of uncertainty moderated catastrophic health appraisals and health anxiety, indicating that this style of dysfunctional belief may be important in the relationship between misinterpretation and health anxiety.

A different theoretical perspective; the metacognitive approach which is grounded in the Self-Regulatory Executive function (S-REF) model (Wells & Matthews, 1994; Wells, 2009), proposes that psychological disturbance is linked more to beliefs about thinking than to beliefs about other things (e.g., illnesses, bodily symptoms). Specifically, in reaction to negative thoughts (e.g., “What if I have brain tumour”) the health-anxiety prone individual activates extended negative appraisal in the form of worrying, ruminating and focusing on threat. Collectively these responses are known as the cognitive attentional syndrome (CAS) and represent attempts at coping or self-regulation. The CAS is more likely to persist in those individuals holding positive (e.g., “Worrying will help me detect problems before it is too late”) and/or negative metacognitive beliefs (e.g., “I cannot control my health worries”). Positive beliefs motivate sustained negative thinking whilst negative beliefs lead to reduced effort in mental control or more dysfunctional forms of control. In each case health worry is more persistent and leads to greater distress. In this model, there can be several mediators and moderators of the relationship between misinterpretation and health anxiety. In particular, the CAS can be a mediator whilst metacognitive beliefs are moderators of the effect of negative cognition on health anxiety. Whilst negative and/or positive metacognitive beliefs could act as moderators, the role of negative beliefs is of particular importance in psychological distress as these not only bias mental control efforts but also convey a sense of greater threat from cognition itself.

In summary, whilst cognitive models attribute health anxiety to belief in catastrophic misinterpretations of symptoms, the S-REF model attributes health anxiety to the regulation of cognition by metacognition. In doing so the model reconceptualises health anxiety as a difficulty in controlling or regulating worry about symptoms, rather than as a problem of believing that one is terminally ill.

There is significant evidence supporting the S-REF model in anxiety and depression (Wells, 2009). Furthermore, metacognition has been shown to predict symptoms of disorder more strongly than cognition across different presentations including; OCD (e.g., Gwilliam, Wells, & Cartwright-Hatton, 2004), generalised anxiety (e.g., Khawaja & McMahon, 2011; Wells & Carter, 1999, 2001), PTSD (Bennett & Wells, 2010) and depression (e.g., Papageorgiou & Wells, 2009). In the area of health anxiety, several studies have demonstrated relationships between metacognitive beliefs posited by the model and health anxiety.

Bouman and Meijer (1999) demonstrated a positive association between health anxiety and metacognition including “negative metacognitive beliefs about uncontrollability and danger of worry”. In a health anxiety focused Stroop test, Kaur, Butow, and Thewes (2011) identified metacognitions as being positively associated with an attentional bias towards both positive and negative health-related information. In a further experimental study exploring the effect of situational threat on attentional bias in the context of health anxiety, Kaur, Butow, and Sharp (2013) found metacognition was positively associated with an attentional bias to threat whereas somatosensory amplification was not. In an online community survey study ( $N = 1246$ ), Barenbrügge, Glöckner-Rist, and Rist (2013) identified that both positive and negative metacognitive beliefs were independently associated with facets of health anxiety commonly conceptualised in the health anxiety literature (e.g., illness beliefs, somatic complaints and frequent medical consultations). Bailey and Wells (2013) demonstrated that metacognition was

strongly associated with health anxiety and explained additional variance over and above established correlates associated with this disorder; illness cognition, somatosensory amplification and neuroticism. Clinically, studies have also shown that metacognitive-based treatment might be effective in individual's suffering with health anxiety (Bailey & Wells, 2014; Papageorgiou & Wells, 1998).

We set out to test for the hypothesised positive relationship between metacognitive beliefs and both catastrophic misinterpretation and health anxiety. We also tested for the first time if metacognitive beliefs moderate the relationship between catastrophic misinterpretations and health anxiety. The S-REF predicts that catastrophic misinterpretation will be most strongly related to health anxiety in the presence of elevated metacognitive beliefs, especially negative beliefs concerning uncontrollability and danger of worry. This is because negative thoughts (e.g., “*This could be cancer*”) are considered normal occurrences but it is the way the individual relates to these thoughts and regulates cognition that causes disorder. Negative metacognitive beliefs interfere with the effective regulation of worry (i.e., repetitive thinking) that is triggered by negative thoughts and also make thinking itself seem harmful. As a result the perception of threat escalates. These particular metacognitive beliefs are considered central in the model and “universal” across disorders (Wells & McNicol, 2014), consistently emerging as strongly associated with and a predictor of psychopathology in general (e.g., Ruscio & Borkovec, 2004; Sarisoy et al., 2014; Spada, Georgiou, & Wells 2010; Wells & Carter, 2001; Wells & Cartwright-Hatton, 2004) which includes health anxiety (Bailey & Wells, 2013; Barenbrügge et al., 2013; Bouman & Meijer, 1999; Kaur et al., 2011). In testing for metacognitive predictors and moderators we aimed to control for specific psychological variables that might be a confounding source of the relationships observed. In particular we controlled for neuroticism and somatosensory amplification on conceptual grounds as it is useful to demonstrate that the relationships observed are not simply a function of a third variable; as both neuroticism and somatosensory amplification have been empirically associated with health anxiety (Barsky, 1992; Barsky & Wyshak, 1990; McClure & Lilienfeld, 2001; Noyes et al., 2003) and metacognition (Bailey & Wells, 2013).

Furthermore, we aimed to run an exploratory regression in which we controlled the overlap of metacognitive variables to determine which metacognitive factors independently contributed to health anxiety as a means of further examining a unique role of uncontrollability beliefs.

## 2. Methods

### 2.1. Participants and procedure

A cross-sectional design was employed using a convenience sample. Three hundred and fifty one students completing Nursing courses at a University in the Northwest of England completed a set of questionnaires. Nursing students were specifically chosen because there is a higher potential to identify health anxiety in this particular group (Azuri, Ackshota, & Vinker, 2010; Zhang, Zhao, Mao, Li, & Yuan, 2014). Additionally as health anxiety is deemed to be a dimensional construct existing on a continuum from mild to severe (Ferguson, 2009; Longley et al., 2010, however for a counterpoint of health anxiety considered as taxonomic, see Asmundson, Taylor, Carleton, Weeks, & Hadjstavropoulos, 2012), a non-clinical sample was deemed appropriate. Three hundred and fourteen of these participants were female (89.5% of the sample) and thirty seven were male (10.5% of the sample). The age range was 19–59 years, with a mean age of 27 years ( $SD 7.48$  years). Full ethical approval was granted through two University ethics committees and students were fully briefed on the nature and purpose of the study.

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