



Research paper

Is computerized psychoeducation sufficient to reduce anxiety sensitivity in an at-risk sample?: A randomized trial[☆]

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ABSTRACT

Background: Anxiety sensitivity (AS), or a fear of anxiety-related sensations, has become one of the most well researched risk factors for the development of psychopathology and comprises three subfactors: physical, cognitive, and social concerns. Fortunately, research has demonstrated brief protocols can successfully reduce AS, and in turn improve psychopathological symptoms. Computerized AS reduction protocols have combined psychoeducation with interoceptive exposure (IE), but they have not been dismantled to evaluate the effects of psychoeducation alone.

Method: The current study sought to determine the efficacy of a brief single-session psychoeducation intervention for AS, compared to a control intervention, in a sample of at-risk individuals ($N=54$) with elevated AS cognitive concerns.

Results: Individuals in the active condition displayed greater reductions in self-reported AS ($\beta=-.198$, 95% CI [.065, .331]) and less fear reactivity ($\beta=.278$, 95% CI [.069, .487]) to the induction of AS cognitive-relevant sensations through a behavioral challenge compared to those in the control condition. Further, fear reactivity to the challenge was mediated by reductions in self-reported AS cognitive concerns.

Limitations: Study limitations include use of an at-risk nonclinical student sample, lack of a long-term follow-up assessment, and inability to discern whether AS reductions due to CAST psychoeducation prevent future, or improve current, psychological symptoms.

Conclusions: These results suggest that psychoeducation alone can produce significant AS reduction.

1. Introduction

Anxiety sensitivity (AS), or a fear of anxiety-related symptoms, is one of the most well-researched risk factors for anxiety pathology. As part of Expectancy Theory, Reiss (1991) proposed that AS is one of three fundamental sensitivities (AS, fear of negative evaluation, and illness sensitivity) that are directly involved in the development of pathological anxiety. Consistent with Expectancy Theory, AS is reliably elevated across anxiety disorder diagnoses (Olatunji and Wolitzky-Taylor, 2009; Taylor et al., 1992). Recently, AS has also been shown to be associated with non-anxiety conditions such as cigarette smoking, substance use, depression, and suicide, demonstrating the importance of AS from a transdiagnostic perspective (Buckner et al., 2011; Capron et al., 2012a; Otto et al., 1995; Schmidt et al., 2007a; Zvolensky et al., 2005).

Consistent with the conceptualization of AS as a risk factor, studies have demonstrated that AS prospectively predicts the development of psychopathology. In one study, individuals with high AS were five times

more likely to develop a future anxiety disorder than those with low AS (Maller and Reiss, 1992). Other studies have also shown that AS prospectively predicts symptoms of panic attacks, posttraumatic stress disorder (PTSD), eating disorders, and suicidal ideation (Anestis et al., 2008; Capron et al., 2012a; Schmidt et al., 1999, 1997; Verreault et al., 2012). Furthermore, research has also shown that even after controlling for trait anxiety, individuals with high AS are more likely to develop DSM-IV Axis I pathology than individuals with low AS (Schmidt et al., 2006).

While often analyzed as a unidimensional construct, research has demonstrated that AS comprises three subfactors: physical concerns, cognitive concerns, and social concerns (Rodriguez et al., 2004; Zinbarg et al., 1997). AS physical concerns center around exaggerated interpretations of bodily sensations. Individuals with high AS physical concerns might find an elevated heart rate to be frightening, interpreting it as an impending heart attack. AS cognitive concerns are focused on feelings of cognitive dyscontrol that stem from anxiety. Individuals with high AS cognitive concerns might fear that if they have difficulty

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concentrating, it means they are going crazy or losing control. Finally, AS social concerns are fears of negative social evaluation due to anxiety symptoms. Individuals with high AS social concerns may fear negative evaluation by others if symptoms of anxiety (e.g., blushing, sweating) are observable.

Fortunately, studies have demonstrated that AS is malleable and can be reduced via low-cost interventions. These AS interventions have come in different forms and appear to mitigate AS, lead to reductions in symptoms, and a lower incidence of psychopathology. Gardenswartz and Craske's (2001) one day workshop led to significant reductions in AS and lower rates of panic disorder diagnoses by follow-up. Group AS interventions for undergraduates (Watt et al., 2006), cigarette smokers (Feldner et al., 2008), and individuals with substance abuse/dependence (Worden et al., 2015) led to improvements including decreased AS, increased motivation to quit smoking, and increased percentage of days abstinent from substances. Telephone- and exercise-based interventions have been effective in reducing AS as well as anxiety, PTSD and depression symptoms (Broman-Fulks and Storey, 2008; Olthuis et al., 2014; Smits et al., 2008).

Computer-based interventions have also demonstrated efficacy in the reduction of AS. For example, the single session, computer-assisted, Anxiety Sensitivity Amelioration Training (ASAT; Schmidt et al., 2007b) led to a 30% reduction in AS and lower incidence of Axis I disorders at the 12- and 24-month follow-ups compared to controls. In a follow-up study, ASAT was adapted to include interoceptive exposure (IE) homework that was tailored based on participant reactivity. This protocol also led to significant reductions in AS (Keough and Schmidt, 2012), which mediated reductions in anxiety and mood symptoms at a 1-month follow-up (Norr et al., 2014).

Recent work suggests the potential importance of the AS cognitive concerns subfactor in the development and maintenance of PTSD and suicidal ideation (Boffa et al., 2016; Capron et al., 2013, 2012b; Elwood et al., 2009; Marshall et al., 2010; Norr et al., 2016a, 2016b). Such findings led to the development of a more specific AS reduction protocol, called Cognitive Anxiety Sensitivity Treatment (CAST), which was designed to focus on these concerns (Schmidt et al., 2014). This fully computerized intervention was based on ASAT and includes psychoeducation and computer-guided IE (i.e., hyperventilation). The CAST intervention has been shown to effectively reduce overall AS and AS cognitive concerns. (Schmidt et al., 2014). Further, the AS reductions due to CAST have been shown to result in decreased symptoms of anxiety, depression, insomnia, suicide, and PTSD (Mitchell et al., 2014; Raines et al., 2015; Schmidt et al., 2014; Short et al., 2015).

As in CAST, the majority of AS interventions use IE as a component of treatment, most often in the form of aerobic exercise (e.g., brisk walking, jogging, or running) or voluntary hyperventilation (Broman-Fulks and Storey, 2008; Deacon et al., 2012; Smits et al., 2008; Watt et al., 2006). Other less commonly used forms of IE include straw breathing and rapid head lifts (Feldner et al., 2008), and those designed to induce mild dizziness (Worden et al., 2015). There are several AS intervention studies using cognitive bias modification (CBM) that do not include an IE component, with some finding robust AS reductions compared to control interventions (Capron and Schmidt, 2016; Steinman and Teachman, 2010) and others finding no differences between conditions (Clerkin et al., 2015; MacDonald et al., 2013). With the vast majority of interventions using IE, it is unclear whether IE is essential to achieve significant AS amelioration, though some CBM work suggests IE may not be necessary. Therefore, the current study sought to extend the literature by examining the efficacy of the psychoeducation component of CAST in the absence of the IE component.

To further extend our understanding of CAST, we incorporated a behavioral challenge to determine if the effects of CAST extend beyond self-reported AS. Experimental psychopathology work has often used biological challenge paradigms to study AS. In such paradigms, researchers induce physiological symptoms, such as through voluntary

hyperventilation or inhalation of carbon dioxide enriched air (Zvolensky and Eifert, 2001). These challenges produce physical symptoms akin to those produced by anxiety such as increased heart rate, dizziness, and shortness of breath. Research has demonstrated that participants' fear in response to the induction of these symptoms is robustly associated with AS (e.g., Eke and McNally, 1996; Zinbarg et al., 2001; Zvolensky et al., 2002), and that biological challenges can capture change due to an AS intervention (e.g., Deacon et al., 2012; Schmidt et al., 2007b). However, these challenges primarily induce physical anxiety symptoms (e.g., racing heart, dizziness), and fear reactivity to biological challenges is most closely associated with self-reported AS physical concerns (Zvolensky et al., 2001), suggesting these paradigms would not be ideal in indexing changes in AS cognitive concerns.

In order to examine behavioral reactivity relevant to AS cognitive concerns, which is of interest with regard to the CAST intervention, a behavioral paradigm that induces AS cognitive relevant sensations is needed. One method by which feelings of anxiety relevant cognitive dyscontrol could be examined is through the induction of dissociative symptoms. Symptoms of dissociation (e.g., feelings of unreality, feeling "spaced out", difficulty concentrating) are similar to cognitive symptoms of anxiety, and panic attacks can even induce states of dissociation (American Psychiatric Association, 2013). Previous research has shown that dissociative symptoms can be reliably induced using audiovisual stimulation (Digital Audio-Video Integration Device; DAVID; Leonard et al., 1999). The DAVID includes a motherboard, glasses that produce flashing LED lights, and headphones that play binaural beats. Supporting the potential utility of using this paradigm to examine changes in AS cognitive concerns, research has demonstrated that AS was predictive of fear reactivity to the DAVID dissociation program (Leonard et al., 2000). Therefore, a behavioral challenge using the DAVID program was included after the intervention in the present investigation.

1.1. Current Study

The purpose of the current study was to examine the efficacy of the psychoeducation component of CAST, without the IE component, in a sample of at-risk undergraduate students with elevated levels of AS cognitive concerns. The study sought to evaluate the effects of the psychoeducation on both self-reported AS and fear reactivity to the induction of sensations of cognitive dyscontrol via a dissociation challenge. We hypothesized that: (1) consistent with prior work, individuals in the active (CAST psychoeducation) condition would experience significant decreases in self-reported AS compared to those in the control condition, (2) individuals in the active condition would experience significantly less fear in response to the dissociation challenge as compared to those in the control condition, and (3) that changes in AS cognitive concerns would mediate the relationship between treatment condition and fear reactivity to the challenge, while changes in AS physical and AS social concerns would not.

2. Method

2.1. Participants

A total of 98 participants were recruited from a pool of 2256 Introductory Psychology students at a large university in the south-eastern United States that completed a department-wide screening battery. Based on their responses, 453 individuals were invited to participate in the current study via email, of which 98 elected to come in for an appointment. At the appointment, 43 participants were excluded for failing to meet inclusionary criteria (ASI-3 cognitive score ≥ 7) and one participant was excluded due to a history of epilepsy, resulting in a final sample size of 54. Power analysis using G*Power (Faul et al., 2007) indicated that 54 participants were needed to achieve

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