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Internet-Based Extinction Therapy for Worry: A Randomized Controlled Trial

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Worry is a common phenotype in both psychiatric patients and the normal population. Worry can be seen as a covert behavior with primary function to avoid aversive emotional experiences. Our research group has developed a treatment protocol based on an operant model of worry, where we use exposure-based strategies to extinguish the catastrophic worry thoughts. The aim of this study was to test this treatment delivered via the Internet in a large-scale randomized controlled trial. We randomized 140 high-worriers (defined as > 56 on the Penn State Worry Questionnaire [PSWQ]) to either Internet-based extinction therapy (IbET) or to a waiting-list condition (WL). Results showed that IbET was superior to WL with an overall large between-group effect size of $d = 1.39$ (95% confidence interval [1.04,1.73]) on the PSWQ. In the IbET group, 58% were classified as responders. The corresponding figure for WL participants was 7%. IbET was also superior to the WL on secondary outcome measures of anxiety, depression, meta-cognitions, cognitive avoidance, and quality of life. Overall treatment results were maintained for the IbET group at 4- and 12-month follow-up. The results from this trial are encouraging as they indicate that worry can be targeted with an accessible and novel intervention for worry. Replication trials with active control group are needed.

Keywords: worry; exposure; extinction; internet

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WORRY IS A COMMON PHENOMENON that many clinicians face in daily practice. Generalized anxiety

disorder (GAD) is the mental health disorder with the strongest emphasis on the worry process, but other disorders, such as obsessive-compulsive disorder (OCD), illness anxiety disorder, social anxiety disorder (SAD), insomnia, panic disorder, and depression, also involve a considerable amount of worry (Chelminski & Zimmerman, 2003; Gladstone et al., 2005; Semler & Harvey, 2004; Starcevic, 1995; Starcevic et al., 2007). Worry is also common in the general population. One study by Ruscio (2002) found that a vast majority of high worriers met none or only one of the four major DSM-IV criteria for GAD. Consequently, worry is a common phenotype that may not be sufficiently captured by current psychiatric diagnostic systems.

Common psychological models conceptualize worry as a strategy to avoid aversive emotional and cognitive experiences and there is strong experimental support for this conceptualization (Behar, DiMarco, Hekler, Mohlman, & Staples, 2009; Newman & Llera, 2011). If worry serves as an avoidance of a threat stimulus, exposure therapy (i.e., repeated and sustained contact with the threat stimuli until habituation is achieved) would be a reasonable intervention for worriers (Barlow, Allen, & Choate, 2004; Newman & Llera, 2011; White & Barlow, 2002). In established treatments for worry, exposure is typically one of several treatment components including breathing techniques, problem solving, muscle relaxation or cognitive restructuring (Behar et al., 2009). A handful of studies have also tested exposure as a stand-alone intervention for worry. The first study was conducted by Provencher, Dugas, and Ladouceur (2004) where 18 GAD patients received 12 weeks of cognitive-behavior therapy (CBT) that was focused on either problem-solving training or worry exposure. Both interventions were equally effective, with large within-group effect sizes. A subsequent trial by Goldman, Dugas, Sexton, and Gervais (2007) randomized 30 high worriers to either written worry exposure or to a writing control-task that was not worry-related. Worry exposure was superior to the control condition in reducing worry and cognitive avoidance. A third trial by Hoyer et al. (2009) randomized 73 GAD patients to either 15 sessions of worry exposure, 15 sessions of applied relaxation, or to a waiting list condition. Patients who were randomized to exposure or applied relaxation had similar improvements and both conditions were superior to the waiting list. Lastly, a recent trial by Fracalanza, Koerner, and Antony (2014) randomized 57 GAD patients to one of two types of brief exposure therapy, or a control condition. Results showed that exposure was superior to the control condition. Thus, at least four clinical trials indicate that exposure can be an effective stand-alone intervention for worry, but these studies also carried two major limitations. The first limitation is the relatively small sample sizes used in these studies and this may affect the generalizability of the findings. The second limitation is the narrow inclusion criteria of GAD patients exclusively, with the exception of Goldman et al. (2007), which included non-GAD high-worrying subjects. The latter limitation is important because many high worriers may have another primary diagnosis than GAD or may not even fulfill criteria for any psychiatric disorder.

Our research group has developed a treatment protocol of worry that resembles the established psychological theories in that worry serves the function of being an avoidance behavior (Behar et al., 2009; Newman & Llera, 2011). More specifically, worry is viewed as a behavior chain of continuous jumping between catastrophic and comforting thoughts in response to an ambiguous, potentially threatening situation (Wadström, 2013, 2015). The use of comforting thoughts, that is, thoughts that provide reassurance that the catastrophe will not occur, is explained to the patient as a self-reinforcing process where, following the Premack (1959) principle of second-order reinforcement, the catastrophic thoughts are reinforced by the temporary relief following the use of comforting thoughts. Put slightly differently, catastrophic thoughts are reinforced because they enable the relief stemming from comforting thoughts which follow catastrophic thoughts. Worry is thus seen as an operant process, which can be broken by stopping the use of comforting thoughts. As covert behaviors can be hard to refrain from, this treatment protocol introduces different strategies that serve as competing responses to catastrophic thoughts, i.e., high-worriers would engage behaviors that block the reinforcing contingencies of thinking comforting thoughts (the suggested competing responses are detailed in the treatment section below).

There are many similarities between previous exposure-based treatments and their underlying theories and the present treatment's rationale. There are, however, also some important differences. First, previous conceptualizations use multiple cognitive constructs in explaining worry (e.g., negative problem orientation, intolerance of uncertainty, positive beliefs about worry; Behar et al., 2009) and targeting these constructs is regarded as important change mechanisms in treatment. In our conceptualization, worry is simply described as an interaction between two specific behaviors, catastrophic and comforting thoughts, which we think is a pedagogical advantage. Second, in contrast to the previously mentioned exposure-based interventions for worry, our protocol does not include any rationale