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Metacognitive Beliefs and Emotional Dysregulation Have a Specific Contribution on Worry and the Emotional Symptoms of Generalized Anxiety Disorder

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Abstract

Metacognitive beliefs and emotional dysregulation are theoretically relevant and empirically supported variables for explaining worry and emotional symptoms in generalized anxiety disorder (GAD). These variables are proposed in alternative models of GAD and tested in separate research. This study first examined the relationships between metacognitive beliefs and emotional dysregulation and, second, analyzed the specific contribution of these variables to worry and emotional GAD symptoms. Correlation analyses revealed participants ($n = 768$) who had dysfunctional beliefs about their cognitive functioning also tended to have more difficulties with emotional regulation. Structural equation analyses revealed metacognitive beliefs and emotional dysregulation have a specific contribution to worry and emotional symptoms in GAD. We found strong correlations between metacognitive beliefs and worry, and between emotional dysregulation and emotional GAD symptoms. Moreover, the associations of metacognitive beliefs with worry and emotional symptoms remain significant when the effect of emotional dysregulation was accounted for. However, the association between emotional dysregulation and worry become non-significant when the effect of metacognitive beliefs was controlled for. These results help clarify the unique contribution of metacognition and emotional dysregulation on GAD and suggest that both variables should be integrated into a more comprehensive model and therapy for this anxiety disorder.

Keywords Metacognition · Metacognitive beliefs · Emotion regulation · GAD · Worry

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Introduction

Generalized anxiety disorder (GAD) is a common, chronic, and disabling anxiety disorder. Around 5% of individuals in the USA will qualify for a diagnosis of GAD at some point in their lives (Kessler and Wang 2008), involving a significant loss on the functionality of those who suffer it. Two core symptoms characterize this anxiety disorder: the presence of anxiety (and other emotional symptoms) and worry about a variety of topics, events, or activities. The worry is clearly excessive and is perceived as difficult to control. The anxiety is also excessive, and it is associated with emotional and behavioral symptoms such edginess or restlessness, fatigue, impaired concentration, irritability, increased muscle aches or soreness, and difficulty sleeping (American Psychological Association, APA, 2013). While GAD involves significant impairment, change in response to psychotherapy is lower than expected for other anxiety disorders (Newman et al. 2013), so a more comprehensive understanding of the mechanisms underlying it is needed to enhance treatment effects.

Recent studies have advanced the conceptualization of GAD (for a review, see Behar et al. 2009). We know that a key contributor to the disorder is worry and its function as a coping strategy (Wells 2000) and a way to avoid negative emotional experience (Borkovec and Roemer 1995). The cognitive avoidance theory of worry (Borkovec et al. 2004) suggests that worry is a verbal-linguistic thought-based activity that inhibits the emotional and somatic activation associated with the feared mental imagery. Rather than avoid negative emotion, however, worry evokes and sustains negative emotionality and negative thoughts (Borkovec et al. 1983) and functions as an ineffective strategy. An important question, then, is why some individuals with GAD use worry rather than other strategies.

So far, we know GAD results from stable knowledge individual have about their own cognitive system functioning, particularly the knowledge about the functioning and significance of their thoughts and memories (Wells 1995). In this sense, the Self-Regulatory Executive Function Model (S-REF; Wells and Matthews 1994) proposes that individuals with GAD have beliefs about thinking, called metacognitive beliefs (Wells 2000; Wells and Carter 2001). S-REF suggests these metacognitive beliefs guide the selection and maintenance of the maladaptive coping strategy (e.g., worry), increasing the accessibility of negative information (Wells 2000) and increasing emotional distress. Two main domains of metacognitive beliefs are especially relevant in GAD: positive beliefs about the helpfulness of worry (e.g., "worrying about my problems helps me to cope") and negative beliefs about worry being harmful, dangerous, and uncontrollable (e.g., "I can't control my thoughts"). Whereas positive metacognitive beliefs motivate engagement with initial worries, negative metacognitive beliefs raise perceptions of threats in individuals who experience them (e.g., the thought that worry is harmful and uncontrollable), leading to feel worry as unavoidable and maintaining its use as a means of coping. Additionally, other related dimensions of metacognition have been associated with worry and psychiatric disorders, for example, the beliefs about the need to control thoughts. From the S-REF model, these metacognitive beliefs have a causal role in activating and maintaining worry, whereas worry leads to higher levels of emotional symptoms. Data from different studies have provided support to these relationships (see Wells 2010 for a review).

Metacognitive beliefs correlated with pathological worry and GAD symptoms in both cross-sectional and prospective studies (Barahmand 2009; Cartwright-Hatton and Wells 1997; Davis and Valentiner 2000; McEvoy and Mahoney 2013; Sica et al. 2007; Thielsch et al. 2015). For example, in an ecological assessment study, Thielsch et al. (2015) found that negative metacognitive beliefs predicted daily worry in adolescents, and Nassif (1999) found that negative metacognitive beliefs predicted the subsequent onset of GAD. Evidence also exists showing that people meeting the criteria for GAD report significantly higher levels of maladaptive metacognitive beliefs about worry than people with other anxiety disorders and non-anxious individuals (Wells and Carter 2001). On the other hand, metacognitive beliefs are related to higher levels of anxiety (Ramos-Cejudo and Salguero 2017; van der Heiden et al. 2010) or other anxiety disorders (Bailey and Wells 2015; Sassaroli et al. 2015; Yoris et al. 2015), and recent research suggests that it is a transdiagnostic factor of psychopathology (Sun et al. 2017).

Other possibilities about why people worry result from the nature of how emotions are generated and regulated (Gross 2001). From an emotional regulation approach, worry is a maladaptive strategy employed to "fix" the regulatory problems associated with the emotional experience. Mennin et al. (2005) argued that individuals with GAD have difficulties in emotional regulation in four areas: they demonstrate high emotional intensity; a reduced understanding of emotions with difficulties in identifying, describing, and clarifying their emotional experiences; a rejection of the emotional experience; and the use of maladaptive emotion regulation strategies. Previous research shows that emotional regulation deficits correlate with GAD symptoms. In a series of studies, Mennin et al. (2005) found that both participants with self-reported GAD symptoms and patients with clinician-assessed GAD reported greater deficits in the four areas of emotion regulation compared to control participants. Similar results have been found in other studies where emotional regulation deficits were associated with analogue sample of GAD (Salters-Pedneault et al. 2006; Turk et al. 2005) and where heightened emotional intensity and emotional dysregulation (mainly maladaptive management) were associated with GAD symptoms, after accounting for depressive and social anxiety symptoms (Mennin et al. 2007). Emotional regulation deficits also correlate with pathological worry (Mennin et al. 2005; Salters-Pedneault et al. 2006); however, using an experimental design, McLaughlin et al. (2007) found that analog GAD participants reported greater emotional dysregulation compared to control regardless of whether they engaged in an induced worry state; that is, emotional dysregulation in GAD participants was independent of the presence of worry.

In sum, there is empirical support for using both metacognitive and emotional dysregulation approaches to explain GAD phenomenology. However, the relationship between these perspectives and their specific contribution to GAD remains unclear. To our knowledge, only two studies have analyzed the relationship between metacognitive beliefs and emotional dysregulation, but in the context of other disorders. First, in a study assessing metacognitive beliefs, emotional dysregulation, and post-traumatic stress symptoms in students exposed to an earthquake, Mazloom et al. (2016) found positive and significant correlations between metacognitive beliefs and emotional dysregulation ($r = .37$). Moreover, path analyses revealed that both variables were independently associated with post-traumatic stress symptoms. Akbari (2017) found similar results in a study analyzing the relationships between metacognition, emotional

dysregulation, distress tolerance, and problematic Internet use in a sample of undergraduates. Again, positive and significant correlations were found between metacognitive beliefs and emotional dysregulation ($r = .43$), and both variables were independently associated with problematic Internet use in path analyses.

These results suggest that metacognitive beliefs and emotional dysregulation are related, although they are distinct variables, and both have a specific contribution to the issues assessed. Although they both have been related to pathological worry and emotional GAD symptoms, their specific contributions on these two core symptoms in GAD need further examination.

In the present study, we analyzed, first, the relationship between metacognitive beliefs and difficulties in emotional regulation, and second, the specific contribution of metacognitive beliefs and difficulties in emotional regulation on worry and emotional GAD symptoms in a large, non-clinical sample. A structural equation modeling (SEM) approach was used including a metacognitive beliefs latent factor (composed by different metacognitive beliefs: positive and negative beliefs, beliefs of lack of cognitive confidence, need to control thoughts, and cognitive self-consciousness), an emotion dysregulation latent factor (composed by different deficits in emotion regulation: non-acceptance, clarity, emotional lack of control, and interference on goals), a pathological worry latent factor, and, finally, an emotional GAD symptoms latent factor (composed only by affective symptoms of GAD). Taking into account the reviewed literature, we hypothesized metacognitive beliefs and difficulties in emotional regulation will be moderately correlated, indicating they are related but distinct variables. On the other hand, we expected both variables have a specific contribution to worry and GAD symptoms, indicating that a complete approach to GAD, combining metacognitive and emotional dysregulation approaches, may be helpful to understand GAD and, in turn, to offer additional strategies to bolster the efficacy of its treatment.

Method

Participants and Procedure

The participants in this study were 768 undergraduate students and non-students from a non-clinical sample (31.1% males, 69.9% females), ranging in age from 16 to 81 (mean age = 31.82, SD = 13.03). We used a convenience sampling method to obtain participants. Enrolled students were invited to participate through announcements and emails from the researchers. We recruited non-student respondents using a snowball-sampling technique (participants referred to other participants) and invited participants to take part in a study to research "individual differences in emotion and cognition." Participation was voluntary and anonymous. The questionnaires were administered in a paper and pencil format and instructions were provided in writing. The ethical review boards at a Spanish university granted ethics approval for the study.

Instruments

Meta-Cognitions Questionnaire-30 (MCQ-30; Wells and Cartwright-Hatton 2004) This measure assesses individual differences in metacognitive beliefs, judgments, and

monitoring tendencies. It comprises five subscales with a total of 30 items. Responses to each item on the MCQ-30 are on a 4-point Likert scale, from 1 = "do not agree" to 4 = "strongly agree." MCQ-30 scores range from 30 to 120 points, and higher scores indicate greater pathological metacognitive activity. The five subscales measure the following dimensions: (1) positive beliefs about worry (e.g., "worrying helps me cope"), (2) negative beliefs of uncontrollability and danger (e.g., "when I start worrying I cannot stop"), (3) cognitive confidence (e.g., "my memory can mislead me at times"), (4) need to control thoughts (e.g., "not being able to control my thoughts is a sign of weakness"), and (5) cognitive self-consciousness (e.g., "I pay close attention to the way my mind works"). The Spanish version of the MCQ-30 (Ramos-Cejudo et al. 2013) showed the same factor structure, good reliability, validity, and internal consistency.

Difficulties in Emotion Regulation Scale (DERS; Gratz and Roemer 2004) This is a 36-item self-report measure used to assess 6 dimensions of emotional dysregulation: non-acceptance, goals, impulse, strategies, clarity, and awareness. Each item is rated on a 5-point scale based on how often participants believe each item pertains to them (1 = "almost never" to 5 = "almost always") with good internal consistency. The Spanish adaptation (Hervás and Jódar 2008) includes the reduction of factors and items with respect to the original scale, and it consists of 28 items, grouped into 5 factors: (a) clarity (e.g., "I have no idea how I feel"), (b) awareness (e.g., "when I feel bad, I recognize my emotions"), (c) non-acceptance (e.g., "when I feel bad, I feel ashamed of myself for feeling that way"), (d) emotional lack of control (e.g., "when I feel bad, I have trouble controlling my behavior"), and (e) goals (e.g., "when I feel bad, I have difficulty concentrating"). Two factors of the original scale, difficulties in impulse control and limited access regulation strategies, were loaded on a single factor called emotional lack of control by the authors. DERS showed good psychometric properties and high internal consistency ($\alpha = .93$) and test–retest reliability over a period of 6 weeks (Hervás and Jódar 2008). To test the study aims, awareness subscale was excluded from the calculation of the DERS total scale score and from the computation of the emotional dysregulation latent factor in SEM analysis. The awareness subscale consists of items representing one's propensity for recognizing and attending to emotions (e.g., "When I'm upset, I acknowledge my emotions"). A recent examination of the latent structure of the DERS showed that this dimension may not represent the same higher-order emotion regulation construct as the other DERS dimensions, supporting the adequacy of a revised version removing this subscale (Bardeen et al. 2012).

Penn State Worry Questionnaire (PSWQ; Meyer et al. 1990) This instrument captures the generality, excessiveness, and uncontrollability of pathological worry. The reliability and validity of the PSWQ have been widely researched, and the instrument appears to have sound psychometric properties (Brown et al. 1992; Molina and Borkovec 1994; Starcevic et al. 2007). It consists of 16 items (5 inversely formulated), and responses are given on a 5-point scale from 1 = "nothing" to 5 = "a lot." PSWQ scores range from 30 to 120 points, with optimal sensitivity and specificity of the PSWQ in clinical samples being achieved with a cutoff score of 65 (Fresco et al. 2003). The Spanish version of the PSWQ (Sandín et al. 2009) removed the 5 inversely formulated items from the

original version, and it consists of 11 items. This version has shown good reliability, validity, and internal consistency.

Screening Scale Generalized Anxiety Disorder According to DSM-IV (SSGAD; Carroll and Davidson 2000) This scale consists of 12 dichotomous-response (yes/no) items for participants to indicate whether or not he or she sensed each item most days in the last 6 months. The items collect the main symptoms following a diagnosis of GAD according to DSM-IV criteria (e.g., "most days I feel nervous"). Because the assessment of worry and emotional symptoms remains unchanged in DMS-V (compared to DSM-IV), findings with the SSGAD might be also useful for DSM-V. This instrument has shown adequate internal consistency ($\alpha = .82$). The Spanish version of the scale (Bobes et al. 2006) showed adequate reliability (Kuder–Richardson coefficient: .85 in patients with GAD diagnosis) and validity, confirming its discriminant capacity between patients and controls (sensitivity = .936, specificity = .955), and adequate sensitivity to change.

Results

Descriptive and Bivariate Analyses

Descriptive statistics, reliability, and zero-order correlation coefficients for the study variables are shown in Table 1. The Cronbach's alpha for all the scales reached satisfactory levels above 0.83. Using a cut-point of ≥ 6 on the SSGAD, 211 participants of the total sample were identified at risk of GAD. We found positive and significant correlations between metacognitive beliefs and emotional dysregulation, indicating that people with difficulties in emotional regulation also showed higher levels of dysfunctional metacognitive beliefs. Both metacognitive beliefs and emotional dysregulation were also positively and significantly correlated with pathological worry and emotional GAD symptoms. In the case of metacognitive beliefs, we found the highest correlations with pathological worry whereas emotional dysregulation shown highest correlations

Table 1 Means, standard deviations, reliabilities, and intercorrelations among measures

	1	2	3	4
1. Metacognitive beliefs	–			
2. Emotional dysregulation	.54	–		
3. Pathological worry	.53	.49	–	
4. Emotional GAD symptoms	.47	.57	.62	–
M	57.15	56.58	30.25	3.63
SD	13.65	17.35	9.62	3.21
α	.89	.92	.93	.83

Note: All correlations are significant at level $p < .01$

with emotional GAD symptoms. Finally, we found strong correlations between pathological worry and emotional GAD symptoms.

Structural Equation Model Testing the Unique Contribution of Metacognitive Beliefs and Emotional Dysregulation on Pathological Worry and Emotional GAD Symptoms

We test the unique contribution of metacognitive beliefs and emotional dysregulation on pathological worry and emotional GAD symptoms using structural equation modeling (SEM) with latent variables in EQS 6.1 (Bentler 1995), to control for measurement error. We used the scores for each of the five subscales of the MCQ-30 as indicators for the metacognitive belief latent factor, whereas the scores for each of the four subscales of the DERS were used as indicators of the emotional dysregulation latent factor. We randomly averaged the item subset of the PSWQ into three parcels for the pathological worry latent factor. Finally, we randomly averaged the item subset of the SSGAD into two parcels for the emotional GAD symptom latent factor. To avoid overlap between pathological worry and emotional GAD symptom latent factors, items from the SSGAD assessing worry were not included in the item subsets for the emotional GAD symptoms latent factor. We used the maximum likelihood estimation procedure (ML); however, univariate and multivariate kurtosis statistics indicate non-normality, so we used the Satorra–Bentler scaled ML correction to adjust the model χ^2 (Hu et al. 1992). According to Schweizer's recommendations (Schweizer 2010), additional measures of model fit were used: (1) root mean square error of approximation (RMSEA), (2) the Bentler comparative fit index (CFI), and (3) standardized root mean square residual (SRMR). For the CFI, values exceeding 0.90 signify acceptable fit. For the RMSEA, values below 0.08 are considered an acceptable fit, whereas values below 0.05 are indicative of good fit. Finally, the values of the SRMR are expected to stay below 0.10 (Schweizer 2010).

We tested a model in which metacognitive beliefs and emotional dysregulation correlated with pathological worry and emotional GAD symptoms. Taking into account the results found in bivariate analysis and in previous literature, a relationship between metacognitive beliefs and emotional dysregulation latent factors was included (see Fig. 1). The model showed the following fit indices: S–B $\chi^2 = 352.92$, df = 71, $p < .05$; RMSEA = .07 (90% CI = 0.06–0.08); CFI = .93; SRMR = .05. Globally, these indices indicate a good fit to the data. As presented in Fig. 1, metacognitive beliefs and emotional dysregulation were positively and significantly related. A significant direct effect of metacognitive beliefs on pathological worry and emotional GAD symptoms was found, with the effect being higher for pathological worry. This result indicates that metacognitive beliefs have an independent effect on pathological worry and emotional GAD symptoms when emotional dysregulation is controlled for. We also found that emotional dysregulation had a significant direct effect on emotional GAD symptoms, but the direct effect of emotional dysregulation on pathological worry was non-significant. The absence of a direct effect for emotional dysregulation on pathological worry indicates that emotional dysregulation does not make a unique contribution to pathological worry when metacognitive beliefs are controlled for.

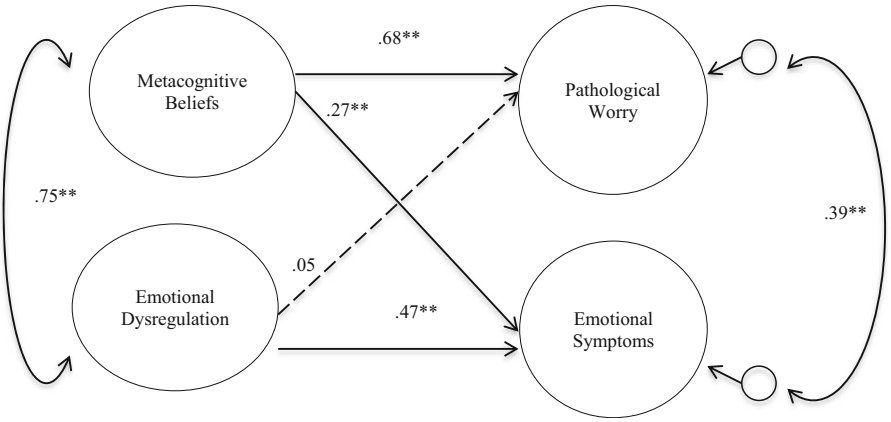


Fig. 1 Model of relationships between metacognitive beliefs and emotional dysregulation accounting for pathological worry and GAD symptoms. Note: Standardized beta coefficients are shown. Dashed paths represent non-significant relationships. $^{**}p < .01$

Discussion

Metacognitive beliefs and emotional dysregulation are relevant variables in explaining the two core symptoms of GAD: worry and anxiety (Mennin et al. 2005; Wells 2010). However, few studies have examined the relationships between metacognitive beliefs and emotional dysregulation, and no studies have analyzed the specific contribution of each variable on GAD symptoms. The main goal of the present study was to overcome this limitation of the literature.

First, our results indicated that higher levels of metacognitive beliefs are associated with higher levels of emotional dysregulation, as shown by other studies (Akbari 2017; Mazloom et al. 2016). This result suggests that people with dysfunctional beliefs about their cognitive functioning (e.g., "I need to worry in order to work well" or "I can't control my thoughts") also tend to have negative beliefs and attitudes about their emotional functioning (e.g., "When I feel bad, I feel ashamed of myself for feeling that way," or "I can't control my emotions"). However, the magnitude of the correlations between metacognitive beliefs and emotional dysregulation suggests that they are related but are also different constructs.

Second, metacognitive beliefs and emotional dysregulation showed a specific effect on worry and emotional GAD symptoms. We found strong correlations between metacognitive beliefs and worry, and emotional dysregulation was strongly correlated with emotional symptoms. Moreover, metacognitive beliefs were associated with worry and emotional symptoms when the effect of emotional dysregulation was accounted for. However, whereas emotional dysregulation was associated with emotional GAD symptoms independently of metacognitive beliefs, the association between emotional dysregulation and worry became non-significant when the effect of metacognitive beliefs was controlled for. This result suggests that metacognitive beliefs and emotional dysregulation may have a specific role in explaining GAD symptoms. While metacognitive beliefs play a key role in pathological worry and emotional symptoms, emotional dysregulation plays a role in emotional symptoms.

These results are coherent with metacognitive theory, which points out the relevance of metacognitive beliefs as a causal factors in predicting worry and emotional symptoms in GAD (Wells 2000), as well as with previous research showing that metacognitive beliefs predict worry, GAD status, and other emotional symptoms (e.g., levels of anxiety; Nassif 1999; Ramos-Cejudo and Salguero 2017; Thielsch et al. 2015). Based on this approach, metacognitive beliefs are a proximal causal factor of worry, and emotional symptoms increase because of the chronic use of this strategy, so the role of metacognition in GAD is mainly via the presence of worry, as our results indicate. Following the emotion dysregulation model (Mennin et al. 2005), individuals with GAD tend to show emotional regulation deficits that lead them to perceive their emotional experience as aversive and, thus, try to suppress or control that experience through worry and other maladaptive strategies. Past research has corroborated the implication of emotional regulation deficits in GAD (Mennin et al. 2005; Turk et al. 2005), as well as the existence of positive relationships between emotional dysregulation and worry (Mennin et al. 2005; Salters-Pedneault et al. 2006). However, the relationship between emotional dysregulation and emotional GAD symptoms has been found to be independent of worry. McLaughlin et al. (2007) found that individuals with GAD experienced more difficulties in understanding and managing their emotions following a negative emotion induction, regardless of the presence of an induced worry state. The authors suggested that, while worry may exacerbate the difficulty in regulating emotions, it is not a necessary component of emotion dysregulation in GAD. Our results are in line with this affirmation.

These results have two implications. First, if metacognitive beliefs and emotional dysregulation make a specific contribution to GAD symptoms, theoretical accounts must consider both factors when explaining this anxiety disorder. Metacognition and emotional dysregulation come from alternative models of GAD and have been tested in separate studies. However, a comprehensive model accounting for both variables may help us to reach a more comprehensive understanding of the mechanisms underlying GAD. Our results also encourage new research to clarify the nature of the relationships between metacognition and emotional dysregulation. In this sense, Both metacognitive and emotion dysregulation models have demonstrated been useful in explaining other emotional disorders than GAD, so future research is needed to granted analyze the role of these variables in predicting emotional disorders from a transdiagnostic perspective. Second, if we conceptualize individuals with GAD as having dysfunctional beliefs about their cognitive functioning and having difficulties in the regulation of their emotions, it follows that they may benefit from interventions that enhance their knowledge of how their cognitive and emotional regulation functions. Our results also suggest that metacognitive therapy could be more useful in treating worry, whereas emotional regulation therapy could be better in reducing the emotional symptoms in GAD.

Among the strengths of the current study are the use of a large sample, well-validated measures, and a methodology that reduces the measurement error. Despite these strengths, our study has several limitations that must be taken into account before we generalize our findings. First, it is not possible to attribute causality because of the cross-sectional design we used. Our results suggest metacognitive beliefs and emotional dysregulation play a unique role in worry and GAD symptoms; however, it remains unclear whether metacognition and emotional dysregulation predicts worry or vice

versa. Prospective and experimental designs are therefore necessary. Second, the use of a non-clinical sample precludes the generalization of our results to clinical samples. Future research must corroborate our findings using participants with GAD in clinical settings or with a GAD diagnosis from the general population. Third, other variables, such as depression, may be associated with emotional dysregulation and GAD, which could explain the relationships found in this study. Fourth, SSGAD was designed to assess GAD symptoms according to DSM-IV criteria, although worry and emotional symptoms remain without major changes in DSM-V (compared with DSM-IV), future research must corroborate our findings using measures designed specifically to assess DSM-V GAD criteria. Despite the limitations, we believe the present findings provide a step forward in the conceptualization of GAD by showing that metacognitive beliefs and emotional dysregulation make a specific contribution to worry and emotional symptoms in GAD. Both factors should, therefore, be integrated into a more comprehensive model and therapy for GAD.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that there is no conflict of interest.

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