Contribution of metacognitive beliefs and emotional dysregulation on worry and the emotional symptoms of generalized anxiety disorder

Running Head:

Metacognition and emotional dysregulation in GAD

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Abstract

Metacognitive beliefs and emotional dysregulation are theoretically relevant and empirically supported variables for explaining worry and emotional symptoms in general 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 in a more comprehensive model and therapy for this anxiety disorder.

Key words: metacognition, metacognitive beliefs, emotion regulation, GAD, worry.

Introduction

Generalized anxiety disorder (GAD) is a common, chronic, and disabling anxiety disorder. Around of 5% of individuals in the United States will qualify for a diagnosis of GAD at some point in their lives (Kessler & Wang, 2008), involving a significant loss on 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 it is experienced as very hard to control. The anxiety is also excessive, and it is associated with emotional 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, Llera, Erickson, Przeworski, & Castonguay, 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, DiMarco, Hekler, Mohlman, & Staples, 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 & Roemer, 1995). The cognitive avoidance theory of worry (Borkovec, Alcaine, & Behar, 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,

Robinson, Pruzinsky & DePree, 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 individuals' knowledge of 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 & Matthews, 1994) proposes that individuals with GAD have negative and positive beliefs about thinking, called metacognitive beliefs (Wells, 2000; Wells & Carter, 2001). S-REF suggests these metacognitive beliefs such as "worrying about my problems helps me to cope" 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. Positive metacognitive beliefs about the helpfulness of worry motivate engagement with initial worries (e.g., "I need to worry in order to work well") whereas negative metacognitive beliefs about worry (e.g., "I can't control my thoughts") being harmful, dangerous, and uncontrollable raise perceptions of threats in individuals who experience them. This approach suggests that these and other metacognitive beliefs (e.g., the need to control thoughts) can be causal factors in predicting worry and emotional symptoms in GAD, and posterior data 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 & Wells, 1997; Davis & Valentiner, 2000; McEvoy & Mahoney, 2013; Sica, Steketee, Ghisi, Chiri, & Franceschini, 2007; Thielsch, Andor, & Ehring 2015). For example, in an

ecological assessment study, Thielsch et al. (2015) found that negative metacognitive beliefs correlated with daily worry in adolescents, and Nassif (1999) found that negative metacognitive beliefs predicted subsequent onset of GAD. Evidence also exists showing that people meeting the criteria for GAD report significantly higher metacognitive beliefs about worry than people with other anxiety disorders and non-anxious individuals (Wells & Carter, 2001). On the other hand, metacognitive beliefs are related to higher levels of anxiety (Ramos-Cejudo & Salguero, 2017; van der Heiden et al., 2010) or other anxiety disorders (Bailey & Wells, 2015; Sassaroli et al., 2015; Yoris et al., 2015), and recent research suggests that it is a transdiagnostic factor of psychopathology (Sun, Zhu & So, 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 emotional experience. Mennin, Heimberg, Turk, and Fresco (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 emotional 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 GAD status (Salters-Pedneault, Roemer, Tull, Rucker, & Mennin, 2006; Turk, Heimberg, Luterek, Mennin & Fresco, 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, Holaway, Fresco, Moore & Heimberg, 2007). Emotional regulation deficits also correlate with pathological worry (Mennin et al., 2005; Salters-Pedneault et al., 2006); however, using an experimental design, McLaughlin, Mennin, and Farach (2007) found that analogue 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 explain GAD phenomenology. However, the relationship between these perspectives and their specific contribution to GAD remains unclear. In a study assessing metacognitive beliefs, emotional dysregulation and post-traumatic stress symptoms in students exposed to an earthquake, Mazloom, Yaghubi, and Mohammadkhani (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, the specific contributions of these two core symptoms in GAD need further examination.

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 complete approach to GAD, combining metacognitive and emotional dysregulation approaches, may offer additional strategies to bolster the efficacy of treatments for GAD.

Method

Participants and procedure

The participants in this study were 768 undergraduate students and non-students from a nonclinical 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, 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 & 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, Salguero & Cano-Vindel, 2013) showed the same factor structure, good reliability, validity, and internal consistency. Cronbach's α in the present study was .89 for the total MCQ score and ranged between .69 and .89 for the subscales.

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). This is a 36-item self-report measure used to assess 6 dimensions of emotional dysregulation: nonacceptance, 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 & 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) emotional confusion (e.g., "I have no idea how I feel"), (b) emotional neglect (e.g., "when I feel bad, I recognize my emotions "), (c) emotional rejection (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) interference (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 (α = .93) and test–retest reliability over a period of 6 weeks (Hervás & Jódar, 2008). To test the study aims, a revised DERS total scale score was also calculated by summing 30 of the 36 items as other studies showed (Bardeen, Fergus, & Orcutt, 2012); the 6 items of the awareness subscale were excluded from the calculation of the revised DERS total scale score. 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"). Internal consistency was good for the revised DERS total scale at .92, and α for the subscales ranged between .76 and .91.

Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger & Borkovec, 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 (Molina & Borkovec, 1994). It consists of 16 items, and responses are given on a 5-point scale from

1 = "nothing" to 5 = "a lot." The original English version has five items, the order of which is inverted in the Spanish version (Nuevo, Montorio & Ruiz, 2002). This version has a unidimensional structure with good reliability, validity, and internal consistency. Cronbach's α in the present study was .93.

Screening Scale Generalized Anxiety Disorder according to DSM-IV (SSGAD; Carroll & 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"). This instrument has shown an adequate internal consistency (α = .82). The Spanish version of the scale (Bobes, García-Calvo, Prieto, García-García, & Rico-Villademoros, 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. In this study the scale presented an internal consistency of α = .83.

Results

Descriptive and bivariate analyses

Descriptive statistics, reliability, and zero-order correlation coefficients for the study variables are shown in Table 1. Overall, we found positive and significant correlations between the metacognitive beliefs and emotional dysregulation variables, indicating that people with difficulties in emotional regulation also showed higher levels of dysfunctional metacognitive beliefs. The highest correlations were found between

negative beliefs and emotional lack of control, goals and nonacceptance emotions, and between the need to control thoughts and nonacceptance and lack of control.

With respect to associations between metacognitive beliefs and emotional dysregulation variables and pathological worry and GAD symptoms, we also found positive and significant correlations. In the case of metacognitive beliefs, we found the highest correlations with both pathological worry and GAD symptoms and negative beliefs about uncontrollability and danger. In the case of emotional dysregulation, we found the highest correlations between pathological worry and nonacceptance and emotional lack of control, whereas highest correlations with GAD symptoms were found for emotional lack of control, goals, and nonacceptance. Finally, we found strong correlations between pathological worry and GAD symptoms.

Structural equation model testing the unique contribution of metacognitive beliefs and emotional dysregulation on pathological worry and GAD symptoms

We test the unique contribution of metacognitive beliefs and emotional dysregulation on pathological worry and 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 averaged the item subset of the PSWQ into two parcels for the pathological worry latent factor. Finally, we averaged the item subset of the SSGAD into two parcels for the GAD symptom latent factor. To avoid overlap between pathological worry and GAD symptom latent factors, items from the SSGAD assessing worry were not included

in the item subsets for the GAD symptoms latent factor. We used the maximum likelihood estimation procedure (ML); however, univariate and multivariate kurtosis statistics indicates non-normality, so we used the Satorra–Bentler scaled ML correction to adjust the model χ^2 (Hu, Bentler, & Kano, 1992). The following measures of model fit were used (Schweizer, 2010): the root mean square error of approximation (RMSEA), the Bentler comparative fit index (CFI), and the standardized root mean square residual (SRMR). CFI values above .90 indicate good fit. RMSEA values below .08 indicate a reasonable fit, whereas values below .05 indicate good fit. We expected SRMR values to be below .10.

We tested a model in which metacognitive beliefs and emotional dysregulation correlated with pathological worry and 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 Figure 1). The model showed the following fit indices: S–B χ^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 Figure 1, metacognitive beliefs and emotional dysregulation were positively and significantly related. A significant direct effect of metacognitive beliefs on pathological worry and 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 GAD symptoms when emotional dysregulation is controlled for. We also found that emotional dysregulation had a significant direct effect on 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 made a unique contribution to pathological worry when metacognitive beliefs are controlled for.

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 both negative and positive metacognitive beliefs are associated with higher levels of emotional dysregulation, as shown by other studies (Abkari, 2016; Mazloom et al., 2016). In particular, negative metacognitive beliefs and the need to control thoughts were the metacognitive beliefs most highly associated with emotional dysregulation. Specifically, we found the highest association between negative beliefs and emotional lack of control. This result suggests that people with dysfunctional beliefs about their cognitive functioning also tend to have negative beliefs and attitudes about their emotional functioning, especially when these beliefs relate to the capacity to control their thoughts and their emotions. However, the magnitude of the correlations between metacognitive beliefs and emotional dysregulation suggest 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, 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 & 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 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 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. 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. 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. Third, other variables, such as depression, may be associated with emotional dysregulation and GAD, which could explain the relationships found in this study. 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 in a more comprehensive model and therapy for GAD.

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

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

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Positive beliefs	--												
2. Negative beliefs	.28	--											
3. Cognitive confidence	.14	.26	--										
4.Need to control Thoughts	.45	.56**	.25	--									
5. Cognitive self-consciousness	.40	.47	.10	.50	--								
6. MCQ_30	.66	.73	.55	.78	.72	--							
7. Clarity	.15	.36	.22	.30	.13	.34	--						
8. Nonacceptance	.25	.48	.19	.45	.33	.49	.45	--					
9. Goals	.27	.45	.27	.39	.29	.49	.46	.52	--				
10. Emotional lack of control	.28	.60	.20	.43	.35	.54	.52	.69	.67	--			
11. DERS	.27	.57	.28	.47	.28	.54	.70	.84	.76	.89	--		
12. Pathological worry	.35	.63	.13	.37	.35	.53	.33	.45	.38	.47	.49	--	
13.Emotional GAD symptoms	.23	.59	.19	.35	.30	.47	.39	.45	.46	.55	.57	.62	--
M	10.15	11.52	11.42	10.12	13.95	57.15	7.51	13.85	9.37	16.07	56.58	30.25	3.63
SD	4.11	3.83	4.60	3.31	4.22	13.65	2.92	6.57	3.96	6.94	17.35	9.62	3.21
α	.89	.78	.87	.69	.81	.89	.76	.91	.88	.91	.92	.93	.83

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

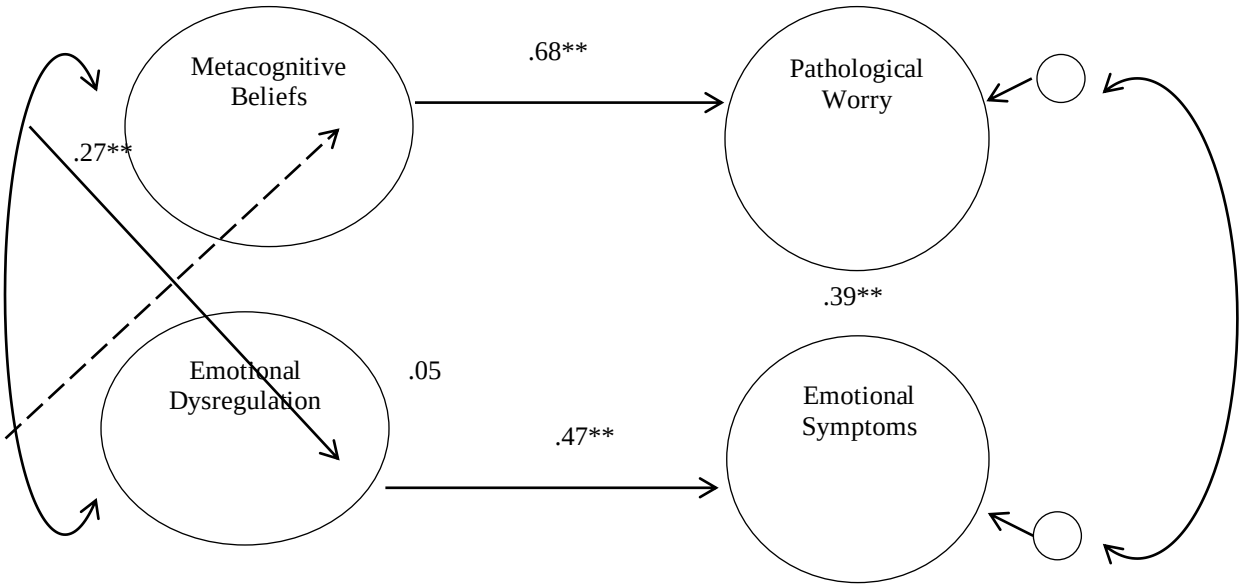

Figure 1. Model of relationships between metacognitive beliefs and emotional dysregulation accounting for pathological worry and GAD symptoms.

Note: Standardized beta coefficients are shown. Dashed paths represent non-significant relationships.
**p < .01