Check for updates

Received: 10 June 2019 | Revised: 13 November 2019 | Accepted: 15 November 2019

DOI: 10.1002/ab.21878

RESEARCH ARTICLE

AGGRESSIVE BEHAVIOR | WILEY

Individual differences in anger and displaced aggression: The role of metacognitive beliefs and anger rumination

José M. Salguero[1] | Esperanza García-Sancho[2] | Juan Ramos-Cejudo[3] | Lee Kannis-Dymand[4]

[1]Department of Personality, Evaluation and Psychological Treatment, University of Malaga, Malaga, Spain

[2]Department of Psychology, University of Cordoba, Cordoba, Spain

[3]Department of Social, Work and Differential Psychology, Complutense University of Madrid, Madrid, Spain

[4]Sunshine Coast Mind and Neuroscience-Thompson Institute, School of Social Sciences, University of the Sunshine Coast, Queensland, Australia

Correspondence
José M. Salguero, Department of Personality, Evaluation and Psychological Treatment, School of Psychology, University of Malaga, Campus de Teatinos, s/n 29071 Malaga, Spain.
Email: jmsalguero@uma.es

Funding information
University of the Sunshine Coast

Abstract

Metacognitive model is a theoretical approach aimed to explain emotion dysregulation and others emotion-related issues, such anger, and aggressive behavior. From this model, people having higher maladaptive metacognitive beliefs (e.g., "I can't control my thoughts") are more likely to activate and maintain anger rumination and, in turn, to experience higher levels of anger and to act aggressively. Preliminary evidence shows the role of metacognitive beliefs on anger rumination and anger levels, whereas no studies have examined its association with aggressive behavior. This study first examined the associations between metacognitive beliefs, anger rumination, anger levels, and the propensity to engage in displaced aggression, and second, the mediation role of anger rumination in the relations among metacognitive beliefs and anger and displaced aggression. Participants were 947 students and non-students from general population recruited in two different countries (Australia and Spain). Correlational analyses revealed a similar pattern of results in the Australian and Spanish sample, with participants having dysfunctional metacognitive beliefs also showing higher anger rumination, higher levels of anger and a higher tendency to act aggressively. Structural equation analyses revealed the associations of metacognitive beliefs with anger levels and displaced aggression was fully mediated by anger rumination in both samples. These results suggest that metacognitive beliefs should be considered in comprehensive models and in the therapy of anger problems and aggression.

KEYWORDS
aggression, anger, anger rumination, displaced aggression, metacognitive beliefs

1 | INTRODUCTION

Anger is a basic emotion that enables a person to take protective action, overcome obstacles and achieve goals in threatening situations (Izard, 1977; Novaco, 1976). Although anger has an adaptive function, it can be problematic when it is frequent, intense, or prolonged. Anger is neither necessary nor sufficient for aggression, but it impels aggressive behavior, particularly when its intensity overrides regulatory control mechanisms (Anderson & Bushman, 2002; García-Sancho, Salguero, & Fernández-Berrocal, 2016).

The self-regulatory executive function model (S-REF; Wells & Matthews, 1994) is a theoretical explanation of the activation and dysregulation of negative emotions. A central tenet of this model is that emotional issues are maintained by the cognitive-affective syndrome (CAS), a maladaptive emotion regulation style which involves perseverative thinking (e.g., rumination, worry), focused

attention, threat monitoring, avoidance, and thought suppression (Wells, 2009). The S-REF model proposes the activation and maintenance of the CAS is dependent on stable beliefs people have about their own cognitive system and coping strategies, called metacognitive beliefs. These metacognitive beliefs, such as positive beliefs about the utility of repetitive thinking (e.g., "ruminating about my problems helps me to cope"), negative beliefs about the uncontrollability or danger of thinking (e.g., "I can't control my thoughts"), and other beliefs about thinking, memory or attention (such as the need to control thoughts, the relevance of self-consciousness, or the lack of cognitive confidence), guide the selection of CAS, increasing the accessibility of negative information (e.g., negative emotions or negative thoughts) and enhancing and maintaining emotional distress (Wells, 2000). This approach suggests maladaptive metacognitive beliefs can be causal factors in predicting emotional disorders (Wells, 2009) and that these beliefs are a transdiagnostic factor in psychopathology (see Sun, Zhu, & So, 2017 for a meta-analysis). Specifically, studies have shown relationships between metacognitive beliefs and emotional distress (Spada, Mohiyeddini, & Wells, 2008), pathological anxiety (van der Heiden et al., 2010), prolonged worry and rumination (Salguero, Ramos-Cejudo, & García-Sancho, 2019; Weber & Exner, 2013), obsessive-compulsive symptomatology (Sassaroli et al., 2015), health anxiety (Bailey & Wells, 2015), generalized anxiety disorder (Wells, 2010), and problematic internet pornography use (Allen, Kannis-Dymand, & Katsikitis, 2017). This evidence comes from both cross-sectional and prospective studies (e.g., Bailey & Wells, 2015; Papageorgiou & Wells, 2009; Ramos-Cejudo & Salguero, 2017; Thielsch, Andor, & Ehring, 2015; Weber & Exner, 2013).

Anger rumination is the term used for repetitive, negative cognitions about an anger-inducing event, such as anger-inducing memories, angry thoughts and feelings, and plans for revenge (Denson, Pedersen, & Miller, 2006; Sukhodolsky, Golub, & Cromwell, 2001). According to the multiple systems model of anger rumination (Denson, 2013), rumination after an anger-inducing provocation maintains or increases the activation of angry feelings, aggressive thoughts, and high arousal, which cause the individual to make more effort to self-regulate one's internal state and consume cognitive resources. A substantial body of empirical evidence suggests that anger rumination following a provocation increases anger levels (Pedersen et al., 2011; Rusting & Nolen-Hoeksema, 1998) and aggression towards the provocateur (Bushman, 2002), and towards other targets (i.e., displaced aggression; Bushman, Bonacci, Pedersen, Vasquez, & Miller, 2005).

From the S-REF model, anger rumination is considered a maladaptive emotion regulation strategy and a component of the CAS (Caselli et al., 2017). Similar to other forms of CAS (e.g., depressive rumination or worry), activation and maintenance of anger rumination is based on maladaptive metacognitive beliefs. Thus, people having a higher maladaptive metacognitive beliefs are more likely to activate anger rumination and, in turn, to experience higher levels of anger and to act aggressively. First evidence of the role of metacognitive beliefs on anger rumination and anger levels comes from Simpson and Papageorgiou (2003) that found patients with anger-control problems held both positive and negative beliefs about anger rumination. Recently, Moeller (2016) found that positive and negative metacognitive beliefs are associated with anger rumination and anger intensity in a sample of male offenders. Caselli et al. (2017) corroborated these results in a prospective study with a sample of undergraduate students. They used a multi-wave panel design, with a 2-week anger, rumination and metacognitive beliefs monitoring protocol. They found metacognitive beliefs (positive beliefs, negative beliefs, and the need of control thoughts) and anger rumination had a significant impact on subsequent anger levels, and that anger rumination mediated the association between these metacognitive beliefs and anger levels. Taken together, these results suggest metacognitive beliefs are relevant to understand anger rumination and anger levels.

Less is known about the associations between maladaptive metacognitive beliefs and aggressive behavior. Previous work has highlighted the role of cognitive factors in understanding individual differences in aggressiveness (for a review, see Gilbert, & Daffern, 2011; Gilbert, Daffern, & Anderson, 2017). From the General Aggression Model (GAM; Anderson & Bushman, 2002), anger-related knowledge structures guide people's interpretations and decision processes conducing to aggressive outcomes. Three knowledge structures haven been considered important (Gilbert et al., 2017): (a) normative beliefs concerning the acceptability of aggression, (b) maladaptive cognitive schemas (a maladaptive style of perceiving oneself, others, or interpersonal relationships), and (c) aggressive behavioral scripts. Regarding metacognitive beliefs, these are knowledge structures, but can be distinguished from those mentioned above as they refer specifically to stable beliefs about our own cognitive system or cognitive coping strategies, like anger rumination. From this perspective, and taking the GAM into account, while maladaptive schema lead to aggressive outcomes triggering negative emotional states, and normative beliefs triggering appraisals that aggression is an acceptable behavior in a given circumstance, metacognitive beliefs lead to aggression by influencing the appraisal and decisions processes in a way that guides the activation and maintenance of anger rumination; which, in turn, would lead to higher levels of anger and to act aggressively.

To our knowledge, only one study has examined the association between metacognitive beliefs and aggression. Krans, Moulds, Grisham, Lang, and Denson (2014) evaluated the effect of positive beliefs about angry rumination on anger and aggression using an experimental design. Participants engaged in cognitive bias modification training intended to induce positive beliefs about rumination versus absence of positive metacognitive beliefs (e.g., "Analyzing myself when I'm angry helps me to problem solve" vs. "…never helps me to problem solve"). Next, they were presented with anger-provoking scenarios and asked to rate their predicted levels of anger and aggression in response to them. There were no significant differences between the two conditions in aggressive responses and participants in the positive beliefs condition showed a trend to less angry in response to the anger-provoking scenarios. This study did

not show significant results regarding metacognitive beliefs on anger and aggression. However, some details should be considered. Participants were trained to modify their cognitive bias, but their metacognitive beliefs and levels of rumination were not assessed. Also, only positive beliefs (or absence of these) about rumination were focused on in the training, not other metacognitive beliefs, such negative beliefs (e.g., "I cannot stop ruminating").

In summary, anger rumination has demonstrated a problematic role in anger and aggression (Denson, 2013). It increases anger levels, interferes the regulation of anger, and impels different forms of aggressive behavior (e.g., displaced aggression). Metacognitive beliefs activate and maintain anger rumination, as a form of the CAS, and studies have shown dysfunctional metacognitive beliefs are related to anger rumination and anger levels. However, this evidence is preliminary and limited. No published studies appear to have examined the associations between metacognitive beliefs, anger rumination, anger, and aggression.

Therefore, in the current study we aimed to replicate and extend previous research. Using a large community sample form two different countries, Australian and Spain, we aimed to examine the relationships between metacognitive beliefs, anger rumination, anger levels, and the propensity to engage in displaced aggression. Displaced aggression refers to situations in which a person is provoked, is prevented from retaliating against the original provocateur, and subsequently aggresses against a seemingly innocent target. It is a relevant form of aggressive behavior, previously associated with anger rumination (Denson et al., 2006; García-Sancho, Salguero, Vasquez, & Fernández-Berrocal, 2016).

Our predictions were the follows:

(1) Anger rumination will be related to higher levels of anger and displaced aggression.
(2) Metacognitive beliefs will be related to higher levels of anger rumination, anger levels, and displaced aggression.
(3) Anger rumination will mediate the relationships between metacognitive beliefs and both anger levels and displaced aggression (see Figure 1).

2 | METHODS

2.1 | Participants and procedure

This study is part of a larger project carried out in Australia and Spain (see Ramos-Cejudo, Salguero, Kannis-Dymand, García-Sancho, & Love, 2017). The participants in this study were 947 undergraduate students and non-students from the general population recruited from Australia and Spain. In Australia, the sample consisted of 314 participants (80.6% females), ranging in age from 18 to 70 (mean age = 35.49, standard deviation [*SD*] = 13.32); in Spain, the sample consisted of 633 participants (56.9% females), ranging in age from 18 to 82 (mean age = 36.62, *SD* = 13.36).

In both Australia and Spain, we used a convenience sampling method to recruit student and nonstudent participants. Enrolled students were invited to participate through announcements and emails. Nonstudent participants were recruited using snowball-sampling through various media, including online social and community websites. We invited participants to take part in a study concerning the accuracy and utility of brief emotion measures. Participation was voluntary, and anonymous. As an incentive, participants were offered the opportunity to be entered in a random draw to win one of three shopping vouchers ($40.00 in Australia, and €40.00 in Spain). The questionnaires were administered electronically (in a random order), with instructions given in writing, and were completed individually. Research ethics review boards at the Australian and Spanish correspondent universities granted ethics approval for the study.

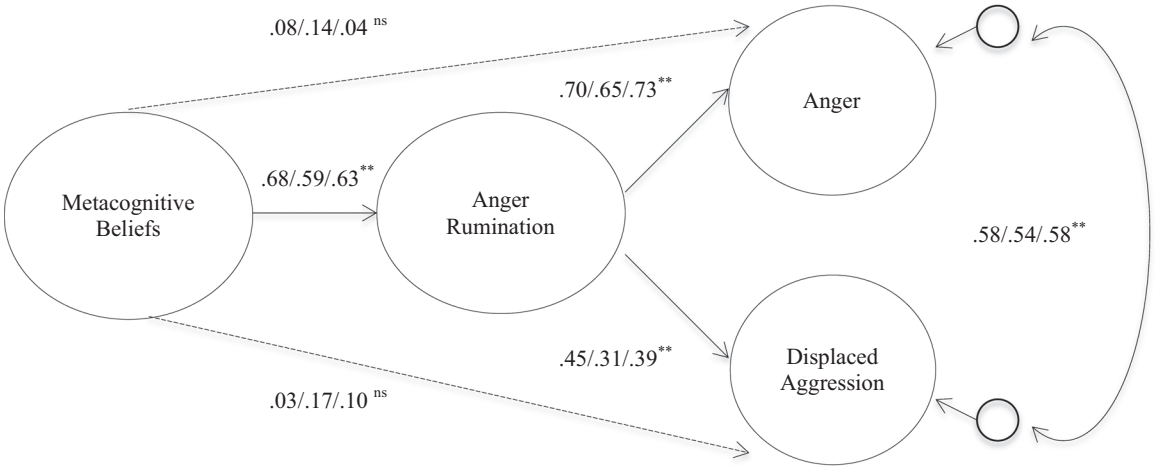


FIGURE 1 Model of relationships between metacognitive beliefs, angry rumination, anger, and displaced aggression in Spanish and Australian samples, and in the total sample. Note: Standardized beta coefficients are shown. Results in Spanish sample on the left, results in Australian Sample on the medium, and results in the total sample on the right. Dashed paths represent nonsignificant relationships $^{**}p < .01$

2.2 | Instruments

Meta-cognitions questionnaire-30 (MCQ-30; Wells & Cartwright-Hatton, 2004). This measure assesses individual differences in metacognitive beliefs. 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 maladaptive metacognitive beliefs. The five subscales measure the following dimensions: (a) positive beliefs about worry (e.g., "worrying helps me cope"), (b) negative beliefs of uncontrollability and danger (e.g., "when I start worrying I cannot stop"), (c) cognitive confidence (e.g., "my memory can mislead me at times"), (d) need to control thoughts (e.g., "not being able to control my thoughts is a sign of weakness"), and (e) cognitive self-consciousness (e.g., "I pay close attention to the way my mind works"). The MCQ has been found to be a reliable measure and demonstrates good convergent and divergent validity (Wells & Cartwright-Hatton, 2004). 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 0.90 for the total MCQ score in both the Australian and Spanish samples.

The anger rumination scale (ARS; Sukhodolsky et al., 2001). This is a 19-item self-report questionnaire that has been found to reliably assess four components of anger rumination: Angry afterthoughts (e.g., "After an argument is over, I keep fighting with this person in my imagination"), thoughts of revenge (e.g., "I have day dreams and fantasies of violent nature"), angry memories (e.g., "I feel angry about certain things in my life"), and understanding of causes (e.g., "I analyze events that make me angry"). Participants rate each item on a four-point scale, ranging from 1 (almost never) to 4 (almost always). ARS scores range from 19 to 76 points, and higher scores indicate greater anger rumination. Original validation of the ARS demonstrated good reliability and validity (Sukhodolsky et al., 2001). The Spanish version of the ARS (Ramos-Cejudo et al., 2017) showed the same 4-factor structure, and also good reliability and validity. Cronbach's α in the present study were 0.93 and 0.91 for the total ARS score.

Dimensions of anger reactions-revised (DAR; Novaco, 1975). This is a 7-item scale assessing anger frequency, intensity, duration, and antagonism (4 items), and anger's perceived impairment of work performance, social relationships, and health (3 items). Respondents rated items on a 5-point Likert scale (from 0 = not at all, to 4 = very much) to indicate the degree to which each statement describes their feelings and behavior. DAR-R total score range from 0 to 28, and higher scores indicate greater anger levels. A two factor-model of DAR-R have been confirmed: anger response (e.g., "When I do get angry, I get really mad"), and anger impairment (e.g., "My anger has a bad effect on my health"). The original DAR-R is a well-established brief measure of anger (e.g., see Nederlof, Hovens, Muris, & Novaco, 2009; Nederlof, Muris & Hovens, 2011). In addition, the Australian and Spanish validation of DAR-R demonstrated good psychometric properties (Kannis-Dymand, Salguero, Ramos-Cejudo, & Novaco, 2019). In this study, Cronbach's α were 0.85 and 0.76 for the total DAR-R score in Australian and Spanish sample respectively.

Displaced aggression questionnaire (DAQ; Denson et al., 2006). This is a 31-item self-report questionnaire that assesses three dimensions of aggression across three subscales: angry rumination, revenge planning, and displaced aggression. Participants are asked to rate each item on a 7-point Likert scale, where 1 = "extremely uncharacteristic of me," and 7 = "describes me very well." The DAQ has demonstrated good validity and internal reliability, with the three subscales showing alphas ranging between 0.92 and 0.93 (Denson et al., 2006). The Spanish version of the DAQ has demonstrated good psychometric properties for all three subscales (García-Sancho et al., 2016). In this study, we only used the Displaced Aggression subscale (e.g., "I take my anger out on innocent others," "If someone made me angry I would likely vent my anger on another person"), whose score range from 10 to 70, and higher scores indicate greater tendency to engage in displaced aggression actions, that is, to aggresses against a seemingly innocent target when provoked by the original provocateur. Cronbach's α for this subscale was 0.84, in Australian sample, and 0.87, in Spanish sample.

2.3 | Overview of data analytic approach

We used IBM SPSS Statistics version 24 to compute descriptive statistics, correlation analyses, and internal consistency, and EQS 6.3 (Bentler, 1995) to compute structured equation modeling (SEM). We carried out SEM using the maximum likelihood (ML) method. Since departures from multivariate normality can have a significant impact on ML estimation, we calculated descriptive analytical measures before conducting SEM analysis. Since multivariate kurtosis statistics indicated non-normality, we used the Satorra–Bentler scaled ML correction to adjust the model χ^2 (Hu, Bentler, & Kano, 1992). According to Schweizer's recommendations (Schweizer, 2010), additional measures of model fit were used: (a) root mean square error of approximation (RMSEA); (b) the Bentler comparative fit index (CFI), and (c) 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, values of the SRMR are expected to stay below 0.10 (Schweizer, 2010).

We tested the proposed model in which metacognitive beliefs are related to anger levels and displaced aggression directly and indirectly, via de mediation effect of anger rumination. We used SEM with latent variables to control measurement error. We used the scores for each of the five subscales of the MCQ-30 as indicators for the metacognitive belief latent factor, the scores for each of the four subscales of the ARS as indicators of the anger rumination latent factor, and the scores of the two subscales of the DAR as indicator of anger latent factor. With respect to displaced aggression, we averaged the item subset of the DAQ into two parcels for create a latent factor.

3 | RESULTS

3.1 | Descriptive statistics and correlations

Descriptive statistics, reliability and zero-order correlation coefficients for all the study variables in both samples are shown in Table 1. Overall, we found a similar pattern of results in the Australian and Spanish sample, whereas the magnitude of correlations was in general higher in the Spanish sample. We found positive and significant correlations between all the variables of interest: Metacognitive beliefs, anger rumination, anger levels, and displaced aggression, indicating that people with higher levels of maladaptive metacognitive beliefs and higher anger rumination showed higher levels of anger and a higher tendency to use displaced aggression. Metacognitive beliefs and anger rumination were also positively related, showing that people with maladaptive metacognitive beliefs use anger rumination more frequently. There was a discrepant result between the samples that is of note; that is, the correlation between anger rumination and displaced aggression was significantly higher in the Spanish sample ($r = 0.62$) than in the Australian one ($r = 0.38$), $z = 4.69$, $p = < .001$. We found a similar result in the correlations between metacognitive beliefs and displaced aggression ($z = 2.37$, $p = < .01$), and in the correlations between anger levels and displaced aggression, although the results were marginally significantly in this case ($z = 1.74$, $p = .08$).

3.2 | Structural equation model

We tested the proposed model in which metacognitive beliefs are related with higher levels of anger and displaced aggression through the mediation effect of anger rumination; including all possible paths of the mediation model. The model showed the following fit indices, for the Australian sample: S-B $\chi^2 = 33.59$, $df = 55$, $p = .98$; normed χ^2 (χ^2/df) = 0.61, RMSEA $p = < .001$; CFI = 1.00; SRMR = 0.05; for the Spanish sample: S-B $\chi^2 = 10.24$, $df = 55$, $p = .99$; normed χ^2 (χ^2/df) = 0.18; RMSEA $p = < .001$; CFI = 1.00; SRMR = 0.05; and for the total sample: S-B $\chi^2 = 5.44$, $df = 55$, $p = .99$; normed χ^2 (χ^2/df) = 0.10, RMSEA $p = < .001$; CFI = 1.00; SRMR = 0.05. Globally, these indices indicate a good fit to the data for the two samples and for the total sample. As presented in Figure 1, positive and significantly relations were found between anger levels and displaced aggression. A significant direct effect of anger rumination on anger levels and displaced aggression was found, being the magnitude of this effect higher for anger levels. On the other hand, a direct and significant effect of metacognitive beliefs on anger rumination was also found. With respect to the direct effect of metacognitive beliefs on anger levels and displaced aggression, the absence of a significant direct effect indicates that anger rumination fully mediated these relationships. Finally, we examined if these effects were different across the Australian and Spanish comparing a model where slopes were allowed to differ across the two samples with a model where slope were constrained to be equal across the samples; results showed not significant differences between these two models ($\Delta\chi^2(5) = 3.77$, $p = .29$), suggesting effects were similar in both samples.

TABLE 1 Mean, standard deviation, reliability, and correlations between variables of interest in the Australian (below the line) and Spanish simple (above the line)

	1	2	3	4
1. Total MCQ	–	.56*	.40*	.45*
2. Total ARS	.49*	–	.57*	.62*
3. Total DAR	.38*	.61*	–	.62*
4. Displaced aggression	.31*	.38*	.54*	–
Australian sample				
Mean	61.10	34.08	12.82	22.87
SD	13.74	9.62	4.89	12.24
Cronbach's α	.90	.93	.85	.94
Spanish sample				
Mean	56.52	35.18	14.83	24.58
SD	13.78	9.58	4.21	11.02
Cronbach's α	.90	.91	.76	.87

Abbreviations: ARS, the anger rumination scale; DAR, dimensions of anger reactions-revised; MCQ, meta-cognitions questionnaire; *SD*, standard deviation.
*$p < .01$.

4 | DISCUSSION

The S-REF model gives rise to the possibility that metacognitive beliefs play a relevant role in explaining anger problems and aggressive behavior (Caselli et al., 2017). In this study, we aimed to evaluate the interplay between metacognitive beliefs, anger rumination, anger levels and displaced aggression. In particular, we expected, first, anger rumination will be related to higher levels of anger and displaced aggression; second, metacognitive beliefs will be related with higher levels of anger rumination, anger levels and displaced aggression; and third, anger rumination will mediate the relationships between metacognitive beliefs and both anger levels and displaced aggression.

First, correlational analysis showed that participants with higher anger rumination informed higher levels of anger and a higher tendency to use displaced aggression following a provocation. This result is consistent with previous studies that have shown anger rumination leads to higher levels of anger and different forms of aggressive behavior, included displaced aggression (Bushman et al., 2005; García-Sancho et al., 2016; 2016; Pedersen et al., 2011; Rusting & Nolen-Hoeksema, 1998).

Second, we found people with higher maladaptive metacognitive beliefs also showed higher anger rumination and anger levels. This result is consistent with the preliminary findings on the role of metacognitive beliefs in anger rumination and anger levels (Caselli et al., 2017; Moeller, 2016; Simpson & Papageorgiou, 2003), and is also consistent with a substantial literature showing metacognitive beliefs are a transdiagnostic factor in psychopathology (Sun et al., 2017) and a predictor of both maladaptive emotion regulation strategies (e.g., rumination and worry; Papageorgiou &

Wells, 2009; Thielsch et al., 2015) and emotional distress (Bailey & Wells, 2015; Ramos-Cejudo & Salguero, 2017). We also found positive associations between metacognitive beliefs and displaced aggression. No studies have examined previously the relations between metacognition and this type of aggression, and only one previous study examined the associations between positive metacognitive beliefs and aggression. Krans et al. (2014) used, first, cognitive bias modification training to induce positive metacognitive beliefs about rumination (vs. non-positive beliefs) in two samples of participants and, second, asked participants rate their predicted responses to hypothetical anger-provoking scenarios. Results showed participants in the positive beliefs condition reported similar levels of predicted aggressive responses compared with participants in the non-positive beliefs condition. Our results are contrary to Krans et al., as we found positive associations between positive metacognitive beliefs and displaced aggression in both Spanish and Australian samples. However, important differences exist between the two studies, with respect to the design and the methodology used to assess both metacognitive beliefs and aggression. On the other hand, our study extends this line of research and provides new results about the associations between other metacognitive beliefs and aggression suggesting metacognitive beliefs may be relevant in understanding problematic behavior associated with dysregulated emotions such anger.

Third, we found anger rumination fully mediated the associations between metacognitive beliefs and both anger levels and displaced aggression. This result is in line with those obtained by Caselli et al. (2017), even when we used a different sample (in our study, students and non-students from two different countries), different measures and a different design. Thus, our study confirms the findings of Caselli et al. (2017) and expands on it, showing metacognitive beliefs are related to displaced aggression, and this relationship is mediated by anger rumination.

Taken together, our results indicate the S-REF model is useful to the understanding of excessive anger and aggressive behavior. From this model, anger rumination is considered a component of the CAS (Caselli et al., 2017). When people are in an anger-induced situation, this syndrome acts by increasing and maintaining the accessibility of negative information (e.g., anger thoughts) and thus leading to higher levels of anger feelings and increasing the risk of aggressive behaviors (Denson, 2013). The activation and maintenance of the anger rumination, as a form of CAS, is dependent on metacognitive beliefs (Wells, 2009). Metacognitive beliefs guide the selection of anger rumination as a strategy to regulate anger feelings. Whereas positive beliefs about rumination can activate rumination, negative beliefs about controllability, and danger (and other beliefs like need to control thoughts) promotes its persistence increasing attentional focus on internal thoughts and reducing the effortful exerted over rumination (Wells, 2009). Thus, metacognitive beliefs lead to anger rumination, which, in turn, lead to higher anger levels and impels aggressive behavior. Cognitive factors, such as maladaptive cognitive schema, normative beliefs and aggressive scripts, are relevant to understand aggressive behavior (Anderson & Bushman, 2002; Gilbert & Daffern, 2011). These knowledge structures lead to aggression triggering negative emotional estates, appraisals that aggression is an appropriate response, and procedural knowledge for act aggressively (Gilbert et al., 2017). Metacognitive beliefs differ from these cognitive factors in that they refer specifically to stable beliefs about one's own cognitive system and cognitive coping strategies, like anger rumination. Thus, metacognitive beliefs lead to aggression activating and maintaining anger rumination. Our results are in line with this affirmation and suggest metacognitive beliefs can be considered a relevant cognitive factor to understand individual differences in aggression. Future research is warranted exploring how metacognitive beliefs relate to other cognitive factors to explain anger and aggression.

The S-REF model has been useful in explaining other emotional issues (e.g., generalized anxiety disorders or depression), and our results contribute to the previous literature indicating the S-REF model, and metacognitive beliefs specifically, are transdiagnostic factors in psychopathology (Sun et al., 2017). It also has clinical implications. Metacognitive therapy (Wells, 2009) includes novel procedures and interventions aimed to promote metacognitive mode of processing, enhance attentional resources, and modify metacognitive beliefs. This therapy is efficacious for anxiety and depression (Normann, van Emmerik, & Morina, 2014), however, it has not been tested to target anger and aggressive problems. Our results suggest that metacognitive therapy could be a beneficial intervention for these conditions but this requires further investigation.

Among the strengths of the current study are the use of a large sample from two different countries (including both students and non-students participants), the measurement of displaced aggression, and the use of a methodology that reduces the measurement error. Despite these strengths, our study has several limitations that must be considered before generalizing our findings. First, it is not possible to attribute causality because of the cross-sectional design we used. Caselli et al. (2017) found similar results to ours using a prospective design, however, they used a reduced sample composed of students. Prospective designs with large and heterogeneous samples are therefore necessary. Second, the Australian sample consisted mainly of women. Although the Spanish sample was more equilibrated with respect to gender, and similar results were found in both samples, future studies must corroborate our findings in gender-equilibrated Australian samples. Third, we used the MCQ-30 to assess metacognitive beliefs. This measure is mainly focused on worry, as a form of the CAS, and did not directly assess metacognitive beliefs about anger rumination. Future studies may benefit from the use of new measures developed to assess metacognitive anger processing (Moeller, 2016). Fourth, although we have for the first time examined the associations between metacognitive beliefs and aggressive behavior, we focused only on a specific form of aggression. Previous research has found anger rumination is associated with different forms of aggression (e.g., physical and verbal aggression; García-Sancho et al., 2016); in this line, and taking into account that the association between metacognitive beliefs and aggression in our

study was mediated by anger rumination, it is reasonable to argue metacognitive beliefs could also be related to other forms of aggression. Future research is granted to examine this hypothesis. Finally, all measures included in this study were self-reports (which are prone to social desirability bias). Future research must corroborate our results including behavioral measures of displaced aggression and using experimental aggression paradigms (e.g., Denson, Perdersen, Friese, Hahm, & Roberts, 2011).

Despite these limitations, we believe the present findings provide a step forward in the utility of the S-REF model in explaining anger and aggression by showing that metacognitive beliefs are associated with higher levels of anger and a higher tendency to use displaced aggression, and that these associations are mediated by the role of anger rumination. Metacognitive beliefs and anger rumination should be considered in comprehensive models and in psychological intervention for anger problems and aggression.

ACKNOWLEDGMENTS

This research was supported in by a USC Research Collaboration Grant.

CONFLICT OF INTERESTS

On behalf of all authors, the corresponding author states that there is no conflict of interest.

ORCID

José M. Salguero http://orcid.org/0000-0002-1036-4460
Esperanza García-Sancho http://orcid.org/0000-0002-0106-8643
Juan Ramos-Cejudo http://orcid.org/0000-0002-7518-8314
Lee Kannis-Dymand http://orcid.org/0000-0002-1882-6121

REFERENCES

Allen, A., Kannis-Dymand, L., & Katsikitis, M. (2017). Problematic internet pornography use: The role of craving, desire thinking, and metacognition. *Addictive Behaviors*, *70*, 65–71. https://doi.org/10.1016/j.addbeh.2017.02.001

Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology*, *53*, 27–51. https://doi.org/10.1146/annurev.psych.53.100901.135231

Bailey, R., & Wells, A. (2015). Metacognitive beliefs moderate the relationship between catastrophic misinterpretation and health anxiety. *Journal of Anxiety Disorders*, *34*, 8–14. https://doi.org/10.1016/j.janxdis.2015.05.005

Bentler, P. M. (1995). *EQS: Structural equations programs*. Encino, CA: Multivariate.

Bushman, B. J. (2002). Does venting anger feed or extinguish the flame? Catharsis, rumination, distraction, anger and aggressive responding. *Personality and Social Psychology Bulletin*, *28*, 724–731. https://doi.org/10.1177/0146167202289002

Bushman, B. J., Bonacci, A. M., Pedersen, W. C., Vasquez, E. A., & Miller, N. (2005). Chewing on it can chew you up: Effects of rumination on triggered displaced aggression. *Journal of Personality and Social Psychology*, *88*(6), 969–983. https://doi.org/10.1037/0022-3514.88.6.969

Caselli, G., Offredi, A., Martino, F., Varalli, D., Selby, E. A., Ruggiero, G. M., … Wells, A. (2017). Metacognitive beliefs and rumination as predictors of anger: A prospective study. *Aggressive Behavior*, *43*(5), 421–429. https://doi.org/10.1002/ab.21699

Denson, T. F. (2013). The multiple systems model of angry rumination. *Personality and Social Psychology Review*, *17*, 103–123. https://doi.org/10.1177/1088868312467086

Denson, T. F., Pedersen, W. C., Friese, M., Hahm, A., & Roberts, L. (2011). Understanding impulsive aggression: Angry rumination and reduced self-control capacity are mechanisms underlying the provocation–aggression relationship. *Personality and Social Psychology Bulletin*, *37*(6), 850–862. https://doi.org/10.1177/0146167211401420

Denson, T. F., Pedersen, W. C., & Miller, N. (2006). The displaced aggression questionnaire. *Journal of Personality and Social Psychology*, *90*, 1032–1051.

García-Sancho, E., Salguero, J. M., & Fernández-Berrocal, P. (2016). Angry rumination as a mediator of the relationship between ability emotional intelligence and various types of aggression. *Personality and Individual Differences*, *89*, 143–147. https://doi.org/10.1016/j.paid.2015.10.007

García-Sancho, E., Salguero, J. M., Vasquez, E., & Fernández-Berrocal, P. (2016). Validity and reliability of the Spanish version of the displaced aggression questionnaire. *Psicothema*, *28*(1), 96–101. https://doi.org/10.7334/psicothema2015.222

Gilbert, F., & Daffern, M. (2011). Illuminating the relationship between personality disorder and violence: Contributions of the general aggression model. *Psychology of Violence*, *1*(3), 230.

Gilbert, F., Daffern, M., & Anderson, C. A. (2017). The general aggression model and its application to violent offender assessment and treatment. In Peter Sturmey (Ed.), *The wiley handbook of violence and aggression* (pp. 1–13). New York: Wiley. https://doi.org/10.1002/9781119057574.whbva037

van der Heiden, C., Melchior, K., Muris, P., Bouwmeester, S., Bos, A. E., & van der Molen, H. T. (2010). A hierarchical model for the relationships between general and specific vulnerability factors and symptom levels of generalized anxiety disorder. *Journal of Anxiety Disorder*, *24*, 284–289. https://doi.org/10.1016/j.janxdis.2009.12.005

Hu, L., Bentler, P. M., & Kano, Y. (1992). Can test statistics in covariance structure-analysis be trusted? *Psychological Bulletin*, *112*, 351–362. https://doi.org/10.1037//0033-2909.112.2.351

Izard, C. E. (1977). *Human emotions*. New York: Plenum Press.

Kannis-Dymand, L., Salguero, J. M., Ramos-Cejudo, J., & Novaco, R. (2019). Dimensions of anger reactions-revised (DAR-R): Validation of a brief anger measure in Australia and Spain. *Journal of Clinical Psychology*, 1–16. https://doi.org/10.1002/jclp.22757

Krans, J., Moulds, M. L., Grisham, J. R., Lang, T. L., & Denson, T. (2014). Evaluating the effect of meta-cognitive beliefs about angry rumination on anger with cognitive bias modification. *Journal of Experimental Psychopathology*, *5*(3), 259–271. https://doi.org/10.5127/jep.038613

Moeller, S. B. (2016). The metacognitive anger processing (MAP) scale: Preliminary testing. *Behavioural and Cognitive Psychotherapy*, *44*, 504–509. https://doi.org/10.1017/s1352465815000272

Nederlof, A. F., Hovens, J. E., Muris, P., & Novaco, R. (2009). Psychometric evaluation of a Dutch version of the dimensions of anger reactions. *Psychological Reports*, *105*, 585–592. https://doi.org/10.2466/PR0.105.2.585-592

Nederlof, A. F., Muris, P., & Hovens, J. E. (2011). Threat/control-override symptoms and emotional reactions to positive symptoms as correlates of aggressive behavior in psychotic patients. *The Journal of Nervous and Mental Disease*, *199*, 342–347. https://doi.org/10.1097/NMD.0b013e3182175167

Normann, N., van Emmerik, A. A., & Morina, N. (2014). The efficacy of metacognitive therapy for anxiety and depression: A meta-analytic review. *Depression and Anxiety*, *31*, 402–411. https://doi.org/10.1002/da.22273

Novaco, R. W. (1975). *Dimensions of anger reactions*. Irvine, CA: University of California.

Novaco, R. W. (1976). The functions and regulation of the arousal of anger. *American Journal of Psychiatry*, *133*, 1124–1128. https://doi.org/10.1176/ajp.133.10.1124

Papageorgiou, C., & Wells, A. (2009). A prospective test of the clinical metacognitive model of rumination and depression. *International Journal of Cognitive Therapy*, *2*(2), 123–131. https://doi.org/10.1521/ijct.2009.2.2.123

Pedersen, W. C., Denson, T. F., Goss, R. J., Vasquez, E. A., Kelley, N. J., & Miller, N. (2011). The impact of rumination on aggressive thoughts, feelings, arousal, and behaviour. *British Psychological Society*, *50*, 281–301. https://doi.org/10.1348/014466610x515696

Ramos-Cejudo, J., Salguero, J. M., Kannis-Dymand, L., García-Sancho, E., & Love, S. (2017). Anger rumination in Spain and Australia: A cross-cultural comparison and validation of the anger rumination scale. *Australian Journal of Psychology*, *69*(4), 293–302. https://doi.org/10.1111/ajpy.12154

Ramos-Cejudo, J., & Salguero, J. M. (2017). Negative metacognitive beliefs moderate the influence of perceived stress and anxiety in long-term anxiety. *Psychiatry Research*, *290*, 25–29. https://doi.org/10.1016/j.psychres.2017.01.056

Ramos-Cejudo, J., Salguero, J. M., & Cano-Vindel, A. (2013). Spanish version of the meta-cognitions questionnaire 30 (MCQ-30). *Spanish Journal of Psychology*, *16*, E95. https://doi.org/10.1017/sjp.2013.95

Rusting, C. L., & Nolen-Hoeksema, S. (1998). Regulating responses to anger: Effects of rumination and distraction on angry mood. *Journal of Personality and Social Psychology*, *74*, 790–803. https://doi.org/10.1037/0022-3514.74.3.790

Salguero, J. M., Ramos-Cejudo, J., & García-Sancho, E. (2019). Metacognitive beliefs and emotional dysregulation have a specific contribution on worry and the emotional symptoms of generalized anxiety disorder. *International Journal of Cognitive Therapy*. https://doi.org/10.1007/s41811-019-00048-4

Sassaroli, S., Centorame, F., Caselli, G., Favaretto, E., Fiore, F., Gallucci, M., & Rapee, R. M. (2015). Anxiety control and metacognitive beliefs mediate the relationship between inflated responsibility and obsessive-compulsive symptoms. *Psychiatry Research*, *228*(3), 560–564. https://doi.org/10.1016/j.psychres.2015.05.053

Schweizer, K. (2010). Some guidelines concerning the modeling of traits and abilities in test construction. *European Journal of Psychological Assessment*, *26*, 1–2. https://doi.org/10.1027/1015-5759/a000001

Simpson, C., & Papageorgiou, C. (2003). Metacognitive beliefs about rumination in anger. *Cognitive and behavioral practice*, *10*, 91–94. https://doi.org/10.1016/s1077-7229(03)80012-3

Spada, M. M., Mohiyeddini, C., & Wells, A. (2008). Measuring metacognitions associated with emotional distress: Factor structure and predictive validity of the metacognitions questionnaire 30. *Personality and Individdual Differerences*, *45*(3), 238–242. https://doi.org/10.1016/j.paid.2008.04.005

Sukhodolsky, D. G., Golub, A., & Cromwell, E. N. (2001). Development and validation of the anger rumination scale. *Personality and Individual Differences*, *31*, 689–700. https://doi.org/10.1016/s0191-8869(00)00171-9

Sun, X., Zhu, C., & So, S. H. W. (2017). Dysfunctional metacognition across psychopathologies: A meta-analytic review. *European Psychiatry*, *45*, 139–153. https://doi.org/10.1016/j.eurpsy.2017.05.029

Thielsch, C., Andor, T., & Ehring, T. (2015). Metacognitions, intolerance of uncertainty and worry: An investigation in adolescents. *Personality and Individual Differences*, *74*, 94–98. https://doi.org/10.1016/j.paid.2014.10.004

Weber, F., & Exner, C. (2013). Metacognitive beliefs and rumination: A longitudinal study. *Cognitive Therapy and Research*, *37*(6), 1257–1261. https://doi.org/10.1007/s10608-013-9555-y

Wells, A. (2000). *Emotional disorders and metacognition: Innovative cognitive therapy*. Chichester, UK: Wiley.

Wells, A. (2009). *Metacognitive therapy for anxiety and depression*. London, UK: Guildford Press.

Wells, A. (2010). Metacognitive theory and therapy for worry and generalized anxiety disorder: Review and status. *Journal of Experimental Psychopathology*, *1*(1), 133–145. https://doi.org/10.5127/jep.007910

Wells, A., & Cartwright-Hatton, S. (2004). A short form of the metacognitions questionnaire: Properties of the MCQ-30. *Behavior, Research & Therapy*, *42*, 385–396. https://doi.org/10.1016/S0005-7967(03)00147-5

Wells, A., & Matthews, G. (1994). *Attention and emotion: A clinical perspective*. Hove, UK: Erlbaum.

How to cite this article: Salguero JM, García-Sancho E, Ramos-Cejudo J, Kannis-Dymand L. Individual differences in anger and displaced aggression: The role of metacognitive beliefs and anger rumination. *Aggressive Behavior*. 2020;46:162–169. https://doi.org/10.1002/ab.21878