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Anger rumination in Australia and Spain: Validation of the Anger Rumination Scale

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Abstract

Objective: Rumination has been empirically supported in the experience of anger. The Anger Rumination Scale (ARS) was developed to assess ruminative processes in anger. The aim of this study was to evaluate the psychometric properties of the ARS in Australia and Spain. **Method:** A large non-clinical sample (N = 1,752) completed a battery including the ARS and measures of trait anger, anger expression and control, aggression, emotional symptoms, and emotion regulation strategies, to determine the factor structure, validity, and reliability of the ARS. Variations between the two cultural samples were also analysed. **Results:** Confirmatory factor analysis verified the four-factor structure of Angry Memories, Thoughts of Revenge, Angry Afterthoughts, and Understanding of Causes in both samples. Findings established good psychometric properties, evidence of convergent and discriminant validity, and associations in the expected direction with related variables. Males in both samples endorsed Thoughts of Revenge significantly higher. Spanish participants scored higher on Angry Memories and Understanding of Causes. **Conclusions:** The ARS is a valid measure of anger rumination in Australian and Spanish populations. Further, gender and cultural variations may influence the tendency to engage in anger rumination.

Key words: Anger Rumination Scale (ARS), Australian validation, Spanish validation

What is already known about this topic

- Anger rumination contributes to negative affect and the experience and expression of anger.
- The Anger Rumination Scale (ARS) measures anger rumination across four domains.
- The ARS has received limited psychometric examination in Australia and Spain.

What this topic adds

- The ARS demonstrated good psychometric properties in an Australian sample.
- The Spanish language version of the ARS developed in this study, exhibited good psychometric properties in a larger sample with extended psychometric evaluation than in previous research.
- The ARS is a valid measure that may inform clinical practice and research in Australia and Spain.

INTRODUCTION

Rumination is a form of thinking style concerned with responding to distress by repetitively focusing on stressors, how they may have been caused, and what possible consequences may arise (Nolen-Hoeksema, 1991). This coping style or emotion regulation strategy (Gross, 2002) leads to maldaptive problem solving because rumination causes individuals to be fixated on a problem and their emotional responses, and maintains the negative emotional response over time (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008).

Rumination has been associated with several mental maladjustment outcomes such as depression, anxiety (Nolen-Hoeksema et al., 2008; Papageorgiou & Wells, 2004), and trauma reactions (Kubota, Nixon, & Chen, 2015). More recently, research has investigated a particular type of rumination: anger rumination (Sukhodolsky, Golub, & Cromwell, 2001). People engage in anger rumination when they are focused on anger-inducing memories,

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re-experiencing anger responses, and when they brood over thoughts of revenge (Caprara, 1986; Denson, Pedersen, & Miller, 2006; Sukhodolsky et al., 2001). Anger rumination may occur in response to provocation to situations related to personal conflict or a social injustice (Rusting & Nolen-Hoeksema, 1998; Sukhodolsky et al., 2001).

Studies have found that anger rumination increases and maintains negative affect and impairs social adjustment through a 'feeding the flame' based cycle (Bushman, 2002; Rusting & Nolen-Hoeksema, 1998). Anger rumination has demonstrated a predictive role in higher levels of aggression in correlational (Anestis, Anestis, Selby, & Joiner, 2009; García-Sancho, Salguero, Vasquez, & Fernández-Berrocal, 2016; Verona, 2005; White & Turner, 2014), as well as experimental studies (Bushman, 2002; Bushman, Baumeister, & Phillips, 2001; Bushman, Bonacci, Pedersen, Vasquez, & Miller, 2005; Denson, Pedersen, Friese, Hahm, & Roberts, 2011; Pedersen et al., 2011). Anger rumination predicts hostility (Anestis et al., 2009), anger experiences (Denson et al., 2006), and high levels of arousal (Pedersen et al., 2011). Regarding social disadjustment, anger rumination may reduce the ability to control anger and even displace it through an aggressive behaviour towards innocent people who were not involved in the provocation situation that triggered the anger (Besharat & Pourbohlool, 2013; García-Sancho et al., 2016). In clinical samples such as borderline personality disorder, anger rumination has been understood as a cognitive vulnerability factor (Abela, Payne, & Moussaly, 2003; Martino et al., 2015; Sauer-Zavala & Baer, 2012; Sauer-Zavala, Geiger, & Baer, 2013) increasing negative emotions, predicting aggression, and promoting dyscontrolled behaviours. Thus, anger rumination is a relevant variable to understand individual differences in anger responses, aggression, and social adjustment.

Literature highlights the Anger Rumination Scale (ARS; Sukhodolsky et al., 2001) as a useful measure to assess anger rumination from a multidimensional approach. It conceptualises anger rumination through four factors: Anger Afterthoughts, Thoughts of Revenge, Angry Memories, and Understanding of Causes. In its initial North American validation, the ARS displayed adequate internal reliability with subscale alpha coefficients ranging from .72 to .86, a total alpha of .93, and a good 1-month test-retest reliability (α = .77) (Sukhodolsky et al., 2001). Its validity was also confirmed through associations found with other key variables, such as anger, emotional abilities, and negative affect.

Given the vast cultural differences in anger responses and emotion regulation styles (Kim & Zane, 2004; Mesquita & Walker, 2003), an important step is to determine whether this measure is appropriate for different populations, as well as to examine the existence of differences between them. Currently, adapted versions of the ARS exist in France (Reynes, Berthouze-Aranda, Guilet-Descas, Chabaud, & Deflandre, 2013), Turkey (Satici, 2014), Farsi (Besharat, 2011), Britian and Hong Kong (Maxwell, Sukhodolsky, Chow, & Wong, 2005), and more recently, in Spain (Uceda, Bleda, Nieto, & Sukhodolsky, 2016), which have demonstrated good psychometric properties and fit to the original four-factor structure. With respect to cultural differences, the few studies that have examined this issue have shown the existence of significant differences, for example, Hong Kong Chinese participants reported higher levels of anger rumination when compared with British participants (Maxwell et al., 2005).

However, the ARS has not been validated in an Australian sample, and although a recent Spanish adaptation demonstrated encouraging properties (Uceda et al., 2016), the sample size was limited (n = 388) and test-retest reliability was not conducted. Therefore, this study aimed to validate the ARS in an Australian sample and develop and validate a Spanish language version of the ARS in Spain with a larger sample, including test-retest reliability in both populations. Furthermore, psychometric properties of the ARS and its relationships with associated variables were evaluated. In this sense, in addition to those variables reported in previous studies (trait anger, anger control and expression, emotional symptoms, and aggression) we examined convergent validity analysing the associations between ARS and another measure of anger rumination, and also examined the associations between ARS and (adaptive and maladaptive) cognitive emotion regulation strategies. Finally, gender and cultural differences among the Australian and Spanish participants were analysed, in order to examine if the use of anger rumination may be influenced by such factors.

METHOD

Participants

Participants (N = 1,752) were recruited from Australia and Spain (see Fig. 1). One subset (1) was evaluated in anger rumination and cognitive emotion regulation strategies. A second subset (2) was evaluated in aggression, anxiety, and depression. A third subset (3) was evaluated in trait anger. For the whole sample, test-retest was composed of participants from subsets 1, 2, and 3. In the Australian sample, subsets 2 and 3 were completed by the same participants.

Instruments

The Anger Rumination Scale (Sukhodolsky et al., 2001), is a 19-item self-report questionnaire that has been found to reliably factorise among four components of anger rumination: Angry Afterthoughts (e.g., After an argument is over, I keep fighting with this person in my imagination; α = .86),

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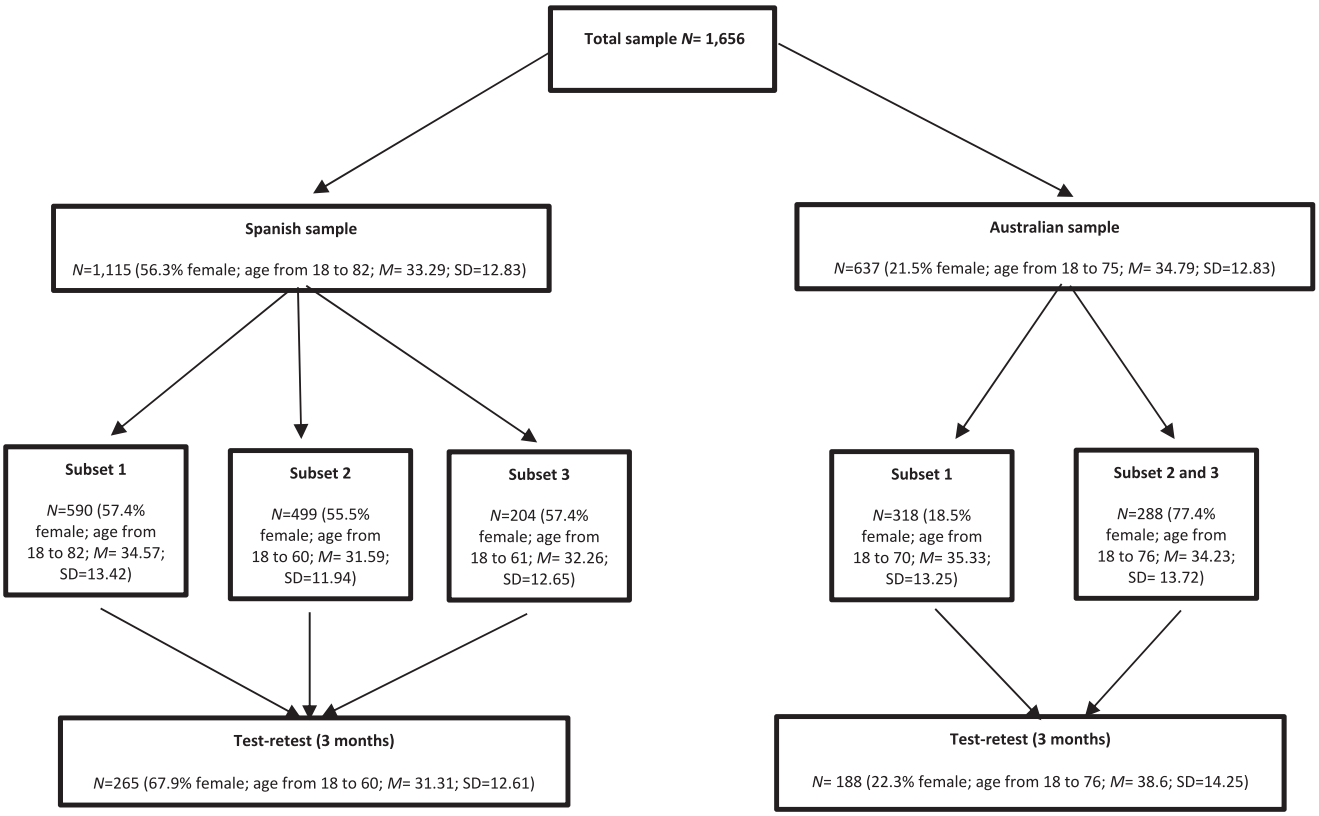


Figure 1 Flowchart of Spanish and Australian sample.

Thoughts of Revenge (e.g., I have day dreams and fantasies of violent nature; $\alpha = .72$), Angry Memories (e.g., I feel angry about certain things in my life; $\alpha = .85$), and Understanding of Causes (e.g., I analyse events that make me angry; $\alpha = .77$). Participants rate each item on a four-point scale, ranging from 1 (almost never) to 4 (almost always). Original validation of the ARS demonstrated good reliability and validity ($\alpha = .93$). Psychometric properties of the scale are presented in the results section.

The Spanish translation was created using a well-established method (World Health Organization, 2016) and following the recommendations in this field (Maneesriwongul & Dixon, 2004): (1) forward translation, (2) expert panel back-translation, (3) pre-testing and cognitive interviewing, and (4) final version, involving two independent translators (a native Spanish speaker and a native English speaker), both of whom were psychologists with expertise in negative affect and cognitive processes.

Cognitive Emotion Regulation Questionnaire—Short (CERQ-S; Garnefski & Kraaij, 2006) consists of 18 items based on the original version (Garnefski & Kraaij, 2007) with nine distinct regulation styles: Self-Blame, Blaming Others, Rumination, Catastrophizing, Putting into Perspective, Positive Refocusing, Positive Reappraisal, Acceptance, and Planning. Items are rated on a scale ranging from 1 'almost never' to 5 'almost always'. The CERQ-S has demonstrated good internal consistencies across all subscales, ranging from .78 to .90 (Garnefski & Kraaij, 2006); including its Spanish adaptation (Holgado-Tello, Amor, Lasa-Aristu, & Domínguez-Sánchez, 2013).

Displaced Aggression Questionnaire (DAQ; Denson et al., 2006) 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 .92 and .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 our study we used the three subscales' scores, however, because the Angry Rumination and Revenge Planning subscales are composed by some items from ARS, we therefore eliminated these items for the analysis and only used the items which did not originate from ARS.

The Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001). This is a nine-item instrument for screening the severity of depression, which incorporates

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DSM-IV depression diagnostic criteria, and includes items rated on a 4-point scale, relating to how frequently they have experienced such problems over the past 2 weeks (0 = 'not at all', 3 = 'nearly every day'). The PHQ-9 has demonstrated strong psychometric properties (Kroenke et al., 2001). The Spanish version of PHQ-9 (Diez-Quevedo, Rangil, Sánchez-Planell, Kroenke, & Spitzer, 2001) has demonstrated psychometric properties comparable to the original English version.

Generalized Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006) is a seven-item instrument, consisting of statements which participants rate on a 4-point scale (0 = 'not at all sure', 3 = 'nearly every day'). The internal consistency of the GAD-7 is strong (α = .92) and test-retest reliability is good (r = .83; Spitzer et al., 2006). In the Spanish version (García-Campayo et al., 2010), the reliability was .94 and validity of its content and the relevance and adequacy of items were confirmed.

The State-Trait Anger Expression Inventory-2 (STAXI-2; Spielberger, 1999) is a widely used 57-item questionnaire, split among three factors: Trait Anger, State Anger, and Anger Expression and Control. Items are rated on a 4-point scale from 1 'completely disagree' to 4 'completely agree'. The STAXI-2 has been well-validated and demonstrated good internal reliability (α = .84–.86; Spielberger, 1999). The Spanish version of STAXI-2 (49 items) (Miguel-Tobal, Casado, Cano-Vindel, & Spielberger, 2001) has shown adequate psychometric properties with internal consistency coefficients for the scales ranging from .69 to .89. In this study, only the Trait Anger, and Anger Expression and Control scales were used.

The Aggression Questionnaire (AQ; Buss & Perry, 1992) is a 29-item self-report questionnaire that measures trait aggression on a 5-point scale, ranging from 1 'extremely uncharacteristic' to 5 'extremely characteristic'. The AQ has four subscales: Physical Aggression, Verbal Aggression, Anger, and Hostility. In this study we only used the physical and verbal subscales scores. The internal consistency is appropriate, with subscales' coefficients ranging from .72 to .85 (Buss & Perry, 1992). In the Spanish context, Andreu, Peña, and Graña (2002) reported values ranging from .68 to .86.

Procedure

This study is part of a larger project validating brief measures of anger in Spain and Australia. In both populations, a method of convenience was used to obtain the sample consisting of student and non-student participants. Enrolled students were invited to participate through announcements and emails from by the researchers. Non-student respondents were recruited using a snowball-sampling technique. Participants were invited to take part in a study to research 'the accuracy and utility of brief emotion measures'. Participation was voluntary and anonymous. Participants were offered to the opportunity win one of three shopping vouchers in each country ($40.00 in Australia, and €40.00 in Spain). The questionnaires were administered individually and electronically; instructions given in writing and participants were asked to provide consent and affirm they met the following inclusion criteria: (1) they would complete an anonymous online survey, (2) they were aged 18 years or older, and (3) live in Australia or Spain. Ethical approval for the study was granted by the ethics' committees of the respective universities.

RESULTS

The SPSS statistical package was used to compute descriptive statistics, correlation analyses, internal consistency, and analyses of variance. Normality and homogeneity of variances was tested using Kolmogorov–Smirnov and Levene's test. EQS 6.1 (Bentler, 1995) was used to compute confirmatory factor analysis (CFA). CFAs were carried out using the maximum likelihood (ML) method. Since departures from multivariate normality can have a significant impact on ML estimation, we calculated descriptive analytical measures prior to conducting each CFA analysis. Multivariate kurtosis statistics were found to indicate non-normality in both samples (above the cut-off point of 5.00), so the Satorra-Bentler scaled ML correction was used to adjust the model chi-square (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) standardised 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).

Confirmatory factor analysis

In order to replicate the original four-factor structure of the ARS in both Australian and Spanish samples, two different confirmatory factor analyses were performed.

The four-factor model provided a good fit to the data in the Australian sample: S-Bχ^2 (df = 146) = 489.48, p < .001; RMSEA = 0.06 (90% CI = 0.06–0.07); CFI = 0.91; SRMR = 0.05. With respect to the Spanish sample, evidence for model fit varied by index: S-Bχ^2 (df = 146) = 767.62, p < .001; RMSEA = 0.06 (90% CI = 0.06–0.07); CFI = 0.89; SRMR = 0.05. CFI <.90 represents an inacceptable model fit, whereas an RMSEA value <.08 and an SRMR value <.10 indicate an acceptable model fit. In line with Uceda et al. (2016), errors of the items 11 and 12 were allowed to

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correlate. Consequently, the model showed an adequate fit to the data: S-Bχ^2 (df = 145) = 700.84, $p < .001$; RMSEA = 0.06 (90% CI = 0.05–0.06); CFI = 0.90; SRMR = 0.05; the correlation between errors was .30 ($p < .05$). The Satorra-Bentler scaled chi-square difference test (Satorra & Bentler, 2001) showed that the incorporation of the covariance between errors 11 and 12 made a substantial improvement in model fit (ΔS-B $\chi^2(1) = 73.80$, $p < .001$). In sum, the CFAs replicated the original four-factor structure of the ARS in each sample. Table 1 shows the standardised factor solutions.

The correlations between the four factors of the ARS in the Australian and Spanish samples are displayed in Table 2. All subscales were positively and significantly correlated, with higher correlations found between Angry Afterthoughts with Angry Memories (r = .73 in the Australian sample, r = .69 in the Spanish sample) and Understanding of Causes (r = .73 in the Australian sample, r = .62 in the Spanish sample), and lower correlations found between Thoughts of Revenge and Understanding of Causes (r = .48 in the Australian sample, r = .39 in the Spanish sample).

Internal consistency of the ARS

Descriptive statistics and Cronbach's alpha coefficients for the ARS are displayed in Table 2, whereas Tables 3 and 4 display the results for the other measures. Cronbach's alpha coefficients for the four subscales ranged between .70 and .87 in the Australian sample, and between .69 and .83 in

Table 1 ARS items and their confirmatory factor loadings for the Australian and Spanish sample

N° Item	Item of the ARS	Standardised factor loadings
'Angry Afterthoughts'		
19	I re-enact the anger episode in my mind after it has happened	.81
	Recreo el episodio de enfado en mi mente una vez que ha pasado	.78
18	When something makes me angry, I turn this matter over and over again in my mind	.83
	Cuando algo me enfada, le doy vueltas en la cabeza una y otra vez	.75
17	Memories of even minor annoyances bother me for a while	.67
	Incluso recuerdos de pequeñas irritaciones me molestan durante un tiempo	.62
9	Whenever I experience anger, I keep thinking about it for a while	.75
	Cuando siento ira, sigo pensando en ello durante un tiempo.	.72
7	After an argument is over, I keep fighting with this person in my imagination	.69
	Cuando la discusión se ha terminado, sigo peleándome con esa persona en mi imaginación	.61
8	Memories of being aggravated pop up into my mind before I fall asleep	.64
	Antes de dormirme, me vienen a la cabeza recuerdos de situaciones en los que he sido molestado/a	.56
'Thoughts of Revenge'		
4	I have long living fantasies of revenge after the conflict is over	.83
	Una vez terminado un conflicto, tengo fantasías de venganza durante mucho tiempo	.74
15	When someone makes me angry I can't stop thinking about how to get back at this person	.75
	Cuando alguien me enfada, no puedo parar de pensar en cómo devolvérsela	.67
13	I have dreams and fantasies of violent nature	.47
	Tengo fantasías y ensoñaciones de naturaleza violenta	.51
6	I have difficulty forgiving people who have hurt me	.51
	Me resulta difícil perdonar a personas que me han hecho daño	.53
'Angry Memories'		
2	I ponder about the injustices that I have been done to me	.75
	Reflexiono sobre las injusticias que me han hecho	.64
3	I keep thinking about events that angered me for a long time	.84
	Sigo pensando sobre hechos que me enfadaron durante mucho tiempo	.78
14	I feel angry about certain things in my life	.66
	Me enfado sobre determinados aspectos de mi vida	.49
1	I ruminate about my past anger experiences	.73
	Le doy vueltas a mis experiencias pasadas de enfado	.67
5	I think about certain events from a long time ago and they still make me angry	.77
	Pienso sobre determinados sucesos que me ocurrieron hace mucho tiempo y todavía me siguen enfadando	.72
'Understanding of Causes'		
12	I think about the reasons people treat me badly	.58
	Pienso acerca de las razones por las que la gente me trata mal	.57
16	When someone provokes me, I keep wondering why this should have happened to me	.61
	Cuando alguien me provoca, sigo preguntándome por qué tuvo que pasarme a mí.	.60
11	I analyse events that make me angry	.64
	Analizo los sucesos que me enfadan	.45
10	I have had times when I could not stop being preoccupied with a particular conflict	.75
	Hay ocasiones en las que no puedo parar de preocuparme sobre un determinado conflicto	.65

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Table 2 Mean, standard deviation, reliability, and correlations between the ARS subscales in Australian and Spanish samples

	Australian sample				Spanish sample			
	1	2	3	4	1	2	3	4
1. Angry Afterthoughts	—	.60	.73	.73	—	.60	.69	.62
2. Thoughts of Revenge		—	.58	.48		—	.54	.39
3. Angry Memories			—	.69			—	.61
4. Understanding of Causes				—				—
M(*SD*) in total sample	1.82(.63)	1.48(.50)	1.8(.62)	2.01(.63)	1.81(.59)	1.49(.51)	2.02(.59)	2.15(.61)
M(*SD*) in male/female	1.86(.65)/ 1.80(.63)	1.58(.55)/ 1.45(.47)	1.89(.61)/ 1.77(.63)	2.09(.66)/ 2.0(.63)	1.80(.61)/ 1.83(.59)	1.56(.57)/ 1.44(.45)	2.05(.61)/ 2.01(.58)	2.11(.61)/ 2.19(.61)
Cronbach's α	.87	.70	.86	.75	.83	.69	.79	.69

Note. All correlations were significant at $p < .001$.

Table 3 Correlations between the ARS subscales and other related variables in Australian sample

	N	M(*SD*)	α	Angry Afterthoughts (ARS)	Thoughts of Revenge (ARS)	Angry Memories (ARS)	Understanding of Causes (ARS)
Trait Anger (STAXI-2)	288	3.47(1.10)	.86	.48**	.44**	.51**	.38**
Anger Expression-Out (STAXI-2)	288	1.79(0.49)	.77	.37**	.41**	.42**	.34**
Anger Expression-In (STAXI-2)	288	2.25(.58)	.80	.54**	.48**	.60**	.53**
Anger Control-Out (STAXI-2)	288	3.03(.59)	.82	−.24**	−.24**	−.22**	−.13*
Anger Control-In (STAXI-2)	288	2.95(.63)	.88	−.27**	−.30**	−.19**	−.10
Physical Aggression (AQ)	288	2.07(1.03)	.83	.26**	.38**	.31**	.22**
Verbal Aggression (AQ)	288	2.74(1.19)	.82	.25**	.35**	.29**	.26**
Anxiety Symptoms (GAD-7)	288	.89(.81)	.93	.49**	.38**	.54**	.50**
Depressive Symptoms (PHQ)	288	.77(.73)	.92	.50**	.40**	.60**	.51**
Angry Rumination (DAQ)	318	3.04(1.47)	.86	.74**	.53**	.72**	.59**
Displaced Aggression (DAQ)	318	2.29(1.21)	.94	.35**	.32**	.32**	.30**
Revenge Planning (DAQ)	318	1.91(1.09)	.92	.49**	.72**	.47**	.42**
Self-Blame (CERQ-S)	318	2.41(0.94)	.76	.27**	.08	.27**	.27**
Acceptance (CERQ-S)	318	3.39(1.02)	.78	−.06	−.13*	−.08	−.02
Rumination (CERQ-S)	318	2.97(1.02)	.68	.50**	.17**	.42**	.41**
Positive Refocusing (CERQ-S)	318	2.41(1.01)	.80	−.14*	.01	−.10	−.08
Planning (CERQ-S)	318	3.43(1.01)	.72	−.02	−.17**	−.07	−.07
Positive Reappraisal (CERQ-S)	318	3.62(1.01)	.75	−.03	−.06	−.09	.06
Putting into Perspective (CERQ-S)	318	3.32(1.11)	.82	−.13*	−.12*	−.19**	−.04
Catastrophizing (CERQ-S)	318	2.09(.99)	.86	.52**	.42**	.55**	.42**
Blaming Others (CERQ-S)	318	2.08(.79)	.77	.32**	.45**	.37**	.49**

Note. Correlations with angry rumination and revenge planning without duplicated items from ARS are shown. ARS = *The Anger Rumination Scale* (Sukhodolsky et al., 2001); STAXI-2 = *The State-Trait Anger Expression Inventory-2* (Spielberger, 1999); AQ = *The Aggression Questionnaire* (Buss & Perry, 1992); GAD-7 = *Generalized Anxiety Disorder-7* (Spitzer et al., 2006); PHQ = *The Patient Health Questionnaire-9* (Kroenke et al., 2001); DAQ = *Displaced Aggression Questionnaire* (Denson et al., 2006); CERQ-S = *Cognitive Emotion Regulation Questionnaire—Short* (Garnefski & Kraaij, 2006).

*$p < .05$.

**$p < .01$.

the Spanish sample (see Table 2). In order to assess the test-retest reliability, correlation analyses were conducted. Test-retest reliability over 3 months was (Spanish and Australian sample) $r_{tt} = .70$ and $r_{tt} = .62$ for Angry Afterthoughts; $r_{tt} = .65$ and $r_{tt} = .73$ for Angry Memories; $r_{tt} = .66$ and $r_{tt} = .66$ for Thoughts of Revenge; and $r_{tt} = .58$ and $r_{tt} = .55$ for Understanding of Causes.

Gender differences

Gender differences were not found for Angry Afterthoughts and Angry Memories in both the Australian and Spanish samples: Angry Afterthoughts $t(1, 635) = .91$; $p = .36$; $d = .07$ and $t(1, 1{,}113) = -1.08$; $p = .28$; $d = .06$; Angry Memories $t(1, 635) = 1.88$; $p = .06$; $d = .15$ and $t(1, 1{,}113) = .73$; $p = .47$; $d = .03$ for the Australian and Spanish participants respectively. Males scored significantly higher than females on Thoughts of Revenge for the Australian ($t(1, 635) = 2.81$; $p = .005$; $d = .22$) and Spanish ($t(1, 1{,}113) = 4.1$; $p = .001$; $d = .25$) samples. Regarding Understanding of Causes, gender differences were not found for Australia participants ($t(1, 635) = 1.51$; $p = .13$; $d = .12$), but females were found to score significantly higher in the Spanish sample ($t(1, 1{,}113) = -2.05$; $p = .04$;

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Table 4 Correlations between the ARS subscales and other related variables in Spanish sample

Related variable	*N*	M(*SD*)	α	Angry Afterthoughts (ARS)	Thoughts of Revenge (ARS)	Angry Memories (ARS)	Understanding of Causes (ARS)
Trait Anger (STAXI-2)	204	1.9(.47)	.82	.37**	.34**	.37**	.26**
Anger Expression-Out (STAXI-2)	204	1.81(.48)	.69	.39**	.43**	.25**	.25**
Anger Expression-In (STAXI-2)	204	2.14(.58)	.70	.25**	.25**	.17*	.15*
Anger Control-Out (STAXI-2)	204	2.98(.76)	.91	−.28**	−.26**	−.18**	−.15*
Anger Control-In (STAXI-2)	204	2.34(.70)	.83	−.21**	−.23**	−.19**	−.12
Physical Aggression (AQ)	499	.2(.94)	.82	.37**	.48**	.35**	.21**
Verbal Aggression (AQ)	499	2.68(1.22)	.82	.39**	.40**	.37**	.35**
Anxiety Symptoms (GAD-7)	499	.73(.55)	.85	.35**	.32**	.47**	.36**
Depressive Symptoms (PHQ)	499	.84(.67)	.88	.42**	.36**	.47**	.39**
Angry Rumination (DAQ)	590	2.23(1.07)	.70	.59**	.55**	.51**	.41**
Displaced Aggression (DAQ)	590	2.45(1.11)	.87	.59**	.48**	.54**	.48**
Revenge Planning (DAQ)	590	2.35(1.05)	.82	.67**	.65**	.53**	.48**
Self-Blame (CERQ-S)	590	2.39(.92)	.70	.19**	.11*	.22**	.26**
Acceptance (CERQ-S)	590	3.55(1.06)	.81	−.07	−.09*	−.07	−.01
Rumination (CERQ-S)	590	3.18(1.05)	.69	.36**	.16**	.36**	.47**
Positive Refocusing (CERQ-S)	590	3.78(1.05)	.80	−.14**	−.04	−.07	−.04
Planning (CERQ-S)	590	3.46(1.01)	.72	−.04	−.03	.02	.16**
Positive Reappraisal (CERQ-S)	590	3.78(1.04)	.74	−.07	−.07	−.03	.07
Putting into Perspective (CERQ-S)	590	3.22(1.06)	.68	−0.1	−.03	.01	.07
Catastrophizing (CERQ-S)	590	2.15(1.01)	.77	.53**	.29**	.50**	.48**
Blaming Others (CERQ-S)	590	1.89(.79)	.79	.37**	.34**	.31**	.30**

Note. Correlations with angry rumination and revenge planning without duplicated items from ARS are shown. ARS = *The Anger Rumination Scale* (Sukhodolsky et al., 2001); STAXI-2 = *The State-Trait Anger Expression Inventory-2* (Spielberger, 1999); AQ = *The Aggression Questionnaire* (Buss & Perry, 1992); GAD-7 = *Generalized Anxiety Disorder-7* (Spitzer et al., 2006); PHQ = *The Patient Health Questionnaire-9* (Kroenke et al., 2001); DAQ = *Displaced Aggression Questionnaire* (Denson et al., 2006); CERQ-S = *Cognitive Emotion Regulation Questionnaire—Short* (Garnefski & Kraaij, 2006).

*$p < .05$.

**$p < .01$.

$d = .11$). According to the criteria of Cohen (1977), the effect size of these differences was small.

Convergent and discriminant validity

We assessed the convergent and discriminant validity of the ARS by analysing Pearson bivariate correlations between the ARS and related constructs in the Spanish and the Australian samples (Tables 3 and 4). The four factors of the ARS correlated in the expected direction with DAQ subscales and the Rumination subscale of CERQ-S. The highest magnitude correlations were found for Angry Rumination and Planning Revenge in both samples (correlations ranging between .48 and .67 and between .42 and .74 for the Spanish and the Australian sample respectively). The four factors of the ARS showed higher magnitude correlations with Angry Rumination (DAQ) than general Rumination (CERQ-S) except with Understanding Causes in the Spanish sample, where the CERQ-S subscales demonstrated a differential pattern of association with the factors of ARS. As expected, a pattern of positive correlations were found between the four factors of the ARS and different maladaptive strategies (e.g., Catastrophizing, Blaming Others, and Self-Blame), in both samples. No significant associations were found between the four factors of the ARS and the adaptive regulation strategies (Tables 3 and 4).

Regarding associations with other variables, a pattern of positive and significant correlations were found between the four factors of ARS and Trait Anger, Anger Expression, Physical and Verbal Aggression, and anxiety and depressive symptoms, in both samples. Anger Control-Out showed negative correlations with all factors. Anger Control-In was negatively associated with all factors except with Understanding of Causes (see Tables 3 and 4) in both samples.

Cross-cultural comparisons

A multivariate analysis of covariance was conducted (MANCOVA) with the ARS subscales as dependent variables, the samples (Spanish and Australian) as independent variables, and age and gender as covariates. Mean and standard deviation values for both the Spanish and Australian samples are reported in Table 2. The results obtained in the MANCOVA showed a significant effect for the samples, Wilk's lambda (1, 1,745) = 28.44, $p < .001$. The univariate tests showed that Spanish participants reported higher levels of Angry Memories, F (1, 1,748) = 43.77, $p < .001$, $d = .29$, and Understanding of Causes, F(1, 1,748) = 18.32, $p < .001$, $d = .22$ and the effect

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size of these differences was low to moderate. No differences were found for Angry Afterthoughts, $F(1, 1{,}748) = 0.2$, $p > .05$, $d = -0.01$ or Thoughts of Revenge, $F(1, 1{,}748) = 1.04$, $p > .05$, $d = .02$.

DISCUSSION

This study assessed the validity and reliability of the ARS in a large Australian and Spanish sample; including a Spanish language adaption. We examined associations among the ARS' four factors and other variables not previously investigated, including angry rumination using an independent measure (DAQ), as well as, adaptive and maladaptive cognitive emotion regulation strategies. Gender differences and variations between the two samples were also explored.

First, the data confirmed the hypothesised four-factor structure for the ARS in both countries. This factor structure is similar to that found not only in the original ARS (Sukhodolsky et al., 2001) but also in the versions adapted to other populations (Besharat, 2011; Maxwell et al., 2005; Reynes et al., 2013; Satici, 2014; Uceda et al., 2016). Our results found similar Cronbach alpha coefficients for the subscales to those reported for the original version (Sukhodolsky et al., 2001). Regarding test-retest reliability, results demonstrated that scores were stable over a 3-month period, in comparison with the 1-month test-retest period utilised in previous studies (Besharat, 2011; Sukhodolsky et al., 2001); reinforcing the stability of the scale over time. However, in line with other studies (Besharat, 2011; Uceda et al., 2016), we found the subscale Understanding of Causes showed lowest test-retest reliability.

Second, significant associations between the ARS and theoretically related variables were found in both samples. Anger rumination was related with higher levels of Anger In and Out, aggression, anxiety and depression; conversely, negative correlations were found with the Anger Control subscales. These results corroborate that anger rumination is associated with negative mood, lack of control, and aggression, as demonstrated in previous studies (Nolen-Hoeksema et al., 2008; Papageorgiou & Wells, 2004; Sukhodolsky et al., 2001; Verona, 2005; White & Turner, 2014). As expected, the four factors of the ARS correlated higher with Angry Rumination and Planning Revenge. These results have been corroborated in previous studies (García-Sancho et al., 2016) providing robutness to the construct of angry rumination and suggesting it is a particular cognitive mechanism to process and manage anger. Indeed, the four factors of the ARS demonstrated higher magnitude correlations with the DAQ's Angry Rumination than general Rumination (CERQ-S), which may explain anger rumination as a specific component of general rumination, involving focusing on anger-inducing memories, re-experiencing anger responses, and revenge related thoughts (Denson et al., 2006; Sukhodolsky et al., 2001), as found recently by Peled and Moretti (2010).

As expected, the ARS showed a differential pattern of association with cognitive-emotional regulation strategies. A pattern of positive correlations was found between the four factors of the ARS and maladaptive cognitive emotion regulation strategies (e.g., Catastrophizing, Blaming Others, and Self-Blame) in both samples. Conversely, there were no significant associations between the four factors of the ARS and adaptive emotion regulation strategies (e.g., Acceptance, Positive Refocusing, Planning, Positive Reappraisal, and Putting into Perspective). As previously demonstrated, cognitive processes such as rumination and appraisals shape and enhance anger experiences within our memories (Denson, 2013) and such maladaptive cognitive emotion regulation strategies could explain clinical issues associated with a lack of social adjustment. However, positive emotion regulation strategies such as Acceptance, Refocusing, and Reappraisal, are related with wellness and psychological adjustment (Garnefski, Kraaij, & Spinhoven, 2002; Gross & John, 2003).

Third, significant gender differences with low effect sizes were found, in which males showed higher scores than females in Thoughts of Revenge in both samples. These results are consistent with previous studies (Besharat, 2011; Maxwell et al., 2005; Sukhodolsky et al., 2001; Uceda et al., 2016), wherein males scored higher than females on Thoughts of Revenge. These results demonstrate that men ruminate more frequently on Thoughts of Revenge than women. These differences are consistent with historic reports of higher trait anger and more frequent expression of anger in males when compared with females (see Maxwell et al., 2005).

Finally, comparisons between the Australian and Spanish participants in our study indicated engagement in anger rumination may be influenced by cultural factors; that is, the Australian and Spanish samples displayed a different correlational pattern. Spanish participants reported higher levels on Angry Memories and Understanding Causes than Australian participants, displaying low-moderate effect sizes. These cultural variations are similar to Maxwell et al.'s (2005) findings, in which Chinese participants reported higher levels of anger rumination across all domains of the ARS in comparison to a British sample. In particular, among Australian people, the relationship between Angry Afterthoughts and Angry Rumination was higher than the relationship between Angry Afterthoughts and Revenge Planning. However, among Spanish people the pattern was inverse; the relationship between Angry Afterthoughts and Angry Rumination was lower than the relationship between Angry Afterthoughts and Revenge Planning. Thus, our results showed cultural differences in how anger is

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managed. Further, some dimensions of the ARS (e.g., Understanding of Causes) may be more socially acceptable in some cultures than in others. For example, studies have shown cultural differences in the justification of the types of physical and verbal aggression that are expressed (Fujihara, Kohyama, Andreu, & Ramirez, 1999). Careful consideration of the meaning of the translated scale minimised the possibility of differing intensity interpretations, suggesting that the differing scores in the present study reflect cultural differences either in anger rumination or the willingness to report it. However, our study is exploratory and further research would explore these cultural differences.

Taken together, these results support the idea that anger rumination is a specific rumination style in anger events (Sukhodolsky et al., 2001) and a maladaptive emotion regulation strategy (Gross, 1998). It is related with negative affective conditions, such as anxiety and depression. It is also related with other dysfunctional emotion regulation strategies that could be maintaining negative affect and posterior aggressive behaviour (Anestis et al., 2009; Bushman, 2002; Denson, 2013; García-Sancho et al., 2016).

However, some limitations need to be considered in terms of the generalisability of our results. We did not use a clinical sample making it impossible to explore the utility of the ARS for differentiating among those with or without marked emotional issues. Similarly, the sensitivity of the ARS to the effects of treatment could not be explored, which should be evaluated in future research. Results with Revenge Planning and Angry Rumination scales (DAQ) should be taken with caution. We used a modified version of these subscales because some items belong originally to the ARS. However, the characteristics of this modified version (e.g., factorial structure) may differ from the original scale. Lastly, our data on the relationships between the ARS and related variables are only correlational. Therefore, longitudinal studies are needed to confirm the predictive value of the ARS.

Despite these limitations, our study provides evidence of the validity and reliability of the ARS in Australia and an adapted Spanish version in Spain, as well as, providing new data from a larger sample to the previous Spanish validation with test-retest reliability, and cultural and gender variations. These results contribute to the previous research establishing that the ARS is a brief instrument for assessing a range of ruminative processes involved in anger experience.

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