



# Ruminating in English, Ruminating in Spanish

## Psychometric Evaluation and Validation of the Ruminative Thought Style Questionnaire in Spain, Argentina, and USA

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**Abstract:** The present study aimed to adapt and validate a Spanish version of the Ruminative Thought Style Questionnaire (RTSQ) and test for measurement invariance of the RTSQ across college students in the US, Spain, and Argentina ( $n = 1,632$ ). Additionally, we examined/compared across these countries, criterion-related (i.e., concurrent) validity of RTSQ factors (i.e., problem-focused thoughts, counterfactual thinking, repetitive thoughts, and anticipatory thoughts) on constructs theoretically-associated with rumination. Consistent with previous findings, we found that a 15-item 4-factor RTSQ provided a more adequate model compared to single-factor CFA models (15- and 20-item versions) in every country. The reliability and validity of the subscales for the Spanish version were satisfactory-to-good in Spain and Argentina. Using multigroup confirmatory factor analyses, we found the 15-item 4-factor version of the RTSQ to be invariant across countries and sex. Bivariate correlations provided evidence for the criterion-related validity of the 4-factor RTSQ across the countries. Our findings suggest that self-report items of the RTSQ convey the same meaning, and that responses to those items load onto the same set of factors, across languages and cultures of administration. Taken together, our findings serve as a foundation for future cross-cultural work testing models in which rumination is a central facet.

**Keywords:** cross-cultural, college students, measurement invariance, psychometrics, rumination, sex differences

Clinically, rumination has been shown to be a robust risk factor for psychopathology (e.g., depression, anxiety, substance use; see Nolen-Hoeksema, Wisco, & Lyubormisky, 2008 for a review). Among rumination measures, the Response Styles Questionnaire (Nolen-Hoeksema, 1991) and the Ruminative Responses Scale (Treyner, Gonzalez, & Nolen-Hoeksema, 2003) are the most commonly used with translations in many languages including Spanish (Extremera & Fernández-Berrocal, 2006). However, one critique of these measures is that participant responses' may be confounded by depressive symptoms (Brinker & Dozois, 2009; Treyner et al., 2003). Drawing from this limitation, Brinker and Dozois (2009) created the 20-item Ruminative Thought Style Questionnaire (RTSQ), which assesses participants' overall tendency toward ruminative thinking (self-reported) and does not focus on disorder-specific content. Although an initial examination suggested a single factor structure (Brinker & Dozois, 2009), recent

factor analytic work (Tanner, Voon, Hasking, & Martin, 2013) suggests that the RTSQ assesses four distinct subcomponents of rumination: problem-focused thoughts (i.e., consistent thinking of causes, consequences, and symptoms of negative affect), counterfactual thinking (i.e., thinking about alternative outcomes/reality), repetitive thoughts (i.e., persistent reflection on negative affect), and anticipatory thoughts (i.e., future-orientated rumination). Recently, Helmig, Meyer, and Bader (2016) created a German version of the RTSQ and also found that the 4-subscale model (15 items; with the same four factors found by Tanner et al., 2013) fit better than a 1-factor model (20 items) in both a community and clinical sample.

Using the same four factors found by Tanner et al. (2013), several recent studies have shown that these facets of rumination are differentially associated with psychological outcomes including typical weekly alcohol use and 30-day alcohol-related negative consequences

(problem-focused thoughts was the strongest predictor of alcohol outcomes; Bravo, Pearson, & Henson, 2017), non-suicidal self-injury (only problem-focused thoughts was significantly associated with non-suicidal self-injury; Voon, Hasking, & Martin, 2014), depressive symptoms (only anticipatory thoughts and repetitive thoughts moderated the relationship between post-traumatic stress disorder [PTSD] and depressive symptoms; Roley et al., 2015), and PTSD (counterfactual thinking was positively associated with PTSD symptom clusters of the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition [DSM-5]*; Mitchell, Contractor, Dranger, & Shea, 2016).

Given that these rumination facets may be an important target for intervention, we aimed to adapt and validate a Spanish version of the RTSQ across two distinct Spanish-speaking countries (Spain and Argentina). Further, recent studies have demonstrated cross-cultural differences on rumination (e.g., differences between Northern European countries and Southern/Eastern European Countries; Potthoff et al., 2016); thus we tested for measurement invariance of the RTSQ in the US, Spain, and Argentina, and tested for mean differences across these countries. In addition, we explored and compared the concurrent validity of the measure across these countries with constructs known to be associated with rumination, such as depressive symptoms (Nolen-Hoeksema et al., 2008) and broad personality traits. In examining the association between personality traits and rumination, recent studies have shown that rumination response styles mediate the associations between neuroticism and depressive symptoms (Muris, Roelofs, Rassin, Franken, & Mayer, 2005; Roelofs, Huibers, Peeters, Arntz, & van Os, 2008). Furthermore, individual differences in behavioral dysregulation, or impulsivity,<sup>1</sup> have also been connected to rumination, especially the urgency facet (d'Acromont & Van der Linden, 2007; Selby, Anestis, & Joiner, 2008). Given the extensive research indicating significant sex differences in rumination (i.e., women ruminate more than men; see Johnson & Whisman, 2013 for a meta-analysis), we conducted additional measurement invariance testing across sex.

## Method

### Participants and Procedure

Participants were college students recruited from four universities across the US (two universities), Argentina, and Spain to participate in an online survey regarding

personal mental health, personality traits, and alcohol use behaviors. Although 1,864 students were recruited across sites, for the present study only data from students that completed the RTSQ ( $n = 1,632$ ) were included in the final analysis from each sample (US sites combined,  $n = 924$ ; Argentina,  $n = 403$ , Spain,  $n = 305$ ). Across the countries, the majority of participants were female ( $n = 1,085$ ; 66.5%) and reported a mean age of 21.94 ( $SD = 5.51$ ) years (see Table A1 for demographic breakdown across countries). College students from the southeastern US site ( $n = 700$ ) received research credit for completing the study (i.e., extra credit for courses at the participating university) whereas students at the southwestern US site ( $n = 224$ ) did not receive any compensation for their participation. In Argentina, all the students who completed the survey took part in a raffle of four cash prizes (each of  $\approx$  US\$ 36) and other items. In Spain, three checks of  $\text{€}100$  each to exchange for office materials (i.e., photocopies, pens, folders) were raffled among the participants. The study was approved by the institutional review boards (or their international equivalent) at the participating universities.

### Measurement Translation

Four psychologists, proficient in English and Spanish, and with expertise in test adaptation, translated the original English version (RTSQ; Brinker & Dozois, 2009) to Spanish. Then, two members of the research team compared the versions (i.e., adjusted the items to be equivalent in Spain and Argentina), and after a thorough discussion, composed a preliminary version of the instrument. Finally, an English language teacher unfamiliar with the inventories conducted a back translation. The analysis of the back translation indicated the Spanish version of the RTSQ could be considered comparable to the original scales.

### Measures

Across all sites, students completed the same battery of measures online using *Qualtrics* software. For all measures except the RTSQ, composite scores were created by averaging or summing items and reverse-coding items when appropriate such that higher scores indicate higher levels of the construct. Descriptive statistics and reliability coefficients for these composite measures are shown in Table A1.

<sup>1</sup> Impulsivity is a multifaceted personality construct that may lead to behavioral dysregulation and disinhibition through distinct processes. There are different taxonomic models of impulsivity/disinhibition, however, one of the most useful and accepted comprises the facets of urgency (positive and negative), (lack of) perseverance, (lack of) premeditation, and sensation seeking (Lynam, Smith, Whiteside, & Cyders, 2006).

## Rumination

Rumination was assessed using the 20-item *RTSQ* (Brinker & Dozois, 2009), measured on a 7-point response scale (1 = *Not at all*, 7 = *Very Well*). The participants were provided with instructions stating, "For each of the items below, please rate how well the item describes you." Tanner et al. (2013) found that the four rumination subcomponents had good to excellent reliability: *Problem-Focused Thoughts* (5 items,  $\alpha = .89$ ), *Counterfactual Thinking* (4 items,  $\alpha = .87$ ), *Repetitive Thoughts* (4 items,  $\alpha = .89$ ), and *Anticipatory Thoughts* (2 items,  $\alpha = .71$ ).

## Big Five Personality Traits

Personality traits were assessed using the 50-item *Big Five Personality Trait Short Questionnaire* (BFPTSQ; Morizot, 2014) at the US sites and the Spanish version (Ortet, Martínez, Mezquita, Morizot, & Ibáñez, 2017) at the sites in Spain and Argentina. The measure assesses five specific personality traits on a 5-point response scale (1 = *Disagree strongly*, 5 = *Agree strongly*): *Openness*, *Extraversion*, *Agreeableness*, *Conscientiousness*, and *Emotional Stability*.

## Impulsivity-Like Traits

Impulsivity-like traits were assessed using the 59-item *UPPS-P Impulsive Behavior Scale* (Lynam, Smith, Whiteside, & Cyders, 2006) at the US sites and the 59-item Spanish version (Pilatti, Lozano, & Cyders, 2015; Verdejo-García, Lozano, Moya, Alcázar, & Pérez-García, 2010) at the sites in Spain and Argentina. The measure assesses five specific impulsivity-like traits on a 4-point response scale (1 = *Disagree strongly*, 4 = *Agree strongly*): *Positive Urgency*, *Negative Urgency*, *Premeditation*, *Perseverance*, and *Sensation Seeking*.

## Depressive Symptoms

Depressive symptoms were assessed using the 20-item *Center for Epidemiological Studies Depression* (CESD; Radloff, 1977) at the US sites and the 20-item Spanish version (Masten, Caldwell-Colbert, Alcalá, & Mijares, 1986; Perczek, Carver, Price, & Pozo-Kaderman, 2000) at the Spain and Argentina sites. Items were measured on a 4-point response scale (0 = *Not at all or Less than 1 day*, 1 = *1-2 Days*, 2 = *3-4 Days*, 3 = *5-7 Days*, 3 = *Nearly every day for 2 weeks*).

## Statistical Analysis

First, we conducted confirmatory factor analyses with maximum likelihood estimation with robust standard errors (MLR) of the *RTSQ* at the Argentina and Spain sites separately using *Mplus 7.4* (Muthén & Muthén, 1998-2015), in order to examine the internal structure of the Spanish version of the questionnaire and to compare the adequacy of a single factor of rumination (both 20-item and 15-item

versions; Brinker & Dozois, 2009) with a 15-item 4-factor model based on subscales proposed by Tanner et al. (2013). To evaluate overall model fit, we used model fit criteria suggested by Marsh, Hau, and Wen (2004) including the Comparative Fit Index (CFI)  $> .90$  (acceptable)  $> .95$  (optimal), Tucker-Lewis Index (TLI)  $> .90$  (acceptable)  $> .95$  (optimal), Root Mean Square Error of Approximation (RMSEA)  $< .06$ , and Standardized Root Mean Square Residual (SRMR)  $< .08$ . We tested for differences in the CFAs using  $\chi^2$  difference test using the Santorra-Bentler scaling correction (Satorra, 2000; Satorra & Bentler, 2001). We further calculated Cronbach's  $\alpha$  to test the internal consistency of the measure across sites.

Upon deciding on the best fitting model, we conducted multigroup confirmatory factor analyses (MG-CFA) using *Mplus 7.4* with MLR to determine the factorial invariance of the questionnaire across participants in different countries (i.e., US, Argentina, and Spain). Given that some research has shown that a diagonally weighted least squares (WLSMV) estimator might be a better estimator for questionnaire data (i.e., ordinal data; Lubke & Muthén, 2004; Li, 2015), we also conducted our analyses using WLSMV as an estimator to corroborate our findings.

For our MG-CFAs, we tested three levels of measurement invariance: configural (test whether items load on the proposed factors), metric (test whether item-factor loadings are equal across groups), and scalar (test whether the unstandardized item thresholds are equal across groups). If all three of the measurement levels are shown to be invariant (based on model fit criteria described below), then we can confidently compare rumination mean scores across countries. Given that the  $\chi^2$  test statistic is sensitive to sample size (Brown, 2015), we used model comparison criteria of  $\Delta CFI/\Delta TFI \geq .01$  (Cheung & Rensvold, 2002) and  $\Delta RMSEA \geq .015$  (Chen, 2007) to indicate significant decrement in fit when testing for measurement invariance. Finally, criterion-related validity (i.e., concurrent validity [when the test and the criterion-related measure are administered at the same time]) of the measure was assessed examining the correlation between the rumination subscales and theoretically-associated constructs: Big Five personality traits, impulsivity-like traits, and depressive symptoms. Specifically, criterion-related validity refers to the relationship between the test's scores with other theoretically relevant constructs (International Test Commission, 2015).

## Results

### Spanish Adaptation CFAs

In both Argentina and Spain, the 15-item 4-factor CFA model provided an acceptable fit to the data, whereas the

**Table 1.** Model fit comparisons of a 20-item 1-factor RTSQ and 15-item 1-factor RTSQ versus the 15-item 4-factor RTSQ across countries using MLR

	Overall fit indices						Model comparison	Comparative fit indices				
	$\chi^2$	df	CFI	TLI	RMSEA	SRMR		$\Delta\chi^2$	$\Delta df$	$\Delta CFI$	$\Delta TLI$	$\Delta RMSEA$
Argentina												
1. 20-item 1-factor	1,048.59	170	.729	.697	.113 (.107, .120)	.077	1 vs. 3	769.28***	86	-.192	-.204	.039
2. 15-item 1-factor	756.22	90	.718	.672	.136 (.127, .145)	.086						
3. 15-item 4-factor	271.65	84	.921	.901	.074 (.065, .084)	.061	2 vs. 3	358.13***	6	-.203	-.229	.062
Spain												
1. 20-item 1-factor	775.45	170	.753	.724	.108 (.100, .116)	.076	1 vs. 3	559.72***	86	-.207	-.224	.045
2. 15-item 1-factor	554.40	90	.749	.707	.130 (.120, .141)	.086						
3. 15-item 4-factor	201.49	84	.936	.921	.068 (.056, .080)	.054	2 vs. 3	241.74***	6	-.187	-.214	.062
United States												
1. 20-item 1-factor	2,799.25	170	.729	.697	.129 (.125, .134)	.085	1 vs. 3	2,400.86***	86	-.239	-.263	.075
2. 15-item 1-factor	2,089.96	90	.718	.671	.155 (.149, .161)	.103						
3. 15-item 4-factor	308.30	84	.968	.960	.054 (.047, .060)	.044	2 vs. 3	1,018.49***	6	-.250	-.289	.101

Notes. Along with a  $\chi^2$  difference test using the Santorra-Bentler scaling correction (Satorra, 2000; Satorra & Bentler, 2001), we relied on the model comparison criteria of  $\Delta RMSEA \leq .015$  (increase indicates worse fit; Chen, 2007) and  $\Delta CFI/\Delta TFI \leq .01$  (decrease indicates worse fit; Cheung & Rensvold, 2002) to compare the adequacy of a single factor of rumination (both 20-item and 15-item versions; Brinker & Dozois, 2009) with a 15-item 4-factor model based on subscales proposed by Tanner et al. (2013). \*\*\* $p < .001$ .

single-factor CFA models (15- and 20-item versions) provided an extremely poor fit to the data (see Table 1). Chi-square difference tests (as well as changes in CFI/TFI/RMSEA across models) indicated that the 4-subscale model is a more adequate model of the Spanish RTSQ for both Argentina and Spain participants (also found among the US sample; see Table 1). These findings were also corroborated when examining WLSMV as an estimator (see Table A2). Within the 4-factor model, the standardized loadings of the indicator variables on their hypothesized factors were all salient (i.e.,  $\geq .30$ ; Brown, 2015) for both Argentina and Spain subsamples. Problem-focused thoughts ( $\alpha = .84$ , Argentina;  $\alpha = .86$ , Spain), counterfactual thinking ( $\alpha = .81$ , Argentina;  $\alpha = .80$ , Spain), and repetitive thoughts ( $\alpha = .88$ , Argentina;  $\alpha = .89$ , Spain) had good reliability; anticipatory thoughts ( $\alpha = .59$ , Argentina;  $\alpha = .60$ , Spain) showed acceptable reliability (Loewenthal, 2001). See Appendix for the items by subscale of the Spanish version of the RTSQ.

## Measurement Invariance and Latent Mean Comparisons

Based on the results above, a 4-factor CFA was tested for measurement invariance across the three countries and sex. Analyses using both MLR (see Table 2) and WLSMV (see Table A3) as estimators revealed that the 4-factor CFA was invariant across both country and sex, such that the configural, metric, and scalar models had acceptable-to-excellent fit and did not significantly differ from each

other based on changes in CFI/TLI/RMSEA (the one exception was the comparison between the metric and scalar invariance models across countries using MLR showed significant differences based on changes in CFI [ $\Delta CFI = -.012$ ]). However, changes in TFI ( $\Delta TFI = -.008$ ) and RMSEA ( $\Delta RMSEA = .004$ ) indicated support for scalar invariance and the model comparisons using WLSMV also indicated scalar invariance; thus we concluded that the 4-factor CFA was invariant across countries. See Table A4 for descriptive statistics of the 15 items of the RTSQ in the total sample.

To test for latent factor score mean differences by country, we first set the US group's latent mean in the full scalar invariant model to zero and allowed the Argentina and Spain groups' latent mean to be freely estimated. To examine the latent mean difference between Argentina and Spain we followed a similar approach but now the Argentina group's latent mean was constrained to zero and the Spain and US groups' latent means were allowed to be freely estimated. A statistically significant result indicates a significant mean difference in the latent factor between the reference group and the predictor group.

Using the US as the reference group, we found that Argentine participants reported slightly lower scores on problem-focused thoughts ( $M_{\text{difference}} = -0.25$ ,  $p = .001$ ), counterfactual thinking ( $M_{\text{difference}} = -0.21$ ,  $p = .020$ ), and repetitive thoughts ( $M_{\text{difference}} = -0.19$ ,  $p = .023$ ), but did not significantly differ with US participants on anticipatory thoughts ( $M_{\text{difference}} = -0.13$ ,  $p = .178$ ). Spanish participants reported slightly lower scores on counterfactual thinking ( $M_{\text{difference}} = -0.22$ ,  $p = .025$ )

**Table 2.** Measurement invariance testing results of the 15-item 4-factor RTSQ across countries and sex using MLR

	Overall fit indices						Model comparison	Comparative fit indices				
	$\chi^2$	<i>df</i>	CFI	TLI	RMSEA	SRMR		$\Delta\chi^2$	$\Delta df$	$\Delta CFI$	$\Delta TLI$	$\Delta RMSEA$
Across countries												
1. Configural	787.22	252	.955	.943	.062 (.058, .067)	.051						
2. Metric	839.33	274	.952	.945	.062 (.057, .066)	.055	1 vs. 2	47.44**	22	-.003	.002	.000
3. Scalar	999.66	296	.940	.937	.066 (.062, .071)	.061	2 vs. 3	181.04***	22	-.012	-.008	.004
Across sex												
1. Configural	707.60	168	.951	.939	.063 (.058, .068)	.049						
2. Metric	729.64	179	.950	.942	.062 (.057, .066)	.050	1 vs. 2	13.38	11	-.001	.003	-.001
3. Scalar	763.19	190	.948	.943	.061 (.056, .066)	.051	2 vs. 3	30.56**	11	-.002	.001	-.001

Notes. Along with a  $\chi^2$  difference test using the Santorra-Bentler scaling correction (Satorra, 2000; Satorra & Bentler, 2001), we used comparison criteria of  $\Delta RMSEA \leq .015$  (increase indicates worse fit; Chen, 2007) and  $\Delta CFI/\Delta TFI \leq .01$  (decrease indicates worse fit; Cheung & Rensvold, 2002) to test for measurement invariance. \*\* $p < .01$ ; \*\*\* $p < .001$ .

and repetitive thoughts ( $M_{\text{difference}} = -0.41, p < .001$ ), but did not significantly differ with US participants on problem-focused thoughts ( $M_{\text{difference}} = -0.15, p = .074$ ) or anticipatory thoughts ( $M_{\text{difference}} = -0.19, p = .841$ ). Using Argentina as the reference group, we found that Spanish participants reported slightly lower repetitive thinking ( $M_{\text{difference}} = -0.22, p = .048$ ), but did not significantly differ with Argentine participants on problem-focused thoughts ( $M_{\text{difference}} = 0.10, p = .263$ ), counterfactual thinking ( $M_{\text{difference}} = -0.00, p = .981$ ), or anticipatory thoughts ( $M_{\text{difference}} = 0.11, p = .323$ ). Independent of country, women reported significantly higher scores on all four factors than men: problem-focused thoughts ( $M_{\text{difference}} = 0.27, p < .001$ ), counterfactual thinking ( $M_{\text{difference}} = 0.19, p = .017$ ), repetitive thinking ( $M_{\text{difference}} = 0.40, p < .001$ ), and anticipatory thoughts ( $M_{\text{difference}} = 0.35, p < .001$ ).

### Criterion-Related Validity

Bivariate correlations of the 4-latent RTSQ factors and study variables are summarized in Table 3. Across all three countries, all four rumination facets tended to be significantly positively associated with negative urgency, positive urgency, and depressive symptoms ( $p < .01$ ). All four rumination facets tended to be significantly negatively associated with Big Five personality traits (openness had mixed results) and perseverance. Correlations with premeditation and sensation seeking were largely nonsignificant. Further, we used the Fisher  $r$ -to- $z$  transformation (Fisher, 1915) to test the statistical significance (Bonferroni correction:  $p < .00034$ ) of differences in correlation coefficients between countries (see Table 3). For the most part, the strength of the correlations did not differ across countries (only five significant differences). Although each of the rumination factors was significantly correlated with each other, results still revealed different associations with

theoretical-related constructs (see Table 3). Taken together, there is strong support for the criterion-related validity of the 4-factor RTSQ across multiple countries.

### Discussion

The present study sought to adapt a Spanish version of the RTSQ, examine measurement invariance across college students in the US, Spain, and Argentina, and examine the criterion-related validity of a 4-facet operationalization of rumination. Consistent with previous research (Helmig et al., 2016; Tanner et al., 2013), we found that the 4-subscale model fit better than a 1-factor model (both the 20-item and 15-item version) and the reliability and validity of the subscales were satisfactory-to-good across all three countries. The 15-item 4-factor measure was also found to be scalar invariant across countries and sex; thus, we were able to examine mean differences across these different subpopulations.

Among 12 possible mean differences across countries, we found six significant mean differences: Spanish participants had lower endorsement of repetitive thinking than both US and Argentine participants and lower endorsement of counterfactual thinking compared to US participants. Argentine participants had lower endorsement of problem-focused thoughts, counterfactual thinking, and repetitive thoughts than US participants. Although these differences were statistically significant, they were rather small and warrant further study to determine if they reflect true cultural differences. Consistent with previous work (Johnson & Whisman, 2013), we found that women reported higher scores on all four facets of rumination. Our measurement invariance testing suggests that the RTSQ captures four facets of rumination similarly across male and female college students in the US, Spain, and Argentina.

**Table 3.** Correlations between the four latent rumination factors and composite scores of study variables across countries

	Problem-focused thoughts			Counterfactual thinking			Repetitive thoughts			Anticipatory thoughts		
	US	Arg	Sp	US	Arg	Sp	US	Arg	Sp	US	Arg	Sp
Problem-focused thoughts	–	–	–									
Counterfactual thinking	<b>.55</b>	<b>.57</b>	<b>.60</b>	–	–	–						
Repetitive thoughts	<b>.57</b>	<b>.63</b>	<b>.71</b>	<b>.77</b>	<b>.56</b>	<b>.60</b>	–	–	–			
Anticipatory thoughts	<b>.71</b>	<b>.74</b>	<b>.64</b>	<b>.72</b>	<b>.71</b>	<b>.68</b>	<b>.70</b>	<b>.69</b>	<b>.63</b>	–	–	–
Premeditation	–.06 <sub>a</sub>	–.02 <sub>a</sub>	.01 <sub>a</sub>	<b>.21<sub>a</sub></b>	.13 <sub>a</sub>	.06 <sub>a</sub>	<b>.20<sub>a</sub></b>	.13 <sub>a</sub>	.12 <sub>a</sub>	.07 <sub>a</sub>	–.01 <sub>a</sub>	.06 <sub>a</sub>
Perseverance	– <b>.33<sub>a</sub></b>	– <b>.34<sub>a</sub></b>	– <b>.27<sub>a</sub></b>	–.00 <sub>a</sub>	–.15 <sub>ab</sub>	–.25 <sub>b</sub>	.02 <sub>a</sub>	–.12 <sub>a</sub>	–.10 <sub>a</sub>	–.17 <sub>a</sub>	–.31 <sub>a</sub>	–.23 <sub>a</sub>
Sensation seeking	–.07 <sub>a</sub>	–.03 <sub>a</sub>	–.02 <sub>a</sub>	.00 <sub>a</sub>	.03 <sub>a</sub>	.03 <sub>a</sub>	.01 <sub>a</sub>	–.00 <sub>a</sub>	.06 <sub>a</sub>	.08 <sub>a</sub>	.07 <sub>a</sub>	.15 <sub>a</sub>
Positive urgency	<b>.34<sub>a</sub></b>	<b>.36<sub>a</sub></b>	<b>.34<sub>a</sub></b>	.06 <sub>a</sub>	<b>.26<sub>a</sub></b>	<b>.27<sub>a</sub></b>	.02 <sub>a</sub>	<b>.17<sub>a</sub></b>	<b>.20<sub>a</sub></b>	<b>.20<sub>a</sub></b>	<b>.32<sub>a</sub></b>	<b>.31<sub>a</sub></b>
Negative urgency	<b>.47<sub>a</sub></b>	<b>.46<sub>a</sub></b>	<b>.47<sub>a</sub></b>	<b>.22<sub>a</sub></b>	<b>.32<sub>a</sub></b>	<b>.35<sub>a</sub></b>	<b>.25<sub>a</sub></b>	<b>.35<sub>a</sub></b>	<b>.38<sub>a</sub></b>	<b>.36<sub>a</sub></b>	<b>.45<sub>a</sub></b>	<b>.44<sub>a</sub></b>
Openness	–.07 <sub>a</sub>	–.10 <sub>ab</sub>	–.30 <sub>b</sub>	<b>.17<sub>a</sub></b>	<b>.15<sub>a</sub></b>	–.05 <sub>a</sub>	<b>.23<sub>a</sub></b>	.05 <sub>ab</sub>	–.04 <sub>b</sub>	<b>.17<sub>a</sub></b>	.14 <sub>a</sub>	.02 <sub>a</sub>
Extraversion	–.21 <sub>a</sub>	–.33 <sub>a</sub>	–.31 <sub>a</sub>	–.08 <sub>a</sub>	–.16 <sub>a</sub>	–.29 <sub>a</sub>	–.04 <sub>a</sub>	–.17 <sub>a</sub>	–.16 <sub>a</sub>	–.06 <sub>a</sub>	–.24 <sub>ab</sub>	–.31 <sub>b</sub>
Agreeableness	–.19 <sub>a</sub>	–.18 <sub>a</sub>	–.27 <sub>a</sub>	–.03 <sub>a</sub>	–.08 <sub>ab</sub>	–.33 <sub>b</sub>	–.02 <sub>a</sub>	–.04 <sub>a</sub>	–.20 <sub>a</sub>	–.07 <sub>a</sub>	–.21 <sub>ab</sub>	–.39 <sub>b</sub>
Conscientiousness	–.37 <sub>a</sub>	–.31 <sub>a</sub>	–.24 <sub>a</sub>	–.07 <sub>a</sub>	–.21 <sub>a</sub>	–.21 <sub>a</sub>	–.05 <sub>a</sub>	–.11 <sub>a</sub>	–.11 <sub>a</sub>	–.26 <sub>a</sub>	–.38 <sub>a</sub>	–.34 <sub>a</sub>
Emotional stability	–.56 <sub>a</sub>	–.55 <sub>a</sub>	–.60 <sub>a</sub>	–.39 <sub>a</sub>	–.34 <sub>a</sub>	–.47 <sub>a</sub>	–.47 <sub>a</sub>	–.53 <sub>a</sub>	–.62 <sub>a</sub>	–.45 <sub>a</sub>	–.46 <sub>a</sub>	–.52 <sub>a</sub>
Depressive symptoms	<b>.58<sub>a</sub></b>	<b>.59<sub>a</sub></b>	<b>.45<sub>a</sub></b>	<b>.31<sub>a</sub></b>	<b>.39<sub>a</sub></b>	<b>.42<sub>a</sub></b>	<b>.36<sub>a</sub></b>	<b>.48<sub>a</sub></b>	<b>.44<sub>a</sub></b>	<b>.38<sub>a</sub></b>	<b>.50<sub>a</sub></b>	<b>.44<sub>a</sub></b>
Sex	<b>.11<sub>a</sub></b>	.12 <sub>a</sub>	.03 <sub>a</sub>	<b>.10<sub>a</sub></b>	.03 <sub>a</sub>	–.03 <sub>a</sub>	<b>.12<sub>a</sub></b>	<b>.18<sub>a</sub></b>	.11 <sub>a</sub>	<b>.12<sub>a</sub></b>	.15 <sub>a</sub>	.07 <sub>a</sub>

Notes. US = United States ( $n = 924$ ); Arg = Argentina ( $n = 403$ ), Sp = Spain ( $n = 305$ ). Sex was coded  $-.5 = \text{male}$ ,  $.5 = \text{female}$ . Significant correlations ( $p < .01$ ) are in bold typeface for emphasis. Values across subscales sharing a subscript in a row indicate correlations that are not significantly different from each other based on Fisher  $r$ -to- $z$  transformations (Bonferroni correction:  $p < .00034$ ).

Across 144 possible correlation differences (4 RTSQ Facets  $\times$  3 Countries  $\times$  12 Criterion), we found 5 statistically significant differences ( $\sim 3.5\%$  of comparisons after  $\alpha$  corrections). We did not discern a parsimonious explanation for these differences as they do not follow a consistent pattern. Specifically, we found: (1) problem-focused thoughts was more strongly correlated (negative association) with openness in Spain ( $r = -.30$ ) compared to the US ( $r = -.07$ ), (2) counterfactual thinking was more strongly correlated (negative association) with perseverance in Spain ( $r = -.25$ ) compared to the US ( $r = -.00$ ), (3) counterfactual thinking was more strongly correlated (negative association) with agreeableness in Spain ( $r = -.33$ ) compared to the US ( $r = -.03$ ), (4) repetitive thoughts was more strongly correlated (negative association) with openness in the US ( $r = .23$ ) compared to Spain ( $r = -.04$ ), and (5) anticipatory thoughts was more strongly correlated (negative association) with extraversion in Spain ( $r = -.31$ ) compared to the US ( $r = -.06$ ). Importantly, in each country, all four facets of rumination had robust positive associations with depressive symptoms and urgency facets of impulsivity, and also a robust negative association with emotional stability (the converse of neuroticism); which supports findings from previous studies (Muris et al., 2005; Nolen-Hoeksema et al., 2008; Selby et al., 2008). Interestingly, low conscientiousness and lack of perseverance also presented moderate associations with all facets of rumination, except repetitive thoughts. This is consistent across the three countries, and supports previous findings (Conway, Csank, Holm, & Blake,

2000; d'Acremont & Van der Linden, 2007). Taken together, our examination of criterion-related validity suggests that rumination has a similar nomological network across these countries.

## Strengths and Limitations

The strengths of the present study must be contextualized in the face of its limitations. First, although initial evidence was provided, more studies are needed to examine other types of construct validity. Specifically, future work could build on these results and examine the lack of association between the RTSQ's scores and measures of different constructs (i.e., discriminant validity) or the association between the RTSQ and other measures of rumination (convergent validity). Future studies should also examine other theoretically-related constructs (i.e., psychological distress and coping styles) to provide further support for criterion-related validity. Based on theory (Nolen-Hoeksema, 1991) and a large body of empirical work (see Olatunji, Naragon-Gainey, & Wolitzky-Taylor, 2013 for a meta-analysis), we believe that rumination is a central construct that can lead to specific cognitive, emotional, and behavioral problems. However, the cross-sectional, observational study design of the present study prevents our ability to make causal inferences using these data. Although our results suggest that the RTSQ captures four facets of rumination similarly across college students in the US and in two Spanish-speaking

countries with distinct dialects (Spain and Argentina), more work is needed to ensure invariance across a wider range of countries and in other populations other than college students. Although we were able to administer the same battery of surveys across three countries, we had to use different recruitment procedures and incentives to encourage participation. Therefore, differences across countries are somewhat conflated with difference in recruitment procedures. Given that our findings were remarkably consistent across the countries, we expect that these differences did not significantly bias our results. Finally, women were significantly and differently overrepresented in each sample (higher in US and Spain compared to Argentina).

## Conclusion

In the present study, we successfully adapted the RTSQ into Spanish (see Appendix), found that the 15-item 4-factor version of the measure was invariant across three countries (US, Spain, and Argentina) and sex, and established that four facets of rumination (i.e., problem-focused thoughts, counterfactual thinking, repetitive thoughts, and anticipatory thoughts) correlate similarly across countries with personality traits, impulsivity-like traits, and depressive symptoms. Taking the most conservative stance, the present study provides evidence that the RTSQ can be used to measure four facets of rumination among male and female college students in the US, Spain, and Argentina. Taking a more liberal stance, the present study supports the validity of the RTSQ and suggests that the RTSQ can be used in a wider range of English-speaking and Spanish-speaking countries. The present study serves as a foundation for future cross-cultural work testing models in which rumination is a central facet.

## Conflict of Interest

All authors declare that they have no conflict of interest.

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## Electronic Supplementary Materials

The electronic supplementary material is available with the online version of the article at <https://doi.org/10.1027/1015-5759/a000465>

## ESM 1. Data (.out)

Output for CFA of a single factor of rumination using 20 items of the RTSQ with WLSMV as estimator in Argentina subsample only.

## ESM 2. Data (.out)

Output for CFA of a single factor of rumination using 15 items of the RTSQ with WLSMV as estimator in Argentina subsample only.

## ESM 3. Data (.out)

Output for CFA of 4 factors of rumination using 15 items of the RTSQ with WLSMV as estimator in Argentina subsample only.

## ESM 4. Data (.out)

Output for CFA of a single factor of rumination using 20 items of the RTSQ with WLSMV as estimator in Spain subsample only.

## ESM 5. Data (.out)

Output for CFA of a single factor of rumination using 15 items of the RTSQ with WLSMV as estimator in Spain subsample only.

## ESM 6. Data (.out)

Output for CFA of 4 factors of rumination using 15 items of the RTSQ with WLSMV as estimator in Spain subsample only.

## ESM 7. Data (.out)

Output for CFA of a single factor of rumination using 20 items of the RTSQ with WLSMV as estimator in USA subsample only.

## ESM 8. Data (.out)

Output for CFA of a single factor of rumination using 15 items of the RTSQ with WLSMV as estimator in USA subsample only.

## ESM 9. Data (.out)

Output for CFA of 4 factors of rumination using 15 items of the RTSQ with WLSMV as estimator in USA subsample only.

## ESM 10. Data (.out)

Output for measurement invariance testing of the 15-item 4-factor RTSQ across sex using WLSMV as estimator.

## ESM 11. Data (.out)

Output for measurement invariance testing of the 15-item 4-factor RTSQ across country using WLSMV as estimator.

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## Appendix

**Table A1.** Items in Spanish Version of the 15-Item RTSQ

Subscale	RTSQ items – Spanish version
RT (1)	Encuentro que mi mente le da vueltas a las cosas una y otra vez
RT (2)	Cuando tengo un problema, atormentará mi mente durante mucho tiempo
RT (3)	Encuentro que algunos pensamientos me vienen a la mente una y otra vez durante todo el día
RT (4)	No puedo dejar de pensar sobre algunas cosas
CFT (5)	Cuando anticipo una interacción social, imagino cada posible situación y conversación previamente
CFT (6)	Tiendo a recordar acontecimientos pasados tal y como me hubiera gustado que hubieran sucedido
CFT (7)	Sueño despierto sobre cosas que quisiera haber hecho
CFT (8)	Cuando siento que he tenido una mala interacción con alguien, tiendo a imaginar varias situaciones donde hubiese actuado de forma distinta
PFT (9)	Cuando trato de solucionar un problema complicado, suelo volver al principio una y otra vez, sin nunca encontrar una solución
PFT (11)	Nunca he podido desviar la atención de pensamientos indeseados
PFT (12)	Incluso si pienso en un problema durante horas, me cuesta mucho llegar a tener una idea clara del mismo
PFT (13)	Me resulta muy difícil llegar a una solución clara sobre algunos problemas, no importa cuánto piense sobre ello
PFT (14)	A veces me doy cuenta de que no he hecho nada más que pensar en algo durante horas
AT (17)	Cuanto estoy esperando que ocurra algo que me gusta mucho, aparecen pensamientos sobre esto que interfieren en lo que estoy haciendo
AT (18)	Algunas veces incluso durante una conversación, tengo otros pensamientos en mi cabeza

Note. RT = Repetitive Thoughts; CFT = Counterfactual Thinking; PFT = Problem-focused Thoughts; AT = Anticipatory Thoughts. The numbers in parentheses refer to the item number of the English RTSQ.

**Table A2.** Demographics and descriptive statistics of non-RTSQ study constructs across countries

	United States ( <i>n</i> = 924)	Argentina ( <i>n</i> = 403)	Spain ( <i>n</i> = 305)
Sex <i>n</i> (%)			
Men	227 (30.0)	175 (43.4)	87 (28.5)
Women	639 (69.2)	228 (56.6)	218 (71.5)
Missing	8 (0.9)	0 (0.0)	0 (0.0)
Age <i>M</i> ( <i>SD</i> )	21.98 (6.33)	22.55 (4.17)	21.03 (4.08)
Education <i>n</i> (%)			
First year (freshman)	271 (29.3)	91 (22.6)	49 (16.1)
Second year (sophomore)	168 (18.2)	99 (24.6)	175 (57.4)
Third year (junior)	216 (23.4)	64 (15.9)	26 (8.5)
Fourth year (senior)	266 (28.8)	53 (13.2)	45 (14.8)
Fifth year	–	60 (14.9)	2 (0.7)
Finished studies (graduating)	–	36 (8.9)	8 (2.6)
Graduate student	2 (0.2)	–	–
Missing	1 (0.1)	0 (0.0)	0 (0.0)
Non-RTSQ Study Constructs <i>M</i> ( <i>SD</i> ) [ $\alpha$ ]			
Premeditation	3.14 (0.50) [ $\alpha$ = .86]	3.01 (0.41) [ $\alpha$ = .75]	2.90 (0.44) [ $\alpha$ = .79]
Perseverance	3.07 (0.50) [ $\alpha$ = .82]	2.95 (0.49) [ $\alpha$ = .80]	3.04 (0.48) [ $\alpha$ = .83]
Sensation Seeking	2.72 (0.63) [ $\alpha$ = .87]	2.51 (0.61) [ $\alpha$ = .83]	2.56 (0.60) [ $\alpha$ = .85]
Positive Urgency	1.90 (0.67) [ $\alpha$ = .94]	1.95 (0.52) [ $\alpha$ = .85]	1.90 (0.47) [ $\alpha$ = .83]
Negative Urgency	2.26 (0.62) [ $\alpha$ = .88]	2.45 (0.47) [ $\alpha$ = .71]	2.32 (0.47) [ $\alpha$ = .75]
Openness	3.74 (0.66) [ $\alpha$ = .80]	3.89 (0.68) [ $\alpha$ = .82]	3.79 (0.66) [ $\alpha$ = .82]
Extraversion	3.49 (0.77) [ $\alpha$ = .85]	3.42 (0.81) [ $\alpha$ = .86]	3.54 (0.81) [ $\alpha$ = .86]
Agreeableness	3.51 (0.60) [ $\alpha$ = .72]	3.61 (0.55) [ $\alpha$ = .68]	3.77 (0.58) [ $\alpha$ = .73]
Conscientiousness	3.56 (0.68) [ $\alpha$ = .81]	3.42 (0.67) [ $\alpha$ = .79]	3.53 (0.70) [ $\alpha$ = .83]
Emotional Stability	2.93 (0.80) [ $\alpha$ = .86]	2.93 (0.80) [ $\alpha$ = .84]	3.10 (0.84) [ $\alpha$ = .87]
Depressive Symptoms	15.18 (10.75) [ $\alpha$ = .91]	15.59 (9.96) [ $\alpha$ = .89]	11.98 (8.57) [ $\alpha$ = .88]

Notes. One-way analysis of variances (ANOVAs) revealed significant differences across countries on sex,  $F(2, 1,621) = 12.99, p < .001, \eta^2_p = .02$ , and age,  $F(2, 1,614) = 6.65, p = .001, \eta^2_p = .01$ . Post hoc comparisons using a Bonferroni correction indicated that the percentage of female participants in Argentina (56.6%) is significantly different (i.e., smaller) than that in both the US (69.2%; Hedge's  $g = 0.28$ ) and Spain (71.5%; Hedge's  $g = 0.29$ ). There was no significant difference between Spain and the US on percentage of female participants. Post hoc comparisons using a Bonferroni correction indicated that participants in Spain ( $M = 21.03$ ) are significantly different (i.e., younger) than participants in both the US ( $M = 21.98$ ; Hedge's  $g = 0.16$ ) and Argentina ( $M = 22.55$ ; Hedge's  $g = 0.37$ ). There was no significant difference between Argentina and the US on age of participants.

**Table A3.** Model fit comparisons of a 20-item 1-factor RTSQ and 15-item 1-factor RTSQ versus the 15-item 4-factor RTSQ across countries using WLSMV

	Overall fit indices						Model comparison	Comparative fit indices				
	$\chi^2$	df	CFI	TLI	RMSEA	WRMR		$\Delta\chi^2$	$\Delta df$	$\Delta CFI$	$\Delta TLI$	$\Delta RMSEA$
Argentina												
1. 20-item 1-factor	1,663.28	170	.823	.802	.148 (.141, .154)	2.139	1 vs. 3	-	-	-.122	-.129	.044
2. 15-item 1-factor	1,296.88	90	.818	.788	.182 (.174, .191)	2.320						
3. 15-item 4-factor	448.50	84	.945	.931	.104 (.094, .113)	1.204	2 vs. 3	426.56*	6	-.127	-.143	.078
Spain												
1. 20-item 1-factor	1,335.02	170	.840	.831	.150 (.142, .157)	1.947	1 vs. 3	-	-	-.116	-.114	.044
2. 15-item 1-factor	1,039.96	90	.856	.832	.186 (.176, .196)	2.071						
3. 15-item 4-factor	373.66	84	.956	.945	.106 (.095, .117)	1.071	2 vs. 3	317.69*	6	-.100	-.113	.080
United States												
1. 20-item 1-factor	6,015.95	170	.854	.836	.193 (.854, .836)	4.307	1 vs. 3	-	-	-.125	-.137	.094
2. 15-item 1-factor	4,217.82	90	.884	.865	.223 (.217, .229)	4.656						
3. 15-item 4-factor	843.53	84	.979	.973	.099 (.093, .105)	1.476	2 vs. 3	1,195.88*	6	-.095	-.137	.124

Notes. We relied on the model comparison criteria of  $\Delta RMSEA \leq .015$  (increase indicates worse fit; Chen, 2007) and  $\Delta CFI/\Delta TFI \leq .01$  (decrease indicates worse fit; Cheung & Rensvold, 2002) to compare the adequacy of a single factor of rumination (both 20-item and 15-item versions; Brinker & Dozois, 2009) with a 15-item 4-factor model based on subscales proposed by Tanner et al., (2013). For the models using the same 15 items, we also relied on a  $\chi^2$  difference test using the DIFFTEST (Muthén & Muthén, 1998–2015). \* $p < .001$ .

**Table A4.** Measurement invariance testing results of the 15-item 4-factor RTSQ across countries and sex using WLSMV

	Overall Fit Indices						Model comparison	Comparative Fit Indices				
	$\chi^2$	df	CFI	TLI	RMSEA	WRMR		$\Delta\chi^2$	$\Delta df$	$\Delta CFI$	$\Delta TLI$	$\Delta RMSEA$
Across Countries												
1. Configural	1,595.38	252	.975	.969	.099 (.094, .104)	2.185						
2. Metric	1,585.58	274	.976	.972	.094 (.089, .098)	2.233	1 vs. 2	52.99**	22	-.001	.003	-.002
3. Scalar	1,840.60	416	.973	.980	.079 (.076, .083)	2.595	2 vs. 3	449.68***	142	-.003	.008	-.015
Across sex												
1. Configural	1,542.15	168	.969	.961	.100 (.096, .105)	2.108						
2. Metric	1,517.56	179	.969	.964	.096 (.092, .100)	2.113	1 vs. 2	6.65	11	.000	.003	-.004
3. Scalar	1,427.39	250	.973	.977	.076 (.072, .080)	2.189	2 vs. 3	98.18**	11	.004	.013	-.020

Notes. Along with a  $\chi^2$  difference test using the DIFFTEST (Muthén & Muthén, 1998–2015), we relied on the model comparison criteria of  $\Delta RMSEA \leq .015$  (increase indicates worse fit; Chen, 2007) and  $\Delta CFI/\Delta TFI \leq .01$  (decrease indicates worse fit; Cheung & Rensvold, 2002) to test for measurement invariance. \*\* $p < .01$ ; \*\*\* $p < .001$ .

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**Table A5.** Descriptive statistics of RTSQ items in total sample

	<i>M (SD)</i>	Skewness	Kurtosis
RT (1)	5.03 (1.74)	-0.819	-0.161
RT (2)	4.78 (1.76)	-0.654	-0.507
RT (3)	4.85 (1.71)	-0.688	-0.362
RT (4)	5.01 (1.66)	-0.835	-0.012
CFT (5)	4.76 (1.88)	-0.596	-0.747
CFT (6)	4.68 (1.88)	-0.532	-0.826
CFT (7)	4.85 (1.83)	-0.636	-0.629
CFT (8)	4.85 (1.76)	-0.724	-0.410
PFT (9)	3.45 (1.67)	0.202	-0.916
PFT (11)	3.56 (1.79)	0.271	-0.940
PFT (12)	3.33 (1.73)	0.335	-0.899
PFT (13)	3.26 (1.74)	0.385	-0.904
PFT (14)	3.75 (1.94)	-0.199	-0.312
AT (17)	4.28 (1.72)	-0.312	-0.812
AT (18)	4.58 (1.72)	-0.465	-0.671

*Note.* RT = Repetitive Thoughts; CFT = Counterfactual Thinking; PFT = Problem-Focused Thoughts; AT = Anticipatory Thoughts. The numbers in parentheses refer to the item number of the English RTSQ.