Psychometric properties of the Spanish version of the anxiety control questionnaire-revised in pregnant women

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Abstract

Anxiety disorders are very frequent during pregnancy. Anxiety control is a generalized psychological vulnerability for its development. The aim of this study is to explore the psychometric properties of the Anxiety Control Questionnaire Revised (ACQ-R) in Spanish pregnant women. 275 women responded to measures of anxiety, depression, affect, and quality of life. The original three-factor solution of the ACQ-R (emotional, threat, and stress control) was replicated by confirmatory analysis. The model fit improved when item 15 was changed from the emotional to the stress scale. Significant associations between ACQ-R scores and depression, anxiety, affect, and quality of life were found. During pregnancy, the measurement of risk factors for the development of anxiety disorders is needed. The ACQ-R is a short and valid instrument that assesses anxiety control perception during pregnancy, which can be a mechanism underlying anxiety progression, and hence a potential target for treatment.

Keywords Psychosocial assessment · Confirmatory factor analysis · Criterion validity · Internal consistency · Anxiety control · Pregnancy

Introduction

Anxiety disorders are very frequent during pregnancy. Recent prevalence data showed that up to 29.1% of women experience at least one anxiety disorder (i.e., panic disorder, obsessive-compulsive disorder, generalized anxiety disorder, specific phobia, social anxiety disorder, or posttraumatic stress disorder) during pregnancy (Viswasam et al., 2019). In Spain, 19.% of women had anxiety symptoms during pregnancy (Prieto et al., 2019). These emotional problems not only have an important impact on the well-being of the mother, but

also have been associated with negative consequences for the baby, such as risk of pre-term delivery, lower birth weight, bonding issues, abnormal child development, and antisocial behaviour in the child (International Marcé Society, 2019; Martini et al., 2015; Uguz et al., 2018).

Several psychological mechanisms have been argued to be antecedents of anxiety problems in pregnant women. These include, to name some examples, personality factors like neuroticism and extraversion (Johnston & Brown, 2013), coping strategies (Peñacoba-Puente et al., 2013), or maternal attitudes (Sockol et al., 2014). There is, however, an important risk factor for anxiety problems which has been largely ignored in this population, such as perceived anxiety control.

Perceived control is defined as being aware of internal and external responses to manage challenges in circumstances beyond our control (Mardiyono et al., 2011). Specifically, perceived anxiety control refers to the individual's belief in one's ability to effectively engage in thoughts and behaviors that aim to manage internal emotional reactions (i.e., anxiety) that occur in response to stress (Mardiyono et al., 2011; Rapee et al., 1996). Thus, this belief is associated with a sense of unpredictability and uncontrollability of emotions over potentially negative events and emotions, which has been argued to explain its impact on increased anxiety levels under stressful circumstances (Barlow, 2002). Previous studies have mostly explored perceived anxiety control in patients with emotional

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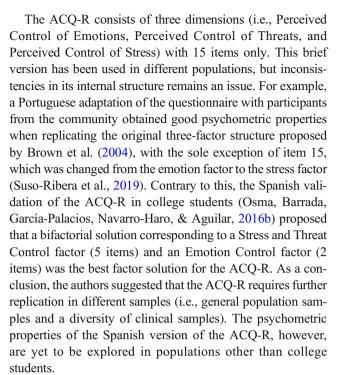5 Department of Nursing, Universitat Jaume I, Castellón, Spain

disorders, especially in anxiety disorders (Gallagher, Bentley, & Barlow, 2014a; Osma, Barrada, García-Palacios, & Botella, 2016a). Overall, these studies show that low anxiety control perception is related to higher anxiety symptoms. It seems that people with anxiety disorders, such as generalized anxiety disorder, had lower anxiety control, which results in experiencing uncontrollable anxiety when facing multiple stressors (Gallagher, Bentley, & Barlow, 2014a; Osma, Barrada, García-Palacios, & Botella, 2016a). In addition, a meta-analytic study showed that anxiety control could act as a mechanism of change in cognitive behavioral therapies because an improvement in anxiety control could reduce anxiety symptomatology (Gallagher, Bentley, & Barlow, 2014a; Osma, Barrada, García-Palacios, & Botella, 2016a).

Pregnancy is, indeed, a period where women face multiple stressors, challenges, and changes (Guardino & Dunkel-Schetter, 2014; Maldonado-Durán et al., 2008), so adequate adjustment to this potentially stressful period may be at least partly influenced by the individual's ability to efficiently control anxiety levels in response to stress. In this scenario, professionals who are in contact with pregnant women need measures that allow them to assess not only the presence of emotional disorders (i.e., anxiety and depressive symptoms) but also risk factors for such disorders (Byatt et al., 2018), such as how women cope with anxiety in stressful situations. Systematic reviews of measures used in perinatal care indicate that measures of mechanisms underlying anxiety in this population have been largely ignored as the focus has been mostly placed on outcomes (i.e., measures of anxiety and depression, but not their potential psychological underlying mechanisms; Meades & Ayers, 2011; Sinesi et al., 2019). One possible explanation for this could be the lack of psychometrically robust measures of anxiety control validated in samples of pregnant women, but ultimately a change of focus from outcomes only to underlying processes is also required.

The Anxiety Control Questionnaire (ACQ) is a widely-used measure of anxiety control (Brown et al., 2004; Mardiyono et al., 2011; Rapee et al., 1996). While anxiety control as measured with the ACQ has been argued to be multidimensional, the factor structure of the scale has been difficult to replicate. When the ACQ was originally developed (Rapee et al., 1996), it was composed of 30 items divided in two factors, namely "perceived control over internal emotional reactions" (14 items; "I can usually relax when I want") and "perceived control over external events" (16 items; "There is little I can do to change frightening events"). Subsequent studies failed to demonstrate this two-factor solution and proposed four (Gerolimatos et al., 2012) and three factor solutions (Brown et al., 2004). In the latter study, Brown et al. (2004) proposed a brief, revised version of the questionnaire, which they named Anxiety Control Questionnaire Revised version (ACQ-R).

The ACQ-R consists of three dimensions (i.e., Perceived Control of Emotions, Perceived Control of Threats, and Perceived Control of Stress) with 15 items only. This brief version has been used in different populations, but inconsistencies in its internal structure remains an issue. For example, a Portuguese adaptation of the questionnaire with participants from the community obtained good psychometric properties when replicating the original three-factor structure proposed by Brown et al. (2004), with the sole exception of item 15, which was changed from the emotion factor to the stress factor (Suso-Ribera et al., 2019). Contrary to this, the Spanish validation of the ACQ-R in college students (Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b) proposed that a bifactorial solution corresponding to a Stress and Threat Control factor (5 items) and an Emotion Control factor (2 items) was the best factor solution for the ACQ-R. As a conclusion, the authors suggested that the ACQ-R requires further replication in different samples (i.e., general population samples and a diversity of clinical samples). The psychometric properties of the Spanish version of the ACQ-R, however, are yet to be explored in populations other than college students.

As noted earlier, to the best of our knowledge anxiety control and its correlates with individual outcomes have not been explored in prenatal care (e.g., care that women receive during pregnancy). Given that perceived control seems to be a modifiable factor that varies across contexts and events and with treatment and has been argued to be an underlying factor influencing the onset and maintenance of anxiety (Gallagher, Naragon-Gainey, & Brown, 2014b; Weems & Silverman, 2006), an instrument that allows the evaluation of perceived control (i.e., a mechanism that might precede the occurrence and severity of anxiety as opposed to a measure of anxiety itself) is necessary for prenatal care use. The use of this instrument in pregnant women could help professionals to detect the presence of risk factors for anxiety symptoms early and therefore refer women to adequate mental health services so that they can receive early treatment to prevent the chronification of symptoms to the postpartum.

In sum, the present study goals are (i) to evaluate the psychometric properties of the Spanish version of the ACQ-R in a sample of pregnant women and (ii) to investigate the criterion validity of this scale. We expect to replicate the original three-factor solution proposed by Brown et al. (2004) by means of a confirmatory factor analysis. Low anxiety control has been associated with higher anxiety, negative mood and negative affect as well as with lower positive affect and quality of life in different samples (Cheung et al., 2007; Ford & Ayers, 2009; Lang & McNiel, 2006; Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b). Therefore, and in relation to concurrent criterion validity, we expect the ACQ-R to correlate with measures of anxiety, depression, affect, and quality of life (i.e., lower control over anxiety would be associated

with more negative mood and affect and less quality of life). By doing this, we expect to show evidence about the utility of the ACQ-R for its use in the psychological screening of pregnant women.

Methods

Participants

The sample was composed of 275 women who responded to psychological measures during pregnancy (weeks 16 to 36 of gestation; mean = 24.43; SD = 6.78). The present study is the result of a secondary analysis and is part of a larger project that assesses the presence of emotional problems (i.e., anxiety and depressive symptoms) and their risk factors (i.e., perceived anxiety control, negative affect, social support, etc.) in pregnant women. Women were recruited between weeks 16 (approximately month 4 of gestation) and 36 (approximately month 9 of gestation) because the second and the third trimesters seem to be the prenatal periods in which depressive symptoms are more prevalent (Bennett et al., 2004). In addition, inclusion criteria included: being an adult pregnant woman (> 18 years) and being fluent in Spanish, that is, being able to read and answer to the questions in Spanish. As observed in Table 1, women were between 18 and 43 years of age (mean = 32.96; SD = 4.28), were generally Spanish (93.4%), frequently highly educated (60.8% had more than 12 years of education) and the large majority were in a relationship at the time of assessment (98.5%). Regarding obstetric variables, most women were multiparous (69.8%), had not suffered previous miscarriages (82.9%), had planned their pregnancy (84.8%), had a natural pregnancy conception (89.1%), and had low pregnancy risk (72.4%).

Procedure

Pregnant women were recruited by different healthcare professionals (i.e., pediatricians, physicians, and midwifes) at several specialized public gynecology centers (blind note). These professionals explained the study goals and all the procedures to women and then gave them a code to access a web page called (blind note). Once in the website, participants were asked to accept participation before completing the on-line assessment. The ethics and research committee of the (blind note) approved the procedures of the study and all women gave their online informed consent to participate.

In a first approach, 4500 women were invited to participate in the study. Of these, 2797 women registered into the website and 275 completed the psychological measures described in the present study (i.e., perceived anxiety control, anxiety and depressive symptoms, affect and quality of life).

Table 1 Sociodemographic characteristics of pregnant women included in this study

Variable	Frequency (%)
Mean age [a]	32.96 (18–43; 4.28)
Weeks of gestation	24.43 (16–36; 6.78)
Nationality [b]	
Spanish	212 (93.4)
Other	15 (6.6)
Educational level [b]	
< 12 years	58 (39.2)
> 12 years	90 (60.8)
Marital status [b]	
In a relationship	271 (98.5)
Not in a relationship	4 (1.5)
Parity	
Primiparous	81 (30.2)
Multiparous	187 (69.8)
Previous miscarriage	
Yes	39 (17.1)
No	189 (82.9)
Pregnancy planification	
Yes	179 (84.8)
No	32 (15.2)
Type of pregnancy	
Natural	188 (89.1)
Assisted Reproduction	23 (10.9)
Pregnancy complications	
Low risk	194 (72.4)
Medium risk	35 (13.1)
High risk	18 (6.7)
Unknown	21 (7.8)

a Values reflect means (range; SD), b Values reflect frequencies (%)

Measures

All the questionnaires mentioned below were administered in Spanish.

Anxiety Control Questionnaire-Revised (ACQ-R; Brown et al., 2004; Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b). This questionnaire is composed of 15 items (11 of them reverse worded) with responses ranging from 0 = "totally disagree" to 5 = "totally agree". Higher scores represent a higher perception of control. The three-factor solution proposed in the original version (Brown et al., 2004) was: Perceived Control of Emotions, which reflects one's ability to effectively control one's emotions (composed by 5 items; i.e., "*I can usually relax when I want*"), Perceived Control of Threats, which evaluates the belief that escape from frightening events is out of one's control (composed by 6 items; i.e., "*If something is going to hurt me, it will happen no matter what I do*"), and Perceived Control of

Stress, which measures perceived difficulty in regulating one's emotions in stressful situations (composed by 4 items; i.e., "*When I am under stress, I am not always sure how I will react*"). Previous research has indicated adequate internal consistency estimates in both the original ($.71 \leq \alpha \leq .73$; Brown et al., 2004) and the Spanish version ($.75 \leq \alpha \leq .85$; Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b) of the ACQ-R. Similar internal consistency was found in our sample for emotion ($\alpha = .76$), threat ($\alpha = .69$) and stress factors ($\alpha = .76$). The Spanish validation version of the ACQ-R was used in the present study. The authors translated the questionnaire into Spanish and then it was back-translated into English by a bilingual psychologist (see Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b).

State Trait Anxiety Inventory (STAI-S/T; Spielberger et al., 1970; 1982). This scale comprises 40 items, of which 20 assess trait anxiety and 20 evaluate state anxiety. All items are rated on a 4 – point Likert scale (0 = "almost never" to 3 = "almost always"). Total scores range from 0 to 60, with higher scores representing greater anxiety. Internal consistency coefficients have ranged from .90 to .94 in the Spanish general population (Guillén-Riquelme & Buela-Casal, 2011). In our sample, the internal consistency of the scale was excellent ($\alpha = .95$).

Beck Depression Inventory-II (BDI-II; Beck et al., 1996; Sanz et al., 2003). This questionnaire is composed by 21 items assessing the severity of depressive symptoms. Response rates range from 0 = "symptom absent" to 3 = "most severe symptom". Total scores range from 0 to 63, with higher scores indicating greater symptom severity. The Spanish version of this questionnaire (Sanz et al., 2003, 2005) has shown good psychometric properties both in the general population ($\alpha = .87$) and in clinical samples ($\alpha = .89$). In our sample, the Cronbach's alpha was also very good ($\alpha = .87$).

The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988; Sandín et al., 1999) is a 20-item self-report questionnaire that evaluates positive (10 items) and negative affect (10 items). Each item can be rated on a scale ranging from 1 = "not at all/very slightly" to 5 = "extremely". Total scores range from 10 to 50, with higher scores representing greater positive/negative affect. Cronbach's alphas in Spanish women have been good both for positive ($\alpha = .87$) and negative ($\alpha = .89$) affect (Sandín et al., 1999). In our sample, the reliability was very good for both positive ($\alpha = .90$) and negative affect ($\alpha = .88$).

The Quality of Life Index (QLI; Ferrans & Powers, 1985; Mezzich et al., 2000) is a self-report questionnaire composed by 10 items. These evaluate different aspects of quality of life with a response scale ranging from 1 = "bad" to 10 = "excellent". Higher scores represent better quality of life. Internal consistency has been excellent in Spanish clinical samples ($\alpha = .89$; Mezzich et al., 2000), as well as in our sample ($\alpha = .87$).

Data Analysis

First, we investigated whether the original three-factor structure of the ACQ-R proposed by Brown et al. (2004) and recently replicated by Suso-Ribera et al. (2019) showed a good fit by means of a Confirmatory Factor Analysis (CFA). Because Brown et al. (2004) also explored the feasibility of a higher-order Perceived Control factor, this would also be investigated. Finally, we will compare these models with the bifactorial solution proposed in the Spanish adaptation of the questionnaire (Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b). Modification indices were investigated to explore whether model changes would have significant effects on the model fit to the data. The fit for the proposed model was evaluated with the Chi-square test, the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Standardized Root Mean Square Residual (SRMR). RMSEA and SRMR scores below .05 indicate an excellent fit and scores below .08 reveal a good model fit. CFI and TLI scores above .95 reveal an excellent fit and values over .90 are interpreted as indicating a good fit (Hu & Bentler, 1999). Moreover, Cronbach alphas were calculated for each measure employed in this study to assess the internal reliability of the instruments used. Finally, Pearson correlations between the ACQ-R and related psychological variables (depression, anxiety, affect, and quality of life) were computed to explore sources of criterion validity of the questionnaire (American Educational Research Association, American Psychological Association, and National Council on Measurement in Education, 2014). All analyses, with the exception of the CFA, were conducted with IBM SPSS Statistics version 22.0 for Windows (IBM Corp, 2013). The CFA was carried out with Mplus version 6.12 (Muthén & Muthén, 2011).

Results

Internal Structure of the ACQ-R

When replicating the original three-factor solution proposed by Brown et al. (2004), the fit was just acceptable ($\chi^2 = 194.88$, df = 87, $p < .001$, RMSEA = 0.067, 90% CI RMSEA = 0.055, 0.080, CFI = 0.874, TLI = 0.847). When exploring the modification indices, it was proposed that item 15 "*When I am anxious, I find it hard to focus on anything other than my anxiety*" should be changed from the Emotion Control scale into the Stress Control scale. Another option to improve the model fit would be to correlate residuals from the same factor (Kline, 2011). However, the modification indices did not support that correlating residuals would sufficiently improve the model fit. The change in item 15 improved the model fit ($\chi^2 = 179.51$, df = 87, $p < .001$, RMSEA = 0.062,

90% CI RMSEA = 0.049, 0.075, CFI = 0.892, TLI = 0.869). Consequently, subsequent analyses were conducted using the aforementioned three-factor model including item 15 into the Stress Control scale.

In addition to the three-factor solution, we explored whether a higher-order perceived control factor was viable. Consistent with Brown et al. (2004), the size of the factor loadings of the three factors into the higher-order perceived control factor (between 0.53 and 0.61, all $p < .001$) and the factor loadings of the items into the three factors (all $p < .001$) supported the suitability of a higher-order perceived control factor. This fit of the model was the same as the three-factor solution presented above.

Finally, we tested the model fit of the bifactorial solution proposed in the Spanish adaptation of the questionnaire (Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b). The fit was poor ($\chi^2 = 254.38$, df = 82, $p < .001$, RMSEA = 0.087, 90% CI RMSEA = 0.075, 0.100, CFI = 0.850, TLI = 0.808) and the modification indices did not support that the model fit could be significantly improved without substantially changing the model.

Table 2 shows the item loadings for each of the factors in four different studies: the original investigation with persons with emotional disorders by Brown et al. (2004), the Portuguese validation study by Suso-Ribera et al. (2019), the Spanish adaptation by (Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b) and the current investigation. For comparability purposes, the three factor solution without the higher-order factor will be used here. However, sources of validity evidence will consider this higher-order solution. Items loadings for factor 1 were higher in our study (between 0.75 and 1.05) compared to those obtained in the original version (between 0.55 and 0.64; Brown et al., 2004) and in the Spanish adaptation (between 0.32 and 0.49; Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b) and similar to the Portuguese validation (between 0.82 and 1.09; Suso-Ribera et al., 2019). The same tendency was observed in factor 2 (item loadings in the present study = 0.75–0.84; item loadings in the study by Brown et al., 2004 were between 0.43 and 0.71; item loadings in the study by Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b were betwee 0.44 and 0.46; loadings in the study by Suso-Ribera et al., 2019 were between 0.62 and 0.96) and factor 3 (item loadings: current study = 0.56–0.90; Brown et al., 2004 = 0.49–0.71; Suso-Ribera et al., 2019 = 0.77–1.08). The three ACQ-R factors were moderately-to-largely intercorrelated ($.48 \leq r \leq .77$, all $p < .001$).

Criterion Validity

As observed in Table 3, all psychological variables included in this study, namely depression, trait and state anxiety, positive and negative affect, and quality of life, were significantly associated with the three ACQ-R scales and the higher-order perceived control scale (all $p < .001$). We found moderate-to-strong negative associations between ACQ-R scores and depression, anxiety, and negative affect, as well as a positive moderate relationship with positive affect and quality of life.

Psychometric properties are also reported in Table 3. Cronbach's alphas for the higher order perceived control factor, Emotion Control, Threat Control, and Stress Control showed a good internal consistency of the three scales and the global factor (Table 4).

Discussion

Women often face multiple challenging situations during pregnancy which sometimes results in the development or aggravation of prenatal anxiety disorders (Viswasam et al., 2019). In order to prevent the onset of such anxiety disorders in pregnant women and to early detect their maintaining or aggravating factors, we need instruments to measure not only anxiety symptoms, but also important risk factors or psychological mechanisms underlying the problem. For this reason, we validated the ACQ-R in a sample of Spanish pregnant women. Our findings revealed that the original three-factor solution with one item-to-factor change is acceptable and indicated that anxiety control is associated with important outcomes in pregnant women. The results also supported the use of a higher-order perceived control factor.

In our study, we mostly replicated the three-factor solution proposed by Brown et al. (2004) by means of a confirmatory analysis, which suggests that the different solutions proposed in past research (Gerolimatos et al., 2012; Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b) might be, at least partly, attributable to the exploratory nature of the analyses conducted in the aforementioned studies. Similar to the ACQ-R Portuguese validation (Suso-Ribera et al., 2019), the only difference with the original solution was that, in our model, the fit improved when item 15 was changed into the stress factor. This suggests that, in our samples, this item ("*When I am anxious, I find it hard to focus on anything other than my anxiety*") was interpreted differently when compared with the participants in the original study.

Several reasons might explain why item 15 was found to better relate to the stress factor. For example, it is possible that cultural and socioeconomic differences between the samples in both investigations are responsible for these results (Greenfield, 2014; Suso-Ribera et al., 2019). While the Brown validation was developed in Boston with a majority of women identified as Caucasian and just 3% of participants identified as Hispanic, our sample was mostly composed by Spanish women. It is possible that Spanish women, who are culturally and geographically more proximal to Portuguese than to American women,

Table 2 Anxiety Control Questionnaire-Revised internal structure and factor loadings across studies

Item		Brown et al., 2004 (n=700)			Suso-Ribera et al., 2019 (n=267)			Osma et al., 2016b (n=382)			Current study (n=275)		
		F1	F2	F3	F1	F2	F3	G	S1	S2	F1	F2	F3
1	How well I cope with difficult situations depends on whether I have outside help			0.49			0.77	0.50					0.56
2	When I am put under stress, I am likely to lose control			0.71			1.02	0.55	0.44				0.90
11	When I am under stress, I am not always sure how I will react			0.56			0.77	0.44	0.46				0.67
14	I usually find it hard to deal with difficult problems			0.69			1.08	0.71					0.87
15	When I am anxious, I find it hard to focus on anything other than my anxiety	0.57					0.94	0.62					0.90
3	When I am frightened by something, there is generally nothing I can do		0.71			0.96		0.63				0.81	
4	Whether I can successfully escape a frightening situation is always a matter of chance with me		0.62			0.86		0.49				0.83	
7	There is little I can do to change frightening events		0.62			0.78		0.61				0.69	
8	The extent to which a difficult situation resolves itself has nothing to do with my actions		0.55			0.71		0.55				0.75	
9	If something is going to hurt me, it will happen no matter I what do		0.50			0.62		0.41	0.33			0.79	
12	Most events that make me anxious are outside my control		0.43			0.70		0.55				0.84	
5	I can usually put worrisome thoughts out of my mind easily	0.55			0.82					0.32	0.75		
6	I am able to control my level of anxiety	0.64			1.09			−0.53		0.49	1.05		
10	I can usually relax when I want	0.57			0.89			−0.52		0.45	0.96		
13	I am unconcerned if I become anxious in a difficult situation, because I am confident in mi ability to cope with my symptoms	0.62			0.99			−0.52		0.39	1.02		
	Reliability	.73	.73	.71	.76	.77	.79	.85	.83	.75			

F1 = Anxiety Control Questionnaire-Emotion; F2 = Anxiety Control Questionnaire-Threat; F3 = Anxiety Control Questionnaire-Stress; G = General Anxiety Perception of Control; S1 = Specific Factor 1 "Stress and Threat Control"; S2 = Specific factor 2 "Emotion Control"

interpret item 15 in the same direction than Portuguese sample. In this sense, it seems that the assessed Spanish and Portuguese populations understood the ability to focus on things other than anxiety (i.e., item 15) as indicating that they are experiencing difficulties in coping with anxiety in specific stressful situations (as in other items in the stress factor, such as "When I am under stress, I am not always sure how I will react" or "When I am put under stress, I am likely to lose control"). Therefore, the focus of item 15 on the ability to focus on things other than anxiety might reflect a perceived ability to function despite stress (or anxiety) instead of measuring their ability to control an emotion.

In the Portuguese validation of the ACQ-R made by Suso-Ribera et al. (2019), an additional explanation was proposed for the change of factor in item 15. Specifically, the authors suggested that differences in wording after the translation (i.e., the term "anxiety" was translated into "nervous") could also explain why item 15 correlated more to a factor that referred to control of stress rather than a factor that evaluates the control of emotions. Because the translation of the Spanish version of the ACQ-R used here is more loyal to the original, we are inclined to think that the translation process is not likely to

explain the change in item 15. While acknowledging this, further cross-cultural research is needed to investigate whether the results in relation to item 15 are replicated.

Regarding the psychometric properties of the ACQ-R in pregnant women, item loadings and Cronbach's alphas for each subscale were calculated. The current study obtained item loadings greater than the original version of Brown et al. (2004) and loadings similar to the Portuguese validation by Suso-Ribera et al. (2019). This indicates that, in the present study, items were more correlated with the factor in which they were grouped than in the original version of the scale (Brown et al., 2004). This is especially noticeable for item 15, which obtained a factor loading of 0.57 in the original version, while it increased to 0.82 when it was included in factor 1 and 0.90 when it was included in factor 3 in the current study and the loading of item 15 raised to 0.94 in the Portuguese validation (Suso-Ribera et al., 2019). Considering that factor loading improved when item was changed from factor 1 to factor 3, the improvement in model fit after the change and the conceptual similarities between the item and items from factor 1, as described above, the change in item 15 from factor 1 to factor 3 (i.e., Perceived Control of Stress) seems to be sensible. With regard to the reliability of the

Table 3 Means of study variables and correlated with the Anxiety Control Questionnaire-Revised in pregnant women

	N; Mean (SD)	1	2	3	4	5	6	7	8	9	10
1. ACQ-R total	275; 46.64 (11.72)	[.82]									
2. Emotion control	275; 10.76 (4.34)	.74	[.76]								
3. Threat control	275; 21.04 (5.38)	.83	.36	[.69]							
4. Stress control	275; 14.83 (4.72)	.86	.52	.58	[.76]						
5. Depression	262; 10.15 (6.72)	−.43	−.42	−.30	−.35	[.87]					
6. Anxiety-state	249; 13.31 (10.18)	−.49	−.46	−.37	−.39	.67	[.95]				
7. Anxiety-trait	250; 18.06 (9.84)	−.70	−.66	−.49	−.58	.73	.72	[.90]			
8. Positive affect	251; 31.11 (6.81)	.46	.47	.33	.36	−.42	−.46	−.52	[.90]		
9. Negative affect	251; 16.79 (5.45)	−.55	−.49	−.38	−.48	.53	.61	.72	−.30	[.88]	
10. Quality of life	231; 8.03 (1.86)	.46	.41	.36	.37	−.56	−.54	−.60	.52	−.41	[.87]

values in brackets correspond to Cronbach's alphas. All p values are <.001. ACQ-R total = higher-order control factor

ACQ-R, the obtained Cronbach's alphas in our study ranged from .69 to .76, which is consistent with findings with the original scale (Brown et al., 2004) and the Portuguese version (Suso-Ribera et al., 2019).

In addition to the three-factor solution, the present study also evidenced that a higher-order perceived control factor is also feasible. This result is consistent with the findings by Brown et al. (2004). As indicated by the authors, this result supports the idea that clinicians and researchers should feel free to use either ACQ-R subscale scores or a total scale that would reflect a broader dimension of perceived control. By contrast, the bifactorial solution proposed in the Spanish validation of the ACQ-R (Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b) was not supported. The differences in the analytical procedures used (exploratory analyses in the original Spanish validation and confirmatory analyses in the present study) might partly explain the discrepancy in the findings. However, other factors like differences in sample characteristics should not be ignored. Importantly, though, the results of the present study reveal that the original three-factor solution which motivated the ACQ-R might be feasible in Spanish settings with minor adaptations (i.e., only

the change of factor in item 15). This is preferable to the solution proposed in the Spanish validation of the ACQ-R, in which the three original factors were collapsed into two (which is conceptually problematic), cross-loadings were frequent and one of the factors included two items only (which is statistically problematic; Costello & Osborne, 2005).

In order to test sources of criterion validity of the ACQ-R, we calculated bivariate associations between ACQ-R scores and other instruments that are known to measure related processes, namely depression, anxiety, affect, and quality of life. These bivariate associations resulted in the expected direction and are consistent with previous findings (Brown et al., 2004; Endler et al., 2001; Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b; Raines et al., 2014; Suso-Ribera et al., 2019). In particular, they showed that low anxiety control is associated with increased depression and anxiety symptoms and reduced affect and quality of life. These findings support the validity of the ACQ-R for its use in Spanish pregnant women. What our results indicate is that, in the case of pregnant women, low anxiety control could be a risk psychological factor associated not only with anxiety but also with depressive symptoms.

Table 4 Means of study variables and correlated with the Anxiety Control Questionnaire-Revised in pregnant women

	N; Mean (SD)	1	2	3	4	5	6	7	8	9
1. Emotion control	275; 10.76 (4.34)	[.76]								
2. Threat control	275; 21.04 (5.38)	.36	[.69]							
3. Stress control	275; 14.83 (4.72)	.52	.58	[.76]						
4. Depression	262; 10.15 (6.72)	−.42	−.30	−.35	[.87]					
5. Anxiety-state	249; 13.31 (10.18)	−.46	−.37	−.39	.67	[.95]				
6. Anxiety-trait	250; 18.06 (9.84)	−.66	−.49	−.58	.73	.72	[.90]			
7. Positive affect	251; 31.11 (6.81)	.47	.33	.36	−.42	−.46	−.52	[.90]		
8. Negative affect	251; 16.79 (5.45)	−.49	−.38	−.48	.53	.61	.72	−.30	[.88]	
9. Quality of life	231; 8.03 (1.86)	.41	.36	.37	−.56	−.54	−.60	.52	−.41	[.87]

values in brackets correspond to Cronbach's alphas. All p values are <.001

International and national recommendations on prenatal mental care (Byatt et al., 2018; Ministerio de sanidad Servicios Sociales e Igualdad, 2014; National Institute for Health and Clinical Excellence, 2018; World Health Organization, 2018) should be followed so that assessments include not only depressive and anxiety symptoms but also related factors (i.e., perceived anxiety control). Because anxiety control can be effectively changed with treatment (Gallagher, Bentley, & Barlow, 2014a; Weems & Silverman, 2006), the assessment of this psychological mechanism by means of the ACQ-R might be important to early detect pregnant women who might be vulnerable to emotional disorders. Based on the current findings, Spanish-speaking researchers and health professionals involved in pregnant women care (e.g., midwifes, nurses, gynaecologists, and psychologists) will be able to effectively evaluate this important mechanism associated with emotional functioning and to include this mechanism in anxiety and depression prevention and treatment plans for pregnant women.

Limitations

This study is not without limitations. First, most women were highly educated and were in a stable relationship, so the results might not be generalizable to single pregnant women or to those with low literacy levels. Because being single is related to reduced emotion and stress control (Suso-Ribera et al., 2019), differences in perceived control could be found in pregnant women without a stable relationship where the demands of pregnancy could be perceived in a more stressful way. It is also important to note that, while the majority of participants were born in Spain and all were fluent in Spanish, cross-cultural differences in anxiety control were not accounted for and therefore some cultural influences on the present study cannot be ignored. Cross-cultural differences in emotional experiences appear to exist. For example, it seems that in Western populations high arousal in emotions is perceived as desirable and effective, while in Eastern cultures adjusting emotions would be preferable (Lim, 2016). Due to the small proportion of non-Spanish women included in this study, we were not able to conduct comparative analyses according to nationality. The number of years they had lived in Spain was also not evaluated and this could be an important factor mitigating cultural differences. According to this and previous recommendations with the ACQ-R (Osma, Barrada, García-Palacios, Navarro-Haro, & Aguilar, 2016b), we encourage researchers to investigate the factor structure of the ACQ-R in different Spanish populations, as well as in cross-cultural investigations. Additionally, test-retest analyses were not computed, so the temporal stability of the scale remains unclear.

Conclusion

Despite the aforementioned shortcomings, the present study may have important clinical and research implications as it is the first study to explore the internal structure and criterion validity of the ACQ-R in a sample of Spanish pregnant women. Overall, our study results support the validity and utility of the ACQ-R, a short, 15-item questionnaire that can be used for screening of a risk factor for the development of anxiety disorders, namely perceived anxiety control, in women during pregnancy.

Declarations

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