

RESEARCH ON TRANSLATIONS OF TESTS

Psychometric Properties of the Spanish Version of the Adolescent Stress Questionnaire (ASQ-S)

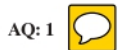


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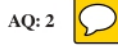
The aim of this study was to develop a Spanish version of the Adolescent Stress Questionnaire and to examine its psychometric properties: factor structure, measurement invariance across samples, reliability, and concurrent validity. Participants consisted of 1,560 Spanish students between 12 and 18 years of age. The results support a structure based on 10 first-order factors (corresponding to stressors on the dimensions Home Life, School Performance, School Attendance, Romantic Relationships, Peer Pressure, Teacher Interaction, Future Uncertainty, School/Leisure Conflict, Financial Pressure, and Emerging Adult Responsibility) and 1 second-order factor that subsumes the first-order factors. This model was selected for measurement invariance testing because it showed good fit indexes and was more parsimonious than the first-order factor model. This structure was replicated across 2 independent samples from the same population, as well as across 3 age groups (early, middle, and late adolescence), showing acceptable fit for all groups. Internal consistency and test-retest reliability were adequate. Evidence of concurrent validity was provided by positive associations with measures of stress manifestations, anxiety, and depression, and by a negative association with life satisfaction. The results indicate that the Spanish version of the Adolescent Stress Questionnaire is a suitable tool for assessing stressors in Spanish adolescents.

Public Significance Statement

We report the psychometric properties of the Spanish version of the Adolescent Stress Questionnaire (ASQ-S) and conclude that it is a useful tool for professionals in the fields of clinical and educational psychology who are interested in assessing contemporaneous stressors from several sources (e.g., family, school, peers, romantic relationships, etc.).



Keywords: adolescence, stressors, assessment, instrumental study, validity, reliability



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Stress has been defined as “the condition that results when person/environment transactions lead the individual to perceive a discrepancy between the demands of a situation and the resources

of the person’s biological, psychological, and social systems” (Caltabiano, Sarafino, & Byrne, 2008, p. 128). Thus, a stressor is any environmental, biological, and/or cognitive event that threatens the physical and/or psychological health or well-being of individuals.

The experience of stressors may be marked during adolescence, because the physical, cognitive, socioemotional, and behavioral changes associated with this developmental stage imply numerous events capable of producing stress (Byrne, Davenport, & Mazanov, 2007). Indeed, stressors in adolescence can have a range of potentially interconnected sources (Flook & Fuligni, 2008; Lehman & Repetti, 2007; Salamon, Johnson, & Swendsen, 2011; Timmons & Margolin, 2015), including the family (Persike & Seiffge-Krenke, 2016; Wright, Creed, & Zimmer-Gembeck, 2010), school (Hjern, Alfvén, & Östberg, 2008; Sun, Dunne, Hou, & Xu, 2011), peer relationships (Bakker, Ormel, Verhulst, & Oldehinkel, 2010; Herres & Kobak, 2015; Persike & Seiffge-Krenke, 2016; Wright et al., 2010), romantic relationships (An-

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derson, Salk, & Hyde, 2015; Kim, Weinstein, & Selman, 2017; Seiffge-Krenke et al., 2010), leisure time (Byrne et al., 2007; Seiffge-Krenke, 1995), and concerns about self and physical appearance (Byrne et al., 2007; Seiffge-Krenke, 1995). Stressors may also derive from the emergence of adult responsibilities and concerns about one's financial situation and future in terms of education, jobs, and career (Byrne et al., 2007; Ciairano, Menna, Molinar, & Sestito, 2009; Seiffge-Krenke et al., 2010; Wadsworth & Compas, 2002).

Although exposure to stressors is, to some extent, considered a normal part of adolescence (Moksnes, Eilertsen, & Lazarewicz, 2016), the broader empirical evidence supports a consistent relationship between exposure to multiple independent and cumulative stressors and emotional difficulties in adolescents. In fact, exposure to cumulative stressors is associated with a range of responses which may manifest as physiological (e.g., cold sweats, loss of voice, a pounding or racing heart, stomach cramps), behavioral (e.g., acting defensively with others, bad mouthing classmates and teachers, talking back to teachers), or emotional symptoms (e.g., feeling scared or worried, not knowing where to turn; ~~Escobar Espejo, Blanca, Fernández-Baena, & Trianes Torres, 2011; Fimian, Fastenau, Tashner, & Cross, 1989~~). Studies have also found clear positive associations between exposure to cumulative stressors and symptoms of both anxiety (Moksnes, Espnes, & Haugan, 2013; Moksnes, Moljord, Espnes, & Byrne, 2010; Wright et al., 2010) and depression (Charbonneau, Mezulis, & Hyde, 2009; Moksnes, Eilertsen, et al., 2016; Moksnes et al., 2013; Moksnes, Moljord, et al., 2010). In addition, there is evidence that this exposure is related to low levels of perceived life satisfaction in adolescents (Bendayan, Blanca, Fernandez-Baena, Escobar, & Trianes, 2013; Moksnes & Haugan, 2015; Moksnes, Løhre, Lillefjell, Byrne, & Haugan, 2016).

Stressors among adolescents have commonly been assessed by means of self-report instruments (Grant, Compas, Thurm, McMahon, & Gipson, 2004). However, much of the early self-report data were based on the perceptions of adult professionals in the field of psychology rather than adolescents themselves, or were derived from adaptations of adult scales to the adolescent population. Compas, Davis, Forsythe, and Wagner (1987) sought to address these methodological issues by developing the Adolescent Perceived Events Scale, comprising 148 major and minor stressor items generated by adolescents themselves. Subsequently, Seiffge-Krenke (1995) developed the 64-item Problem Questionnaire, which assesses the perceptions of minor stressors in seven stress domains: School, Future, Life With Parents at Home, Relationships With Peers, Leisure Time, Romantic Relations, and Own Self. For their part, Byrne, Byrne, and Reinhart (1995) developed in Australia the Adolescent Stress Questionnaire (ASQ), comprising 31 items loading on seven factors; this structure was later confirmed by Byrne and Mazanov (2002) using confirmatory factor analysis (CFA). More recently, Byrne et al. (2007), using the focus group method, expanded the ASQ to 56 items. Principal components analysis of the 56-item ASQ in a sample of adolescents aged between 13 and 18 years yielded 10 factors that were labeled Home Life, School Performance, School Attendance, Romantic Relationships, Peer Pressure, Teacher Interaction, Future Uncertainty, School/Leisure Conflict, Financial Pressure, and Emerging Adult Responsibility. Scores on the ASQ showed good internal reliability (range .62–.92) and test–retest reliability over a

1-week interval (range .68–.88). Factor scores were positively related to measures of anxiety and depression, and negatively to a measure of self-esteem (Byrne et al., 2007). In our view, the 56-item ASQ is more appropriate for assessing minor stressors because (a) it is based on the meticulous listing of stressor items generated by adolescents themselves, (b) the stressors are more contemporary in content than are those listed in the Adolescent Perceived Events Scale or Problem Questionnaire, and (c) it does not include major stressors.

Studies examining the psychometric properties of the ASQ have reported differential results. Moksnes and Espnes (2011), applying a Norwegian version of the instrument to students aged between 13 and 18 years, failed to replicate the factor structure reported by Byrne et al. (2007). These authors used CFA and post hoc modeling to modify each factor separately to improve the model fit. The results supported a modified scale with 30 items loading on seven correlated first-order factors. Factor scores were positively correlated with measures of depression and anxiety, and negatively with self-esteem.

By contrast, in the United Kingdom and with students aged between 12 and 18 years, McKay, Percy, and Byrne (2016) provided support through CFA for the model based on 10 correlated first-order factors. Likewise, in the study carried out by De Vriendt et al. (2011) across several European cities and involving students aged between 12 and 17 years, CFA showed an acceptable fit for this structure, while also adding a second-order factor that subsumed the 10 factors and supported the use of a total score for the questionnaire. All factor scores showed internal consistency (range .57–.88) similar to that reported by McKay et al. (2016), and some of them showed insufficient test–retest reliability over a 2-week interval (range .45–.84).

Given the relevance of stress and its consequences for adolescents, improving the assessment of stressors is a key objective for research in this field (Grant et al., 2004). As there is currently no instrument in Spanish which can provide a valid and reliable measure of minor stressors in different domains, the aim of the present study was to develop a Spanish version of the 56-item ASQ (Byrne et al., 2007).

Our analysis of the psychometric properties of this Spanish version (ASQ-S) focuses on its factor structure, measurement invariance across samples, reliability, and concurrent validity. More specifically, we use CFA to examine whether the factor structure of the ASQ-S is consistent with the second-order factor model proposed by De Vriendt et al. (2011), which would support the use of a total score. This is important because a total score would provide information about cumulative stressors across several domains and could indicate to clinical and educational psychologists when a more detailed assessment is required. To provide more evidence of construct validity and to verify the structural model underlying the ASQ-S, we used a cross-validation strategy, splitting the sample into two random groups and applying several measures of covariance structure equivalence. The same procedure was followed to verify the structural model across age groups, splitting the sample into early, middle, and late adolescence.

We also report the corrected item-factor and item-total correlations, as well as internal consistency and test–retest reliability. To obtain evidence of concurrent validity, we considered measures of stress manifestations, anxiety, depression, and life satisfaction, because these are the variables most commonly included in valid-

ity studies of stressor measures. We expected to find positive associations with stress manifestations, anxiety, and depression, and a negative relationship with life satisfaction.

Method

Participants

The sample consisted of 1,560 adolescents (756 males and 804 females) aged between 12 and 18 years ($M = 14.53$, $SD = 1.82$). They were currently enrolled in the first ($n = 382$), second ($n = 294$), third ($n = 269$), or final year ($n = 179$) of compulsory secondary education, or in either the first ($n = 262$) or second year ($n = 174$) of baccalaureate studies. Six state schools in the metropolitan area of the city of Malaga, Spain, were invited to participate in the study and they all accepted. Although the schools were selected by convenience, participant classes within them were selected randomly. The inclusion criteria for students were (a) age between 12 and 18 years, (b) Spanish nationality, (c) not having been specifically diagnosed with some type of learning problem that would make it difficult for them to respond to the questionnaires, and (d) adequate completion of the tests administered (i.e., not spoiled or incomplete). Application of the latter criterion meant that 2.9% of cases were excluded from the analysis. All students came from families with a medium socioeconomic status.

For the analysis of test–retest reliability we considered a subsample of 446 of these participants (196 males and 250 females) aged between 12 and 18 years ($M = 14.99$, $SD = 1.91$) and enrolled in the first ($n = 70$), second ($n = 47$), third ($n = 107$), or fourth year of compulsory secondary education ($n = 45$), or in the first ($n = 82$) or second year ($n = 95$) of baccalaureate studies. Classes for this test–retest reliability analysis were selected randomly.

The sample used to examine validity comprised 1,336 of the original participants (638 males and 698 females) aged between 12 and 18 years ($M = 14.41$, $SD = 1.79$), as for this analysis, we excluded those students who did not complete some of the instruments administered. Participants were divided into those with and without missing data, and an independent samples t test was performed to establish mean differences in the variables involved in the validity analysis. Results showed no differences between the two groups on any variables (stress manifestations, anxiety, depression, and life satisfaction), indicating a similar pattern across both. Therefore, and given that the corresponding sample was large enough, only complete cases were analyzed.

Measures

Stress. This was measured using the ASQ (Byrne et al., 2007), in its Spanish adaptation (ASQ-S). The ASQ comprises 56 self-report items related to minor adolescent stressors, each rated on a 5-point Likert scale anchored by 1 (*not at all stressful or irrelevant to me*) and 5 (*very stressful*). As noted in the introduction to this article (see, also, Table 3), the authors of the original scale identified 10 factors of adolescent stressor experiences. Higher scores on these factors are indicative of higher levels of stress.

The ASQ-S was developed using a back translation method and in accordance with the recommendations of the International Test Commission (2005; see also, Muñiz, Elosua, & Hambleton, 2013). In the first step, the original instrument was translated by two professional translators who were both native speakers of Spanish. Next, the research team (two psychometricians, one school psychologist, and three educational psychologists), together with the translators, rated the equivalence of the two versions (English and Spanish), systematically reviewing each of the item statements until a consensus was reached regarding the Spanish version. The Spanish version was then translated back into English by a different translator (a native speaker of English), after which the research team compared the original and back-translated English versions to ensure semantic and conceptual equivalence. Finally, the ASQ-S was administered to 68 students in a pilot session.

Stress manifestations. The Student Stress Inventory (SSI; Fimian et al., 1989) comprises two independent self-report scales for evaluating two distinct aspects: stressful stimuli and stress manifestations. The present study used solely the Stress Manifestations subscale (SSI-SM), which has been adapted into Spanish by Escobar-Espejo et al. (2011). This subscale consists of 22 self-report items that are rated on a 5-point Likert scale anchored by 1 (*no strength, not noticeable*) and 5 (*major strength, extremely noticeable*). The factor structure of the SSI-SM is based on three first-order factors, labeled Emotional Manifestations, Physiological Manifestations, and Behavioral Manifestations, and one second-order factor indicative of the total score for Stress Manifestations (Escobar-Espejo et al., 2011). Higher scores on the factors are indicative of higher levels of stress manifestations. The internal consistency coefficients in the present sample were .87, .62, and .62 for scores on Emotional Manifestations, Physiological Manifestations, and Behavioral Manifestations, respectively, and .88 for the total score.

Anxiety. This was assessed using the State–Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970, 2008), in its Spanish adaptation by Guillén-Riquelme and Buéla-Casal (2011). This test comprises two independent self-report scales that measure two distinct aspects: State Anxiety and Trait Anxiety. Each scale has 20 self-report items that are rated on a 4-point Likert scale anchored by 0 (*not at all*) and 3 (*very much so*). High scores on State Anxiety reflect transitory periods of anxiety, in other words, feelings (subjective and consciously perceived) of apprehension, tension, and worry that fluctuate and vary in intensity over time. By contrast, high scores on Trait Anxiety are indicative of a propensity toward anxiety, that is, a stable tendency to experience anxiety states. The internal consistency coefficients for scores on State Anxiety and Trait Anxiety in the present sample were .88 and .87, respectively.

Depression. This was evaluated using the Reynolds Adolescent Depression Scale (RADS; Reynolds, 1987, 2002), adapted into Spanish by Figueras-Masip, Amador-Campos, and Peró-Cebollero (2008). The RADS evaluates the current level of an adolescent's depressive symptomatology by means of 30 self-report items that are rated on a 4-point Likert scale anchored by 1 (*almost never*) and 4 (*most of the time*). The instrument comprises four scales: Somatic Complaints, Negative Self-Evaluation, Dysphoric Mood, and Anhedonia/Negative Affect. The present study considered the first three of these scales, on which high scores are indicative of depressive symptoms. The internal consistency coef-

ficients for scores on these scales in the current sample were .69, .83, and .80, respectively.

Life satisfaction. This was assessed using the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), adapted into Spanish by Atienza, Pons, Balaguer, and García-Merita (2000). The SWLS provides a global measure of life satisfaction as a component of subjective well-being. The Spanish version, for which new empirical evidence of validity has been reported (Bendayan et al., 2013), consists of five self-report items that are rated on a 5-point Likert scale anchored by 1 (*strongly disagree*) and 5 (*strongly agree*). Higher scores are indicative of higher levels of satisfaction. Internal consistency for the present sample was .78.

Procedure

After obtaining approval for the study from the principal of each secondary school, participants were selected from targeted classrooms. Following the conventional ethical guidelines for research in Spain, approval for the study was also obtained from the parents' association. In addition, all parents were informed of the purpose of the study and the procedures, and they were given the option of refusing permission for their child to participate. No parents withheld permission. Students themselves were also informed that they could withdraw from the study at any time if for any reason they did not wish to take part. None of them did so. A battery of questionnaires, including the measures described above, was completed by each participant during two 60-min sessions held during class time; the actual time required to complete the questionnaires in each session was approximately 35 min. The ASQ-S and the SSI-SM were administered in the first session, and the STAI, the RADS, and the SWLS in the second. A school psychologist supervised the sessions for assessment purposes, gave detailed verbal instructions to pupils about completing the questionnaires, and answered any questions they had.

Test-retest reliability was assessed over a 4-week interval to ensure no memory effect in the second administration. Although there is no strict rule, a period of 2–4 weeks between test and retest is considered to be reasonable (Aday & Cornelius, 2006).

Data Analysis

The internal structure of the ASQ-S was analyzed by means of CFA. A cross-validation strategy was employed, splitting the sample into two random groups. The first sample was labeled "calibration sample" ($n = 811$) and the second "validation sample" ($n = 749$). In the calibration sample, we first tested a first-order factor model in which each of the 56 ASQ-S items loaded on one of the 10 correlated latent factors. As this analysis showed the 10 factors to be highly correlated, and given that the covariation among these factors might be accounted for by a single higher order factor, we proceeded, in accordance with the procedure followed by De Vriendt et al. (2011), to test the fit of a higher order model with a second-order latent factor overlaying 10 first-order latent factors. The usual recommendation is to select the second-order factor model if it shows an acceptable fit, as it is more parsimonious than the first-order model. Consequently, having confirmed the fit of the second-order factor model in the calibration sample, it was established as the baseline model. To provide more evidence of construct validity and to verify the

structural model underlying the ASQ-S, we then tested the fit of this baseline model in the validation sample, applying several measures of covariance structure equivalence. First, we examined configural invariance to establish whether the number of factors and factor-loading patterns was the same across groups; thus, the model was tested by constraining the factor structure to be equal across groups (configural model). We then analyzed metric invariance to test equality with respect to the first-order and second-order factor loadings across groups. Thus, the model was tested by (a) constraining all first-order factor loadings to be equal, and (b) by constraining second-order factor loadings to be equal across groups.

The same procedure was then followed to verify the structural model across age groups. To this end, the sample was divided into three groups, defined as suggested by the World Health Organization (2014): early (10–13 years), middle (14–16 years), and late (17–19 years) adolescence. Configural and metric invariance was then tested for the second-order factor model.

These CFAs were carried out via structural equation modeling, using the EQS 6.3 software package (Bentler, 2006). Analyses were performed on the polychoric correlation matrix of items, using the maximum likelihood and robust estimation methods. The Satorra-Bentler chi-square (χ^2_{S-B}) was computed with the following goodness-of-fit indices (Bentler, 2006): the comparative fit index (CFI; Bentler, 1990), the nonnormed fit index (NNFI; Bentler & Bonett, 1980), and the root mean square error of approximation (RMSEA; Browne & Cudeck, 1993; Steiger, 2000). The CFI and NNFI measure the proportional improvement in fit by comparing a hypothesized model with the null model as baseline model. Values above .90 are usually considered to indicate an acceptable fit (Bentler, 1992; Bentler & Bonett, 1980; Sharma, Mukherjee, Kumar, & Dillon, 2005; Sun, 2005; Weston & Gore, 2006), while a value close to .95 is indicative of a good fit (Hu & Bentler, 1999). The RMSEA is an absolute misfit index, and the closer its value to zero, the better the fit. Values less than .08 indicate a reasonable fit (Browne & Cudeck, 1993), and those less than .06 a good fit (Hu & Bentler, 1999). To assess the configural and metric invariance of the CFA, and given that the chi-square test is sensitive to sample size, the fit of the nested model was assessed by comparing the CFI values (Cheung & Rensvold, 2002). If the decrease in CFI in the most constrained model is less than or equal to .01 in relation to the configural model, then it is considered that the equal constraints are tenable.

The corrected item-factor correlation and corrected item-total correlation were also computed. The factor score was calculated by summing scores for the items that load on each factor, while the total score was calculated as the sum of all 56 item responses. The score of the respective items was eliminated when computing the corrected correlations. Values greater than .30 are considered satisfactory (De Vaus, 2002; Traub, 1994).

Evidence of reliability was also obtained. Internal consistency was assessed by calculating Cronbach's alpha coefficients for scores on each factor and the total score on the ASQ-S. Test-retest reliability was analyzed by calculating the Pearson's correlation between scores on the first administration of the test and scores at retest (4 weeks later). Values greater than .70 are considered acceptable (Shultz & Whitney, 2005).

Finally, concurrent validity was examined through Pearson correlation analyses, testing the relationship between ASQ-S scores

and scores on measures of stress manifestations, anxiety, depression, and life satisfaction. In accordance with Cohen's (1988) criterion, we considered correlation coefficients of |.30| to be moderate and values of |.50| to be large.

Results

Factor Structure

A CFA was performed with the calibration sample to test the fit of the first-order factor model and the second-order factor model. Both models showed a good fit: $\chi^2_{S-B}(1,439) = 4,995.32$, CFI = .959, NNFI = .956, and RMSEA = .055 for the first-order factor model; $\chi^2_{S-B}(1,473) = 5,671.41$, CFI = .952, NNFI = .950, and RMSEA = .059 for the second-order factor model. For the first-order factor model, factors were highly correlated, ranging from .27 to .81, with 66.6% of the correlations being higher than .50. As the second-order factor model is more parsimonious and showed a good fit, we selected it as the baseline model. The second-order factor model also showed adequate fit in the validation sample (see Table 1).

We then calculated the goodness-of-fit indices related to the test for multigroup configural invariance, all of which indicated a good fit. The goodness-of-fit indices related to the equality of the first-order and second-order factor loadings were also satisfactory. Furthermore, the CFI showed no decrease from the configural model to the model with first-order and second-order factor loadings constrained to be equal across groups. These results indicate that the ASQ-S has a stable structure across groups. This structure is consistent with the finding of De Vriendt et al. (2011). Table 1 shows the fit indices for the cross-validation strategy.

Regarding configural and metric invariance across age groups, the results again showed acceptable goodness-of-fit indices (see Table 2), with CFI and NNFI values close to .95 and the RMSEA close to .06 across early, middle, and late adolescence. The configural model thus provides an adequate fit to the data. When the equivalence of the first-order and second-order factor loadings was introduced, the decrement in the CFI did not exceed .01. These results therefore indicate that the ASQ-S has a stable structure across age groups. Estimations for the standardized parameters of the model with the total sample are shown in Table 3; all are significant.

Reliability

Table 3 also shows the corrected item-factor correlation and corrected item-total correlation. All values were above .30, except for item 48 (value of .27).

The Cronbach's alpha coefficients for scores on each factor are presented in Table 4. All values were above .70, except for factor 10 (coefficient of .50). The value of alpha for the total score was .95.

The correlation between scores on the first administration of the ASQ-S and scores at retest were significant and higher than .70 for all factors (see Table 4), with the exception of factor 10 (coefficient of .63). For the total score, the test-retest correlation was .84.

Evidence of Concurrent Validity

The Pearson correlations between ASQ-S factor scores and scores on factors of the SSI-SM, STAI, RADS, and SWLS are shown in Table 5. All ASQ-S factor scores were related positively with measures of stress manifestations, anxiety, and depression, and negatively with life satisfaction. The highest correlations, equal to or above |.30|, were for the ASQ-S total score. Home Life, Financial Pressures, Peer Pressure, and School Performance were the ASQ-S factors with the highest number of correlation coefficients above |.30| in relation to the other measures.

Discussion

This study was conducted to develop the ASQ-S and to evaluate its psychometric properties: factor structure, measurement invariance across samples, reliability, and concurrent validity.

Results from the CFA showed a factor structure with good fit indices and which was consistent with expectations, namely 10 first-order factors (Home Life, School Performance, School Attendance, Romantic Relationships, Peer Pressure, Teacher Interaction, Future Uncertainty, School/Leisure Conflict, Financial Pressure, and Emerging Adult Responsibility) and one second-order factor that subsumes these factors and which supports the use of a total score for adolescent stressors. The factor structure of the ASQ-S therefore replicates the structure found by De Vriendt et al. (2011) using CFA. Furthermore, the items corresponding to the first-order factors are the same as those described by Byrne et al. (2007) when using PCA. In the present study, this factor structure was also replicated across two independent samples from the same population, as well as across three age groups (early,

Table 1

Fit Indices for the Second-Order Factor Model of the Spanish Version of the Adolescent Stress Questionnaire for Calibration and Validation Samples and Measurement Invariance Tests Across Samples

Model	χ^2_{S-B}	df	CFI	NNFI	RMSEA [90% CI]	ΔCFI
Calibration sample	5,671.41	1,473	.952	.950	.059 [.058, .061]	
Validation sample	6,105.93	1,473	.942	.940	.065 [.063, .066]	
Configural invariance	11,772.72	2,946	.947	.945	.062 [.061, .063]	
Equality constraints on first-order factor loadings	11,864.23	2,992	.947	.946	.062 [.060, .063]	0
Equality constraints on first- and second-order factor loadings	11,893.29	3,002	.947	.946	.062 [.060, .063]	0

Note. Calibration sample, $n = 811$; validation sample, $n = 749$. S-B = Satorra-Bentler; CFI = comparative fit index; NNFI = nonnormed fit index; RMSEA = root mean square error of approximation; CI = confidence interval; ΔCFI = CFI configural invariance model - CFI more constrained model.

Table 2

Fit Indices for the Second-Order Factor Model of the Spanish Version of the Adolescent Stress Questionnaire by Age Groups and Measurement Invariance Tests across Age Groups

Model	χ^2_{S-B}	<i>df</i>	CFI	NNFI	RMSEA [90% CI]	Δ CFI
Early adolescence	4,700.52	1,473	.957	.955	.064 [.062, .066]	
Middle adolescence	5,697.41	1,473	.935	.932	.062 [.060, .063]	
Late adolescence	2,925.20	1,473	.941	.939	.061 [.057, .064]	
Configural invariance	13,514.53	4,419	.945	.943	.063 [.062, .064]	
Equality constraints on first-order factor loadings	13,826.74	4,511	.944	.942	.063 [.062, .064]	-.001
Equality constraints on first- and second-order factor loadings	13,752.12	4,531	.944	.943	.063 [.061, .064]	-.001

Note. Early adolescence (12–13 years), $n = 539$; middle adolescence (14–16 years), $n = 753$; late adolescence (17–18 years), $n = 268$. S-B = Satorra–Bentler; CFI = comparative fit index; NNFI = nonnormed fit index; RMSEA = root mean square error of approximation; CI = confidence interval; Δ CFI = CFI configural invariance model – CFI more constrained model.

middle, and late adolescence), showing adequate fit for all groups. The results indicated that both the pattern of latent factors and the factor loadings were equivalent across groups, showing configural and metric invariance. These results verify the structural model underlying the ASQ-S and provide further evidence of construct validity.

The corrected item-factor correlation and corrected item-total correlation achieved satisfactory values above .30, with the exception of item 48. This item refers to “Work interfering with school and social activities,” reflecting the stress of taking on work responsibilities as one grows older. However, given that young people in Spain must be 16 or older before they can work without the authorization of their parents or legal guardians this item would only be of relevance to a small proportion of our sample (i.e., those aged 16 or over and working) and would not be representative of the stressors commonly faced by early to-middle adolescents in Spain.

The internal consistency coefficient for the total score was .95, indicating adequate reliability. The internal consistency for the factor scores yielded values above .70 on 9 of the 10 factors (range .50–.87). The highest alpha value was found for the score on Home Life and the lowest for Emerging Adult Responsibility. These results are similar to those obtained by both Byrne et al. (2007) (range .62–.92) and De Vriendt et al. (2011) (range .57–.88). Moreover, the highest and lowest alpha values found in both these studies corresponded to the same factor scores as in the present study. Overall, the results indicate good internal consistency for most factor scores.

Test–retest reliability was examined in a sample of 446 participants over a 4-week interval. The test–retest correlation for the total score was .84, whereas for factor scores the coefficients were above .70 on 9 of the 10 factors (range .63–.80). As in the case of internal consistency, the highest value was found for the score on Home Life and the lowest for Emerging Adult Responsibility. These results are similar to the findings of Byrne et al. (2007) over a 1-week interval (range .68–.88) and are better than those reported by De Vriendt et al. (2011) over a 2-week period (range .45–.84), where only two factor scores yielded coefficients above .70. Given that the time between test and retest was longer in the present study, we consider that our results indicate satisfactory test–retest reliability.

As already noted, the highest values of internal consistency and test–retest reliability corresponded to the score on Home Life. This result may be partly attributable to the fact that the Home Life factor has the greatest number of items (12 items) among all the

factors. However, and as we discuss below, it may also indicate that family is crucial for adolescent development (American Psychological Association, 2002; Steinberg, 2001).

The lowest coefficients for both internal consistency and test–retest reliability corresponded to the score on Emerging Adult Responsibility, comprising the items “Having to take on new family responsibilities with growing older,” “Employers expecting too much of you,” and “Work interfering with school and social activities.” As suggested earlier, this finding may be due to the age of the present sample, spanning all stages of adolescence (12 to 18 years); thus, employment-related stressors might be less salient, above all for early and middle adolescents. In fact, the internal consistency coefficients for the late adolescence group are higher than for the early and middle group (.58 vs. .47), a trend that can also be seen in the test–retest correlation (.70 vs. .58). Previous studies of the ASQ have also reported instability for Emerging Adult Responsibility, which has consistently been the factor score with the lowest internal consistency (Byrne et al., 2007; De Vriendt et al., 2011; McKay et al., 2016; Moksnes, Byrne, Mazanov, & Espnes, 2010). This result could be due to the age and family situation of the adolescents in our sample, most of whom still lived with and were financially dependent on their parents. Further research is therefore needed to examine the variables that are related to this factor.

Our results also provide evidence for the concurrent validity of the ASQ-S total score. First, positive correlations were found with stress manifestations, as assessed by the SSI-SM. Those adolescents who reported more minor stressors also scored higher on Emotional Manifestations, Physiological Manifestations, and Behavioral Manifestations of stress. These results are consistent with previous findings suggesting that stress as a stimulus is not independent of stress as a response, and therefore a complete assessment of stress should cover both these dimensions (Escobar-Espejo et al., 2011; Fimian et al., 1989). In other words, to obtain a deeper understanding of stressors and their implications for adolescent development it is important to consider not only sources of stress but also their emotional, physiological, and behavioral manifestations.

Second, we found positive correlations between the ASQ-S total score and both State Anxiety and Trait Anxiety, as measured by the STAI. These results are consistent with previous studies using the ASQ that found a direct association between stressors and anxiety in the adolescent population (Byrne et al., 2007; Moksnes, Byrne, et al., 2010; Moksnes & Espnes, 2011; Moksnes et al.,

PSYCHOMETRIC PROPERTIES OF THE ASQ-S

Table 3

Standardized First-Order and Second-Order Factor Loadings for the Second Order Factor Model of the Spanish Version of the Adolescent Stress Questionnaire (ASQ-S) and Corrected Item-Factor and Item-Total Correlations

ASQ-S items	Factor loading	Second-order factor loading	Item-factor correlation	Item-total correlation
Factor 1. Home Life		.85		
Item 1. Disagreements between you and your father	.63		.58	.43
Item 2. Not being taken seriously by your parents	.57		.52	.50
Item 4. Little or no control over your life	.52		.42	.45
Item 13. Abiding by petty rules at home	.52		.45	.44
Item 27. Disagreements between your parents	.77		.67	.57
Item 29. Arguments at home	.76		.64	.56
Item 33. Living at home	.50		.37	.33
Item 35. Disagreements between you and your mother	.79		.68	.58
Item 42. Lack of trust from adults	.68		.56	.60
Item 44. Parents expecting too much from you	.62		.54	.56
Item 46. Lack of understanding by your parents	.80		.68	.65
Item 47. Parents hassling you about the way you look	.62		.46	.51
Factor 2. School Performance		.79		
Item 5. Having to study things you do not understand	.64		.54	.46
Item 6. Teachers expecting too much from you	.52		.41	.41
Item 9. Keeping up with schoolwork	.64		.53	.43
Item 12. Difficulty with some subjects	.69		.56	.49
Item 14. Having to concentrate too long during school hours	.59		.52	.43
Item 15. Having to study things you are not interested in	.60		.51	.45
Item 41. Pressure of study	.69		.57	.58
Factor 3. School Attendance		.47		
Item 3. Getting up early in the morning to go to school	.53		.43	.23
Item 31. Compulsory school attendance	.85		.60	.39
Item 37. Going to school	.91		.68	.40
Factor 4. Romantic Relationships		.64		
Item 16. Being ignored or rejected by the person you want to go out with	.61		.46	.50
Item 25. Making the relationship with your boy-/girlfriend work	.79		.63	.44
Item 38. Not having enough time for your boy-/girlfriend	.83		.64	.52
Item 50. Getting along with your boy-/girlfriend	.78		.58	.41
Item 56. Breaking up with your boy-/girlfriend	.84		.65	.46
Factor 5. Peer Pressure		.67		
Item 8. Being hassled for not fitting in	.76		.59	.40
Item 26. Being judged by your friends	.77		.65	.51
Item 28. Changes in your physical appearance with growing up	.50		.46	.50
Item 30. Pressure to fit in with peers	.81		.65	.47
Item 34. Insatisfaction with how you look	.64		.54	.52
Item 52. Peers hassling you about the way you look	.84		.69	.48
Item 54. Disagreements between you and your peers	.63		.54	.54
Factor 6. Teacher Interaction		.84		
Item 17. Disagreements between you and your teachers	.63		.51	.52
Item 23. Not getting enough timely feedback on schoolwork	.52		.39	.47
Item 39. Teachers hassling you about the way you look	.67		.50	.45
Item 40. Abiding by petty rules at school	.54		.38	.44
Item 43. Not being listened to by teachers	.77		.63	.57
Item 53. Lack of respect from teachers	.76		.59	.50
Item 55. Getting along with your teachers	.59		.45	.47
Factor 7. Future Uncertainty		.65		
Item 7. Concern about your future	.73		.53	.43
Item 19. Putting pressure on yourself to meet your future goals	.59		.45	.38
Item 32. Having to make decisions about future work or education	.80		.54	.50
Factor 8. School/Leisure Conflict		.74		
Item 18. Not having enough time for fun	.79		.68	.52
Item 21. Not getting enough time for leisure	.81		.67	.51
Item 22. Having too much homework	.63		.52	.47
Item 24. Not enough time for activities outside of school hours	.76		.66	.54
Item 51. Lack of freedom	.63		.49	.61
Factor 9. Financial Pressure		.72		
Item 20. Pressure to work to make more money	.56		.39	.46

(table continues)

Table 3 (continued)

ASQ-S items	Factor loading	Second-order factor loading	Item-factor correlation	Item-total correlation
Item 36. Not enough money to buy the things you want	.81		.62	.53
Item 45. Having to take on new financial responsibilities with growing older	.66		.52	.57
Item 49. Not enough money to buy the things you need	.90		.66	.54
Factor 10. Emerging Adult Responsibility		.94		
Item 10. Employers expecting too much of you	.49		.37	.42
Item 11. Having to take on new family responsibilities with growing older	.58		.32	.47
Item 48. Work interfering with school and social activities	.56		.27	.44

Note. $N = 1,560$. Items are reproduced from Byrne et al. (2007, pp. 402–403).

2013; Moksnes, Moljord, et al., 2010). Similar results have also been obtained using other measures of stressors (Wright et al., 2010).

Third, positive relationships were found between the ASQ-S total score and the Somatic Complaints, Negative Self-Evaluation, and Dysphoric Mood subscales of the RADS. Previous studies with the ASQ have likewise found a close relationship between stressors and depressive symptoms in adolescents (Byrne et al., 2007; Charbonneau et al., 2009; Moksnes, Eilertsen, et al., 2016; Moksnes & Espnes, 2011; Moksnes et al., 2013; Moksnes, Moljord, et al., 2010).

Finally, the total score on the ASQ-S was negatively correlated with that on the SWLS, an indicator of satisfaction with life. Previous studies have similarly found that those adolescents who report experiencing more stressors also report lower levels of life satisfaction (Bendayan et al., 2013; Moksnes & Haugan, 2015; Moksnes, Løhre, et al., 2016).

All the ASQ-S factor scores were related with stress manifestations, anxiety, depression, and life satisfaction. However, Home Life, Financial Pressures, Peer Pressure, and School Performance were the factors that showed the strongest association with these other measures. These results suggest that family, finance, peer relations, and school are the key domains to target to prevent emotional problems in adolescents. Furthermore, there appears to be interconnectivity between these domains in adolescents' daily lives (Flook & Fuligni, 2008; Lehman & Repetti, 2007; Salamon et al., 2011), with research highlighting, for example, reciprocal spillover effects between parent-adolescent conflict and school problems (Timmons & Margolin, 2015).

The family context has several functions in relation to adolescent development and emotional adjustment, and it is an important source of support and affection. However, as this stage of life is also when young people begin to seek greater independence from their parents, numerous stressors related to parent–child interactions may emerge, with a negative impact on health and well-being (Moksnes & Haugan, 2015; Wright et al., 2010). Our results showed that stressors such as disagreements with parents, parental control, lack of trust from adults, high parental expectations, lack of parental understanding, or hassles with parents related to appearance could be risk factors for internalizing problems and low life satisfaction. One way of preventing home/family stressors might therefore be to develop parent education programs that teach skills related to supporting adolescent autonomy, a strong sense of bonding, closeness, attachment to family, setting limits, explaining rules, appropriate expectations about the child, reasoning, and listening.

Financial difficulties represent a classical stressor domain and several studies have documented the negative impact on adolescent adjustment (Cronin, Becher, Christians, Maher, & Dibb, 2015; Ponnet, Wouters, Goedemé, & Mortelmans, 2016; Wadsworth & Compas, 2002). In recent years, increasing numbers of families have experienced economic strain due to the recession (Cronin et al., 2015), and this is likely to be an important source of the financial pressure reported by adolescents. Furthermore, financial problems of this kind are associated with more conflict and instability among family members (Ponnet et al., 2016; Wadsworth & Compas, 2002), and are also a source of other stressors. Family intervention focused on enhancing both primary control

Table 4

Internal Consistency and Test–Retest Reliability of the Spanish Version of the Adolescent Stress Questionnaire (ASQ-S)

ASQ-S	Cronbach's α	Test–retest reliability
Factor 1. Home Life	.87	.80
Factor 2. School Performance	.79	.75
Factor 3. School Attendance	.74	.72
Factor 4. Romantic Relationships	.80	.73
Factor 5. Peer Pressure	.84	.78
Factor 6. Teacher Interaction	.77	.71
Factor 7. Future Uncertainty	.70	.73
Factor 8. School/Leisure Conflict	.81	.76
Factor 9. Financial Pressure	.75	.71
Factor 10. Emerging Adult Responsibility	.50	.63
Total ASQ-S	.95	.84

Note. All test–retest reliability coefficients were significant, $p < .001$. Internal consistency, $N = 1,560$. Test–retest reliability, $N = 446$.

Table 5

Correlations of the Adolescent Stress Questionnaire (ASQ) Spanish Version Factors With Stress Manifestation, Anxiety, Depression, and Life Satisfaction Measures

Variable	Factor (F)										Total ASQ
	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	
Stress manifestations											
Emotional manifestations	.48	.39	.15	.27	.31	.26	.36	.29	.35	.26	.46
Physiological manifestations	.36	.26	.14	.21	.26	.24	.23	.20	.25	.22	.35
Behavioral manifestations	.31	.26	.20	.22	.20	.27	.20	.19	.27	.16	.33
Total stress manifestations	.48	.39	.18	.28	.32	.30	.34	.29	.36	.26	.47
Anxiety											
State anxiety	.37	.30	.12	.22	.27	.22	.27	.20	.24	.19	.35
Trait anxiety	.45	.34	.16	.32	.39	.28	.32	.24	.33	.24	.45
Depression											
Somatic complaints	.46	.38	.27	.26	.35	.34	.31	.30	.36	.27	.48
Negative self-evaluation	.50	.29	.20	.28	.42	.30	.25	.25	.32	.24	.46
Dysphoric mood	.49	.33	.09	.30	.43	.30	.36	.25	.32	.25	.47
Life satisfaction	-.33	-.22	-.18	-.20	-.26	-.16	-.16	-.14	-.27	-.16	-.30

Note. $N = 1,336$. All correlation coefficients were significant, $p < .001$. Factors: F1 = Home Life; F2 = School Performance; F3 = School Attendance; F4 = Romantic Relationships; F5 = Peer Pressure; F6 = Teacher Interaction; F7 = Future Uncertainty; F8 = School/Leisure Conflict; F9 = Financial Pressure; F10 = Emerging Adult Responsibility.

coping (e.g., problem solving, emotional expression, and emotion regulation) and secondary control coping (active acceptance, cognitive restructuring, distraction, and positive thinking) to manage finance-related stress may improve the family climate, decreasing negative parent-child interactions and children's emotional problems (Wadsworth et al., 2013).

In addition to the family, peer relationships are essential in adolescence due to the need for social affiliation, and they are an important component of personal growth and well-being (Rubin, Bukowski, & Parker, 2006; Slee & Skrzypiec, 2016). Given the increasing significance of peers during adolescence, negative peer events begin to play an important role in the development of emotional problems, increasing levels of anxiety and depression and decreasing life satisfaction (Bakker et al., 2010; Herres & Kobak, 2015; Hjern et al., 2008; Moksnes & Haugan, 2015; Persike & Seiffge-Krenke, 2016; Wright et al., 2010). Peer stressors cover a wide spectrum of events such as being hassled for not fitting in, being judged by friends, pressure to fit in with peers, peers hassling you about the way you look, disagreements with peers, and so forth. The assessment of peer stressors may reveal the need for clinical and educational initiatives focused on social competence, increasing assertiveness, and conflict resolution skills (e.g., negotiating, engaging in a conversation, etc.).

Finally, the academic sphere is another salient source of adolescent stress that is associated with a variety of emotional problems (Byrne et al., 2007; Moksnes et al., 2013; Moksnes, Løhre, et al., 2016; Sun et al., 2011). The overall experience of cumulative academic stressors is also positively related to family stress (Flook & Fuligni, 2008; Lehman & Repetti, 2007). Specifically, school performance appears to be a prominent stressor in adolescents due to academic transitions and changes, including a greater emphasis on academic success, increased academic demands, greater responsibilities, and higher expectations from oneself and others (Byrne et al., 2007; Hjern et al., 2008). The score on the School Performance factor of the ASQ allows early identification of adolescents who may be at risk for

school maladjustment. In this context, the implementation of classroom-based programs may help to promote healthy academic coping strategies, time management, and goal setting skills. In addition, educational practice and teaching styles should be reviewed to promote a supportive and positive academic environment.

Overall, and given the impact that stress can have on emotional adjustment and well-being, the results of the present study show that the assessment of stressors in several domains should be a key objective in adolescence. In this context, the ASQ-S is a useful tool for assessing minor stressors in Spanish adolescents aged between 12 and 18 years, offering both a total score and factor scores for specific stressor domains. A high score on the ASQ-S would indicate a risk profile that would require more detailed assessment using specific measures of social and emotional adaptation. The factor scores could help to identify the most important areas of stressors, thus facilitating the design of targeted interventions.

The present study does have a number of limitations that should be acknowledged. As all participants were from the south of Spain it would be interesting for future studies to explore other geographical areas of the country, as well as other Spanish-speaking countries. The validity evidence for ASQ-S scores could also be extended by examining their relationship to other variables such as self-esteem, coping strategies, and externalizing behavior, and by considering other sources of information such as parents and teachers. Finally, evidence for the discriminant validity of factor scores should also be provided in future studies. One would expect the factor score for a given stress domain to be more strongly related to some specific variables than others. For example, the score on Home Life should be more strongly associated with a nonauthoritative parenting style (Steinberg, 2001), the score on School Attendance should be related to low academic motivation (Green et al., 2012), and the score on Teacher Interaction should be negatively associated with a learner-centered teaching style (Opdenakker & Van Damme, 2006).

In sum, the ASQ-S is a valid and reliable addition to the field of adolescent stressor assessment. The instrument will help to provide a better understanding of the minor stressors experienced by Spanish adolescents, as well as of their consequences, facilitating the design of prevention and intervention programs.

Conclusion

The present study provides new insights into the psychometric properties of the ASQ by applying it to a sample of Spanish adolescents, a population not previously studied. The factor structure of the ASQ-S was consistent with a second-order model and showed satisfactory goodness-of-fit indices. The internal consistency and test-retest reliability were also adequate. As expected, we found positive associations with measures of stress manifestations, anxiety, and depression, and negative associations with a global measure of life satisfaction. The ASQ-S is a measure of contemporaneous adolescent stressors that is clear, simple, and easy to administer, and it provides important information for professionals in the clinical and educational psychology fields. Studies such as this add further support for the psychometric properties of the questionnaire, confirming its utility as a measure of adolescent minor stressors.

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