



Dimensionality and Measurement Invariance of a Brief Form of the Young Schema Questionnaire for Adolescents

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Abstract

The current work aims to develop and examine the psychometric properties of the Brief form of the Young Schema Questionnaire for Adolescents (B-YSQ-A), so that Early Maladaptive Schemas can be accurately measured in younger populations. Early Maladaptive Schemas are self-defeating core themes underlying maladaptive cognition, affect, and behavior. A community sample of 877 adolescents, aged 12–18 years old, filled out self-report instruments on maladaptive schemas, anger management, and internalizing and externalizing symptoms. The items composing the B-YSQ-A were selected based on statistical and content analyses criteria. Its internal structure, reliability, age- and gender-based invariance, and between-gender mean differences were examined, as well as its relationship with external variables. Results indicated a satisfying fit for the 18 original schema factors through confirmatory factor analysis. These schemas also showed adequate internal consistency and test-retest reliability, with the exception of the entitlement/grandiosity and self-sacrifice schemas. The B-YSQ-A was found to be age and gender invariant. Concerning gender differences, boys scored higher on the entitlement/grandiosity, insufficient self-control/discipline, approval/recognition seeking, unrelenting standards/hypercriticalness and punitiveness schemas, whereas girls scored higher on the abandonment/instability, mistrust/abuse, and self-sacrifice schemas. Furthermore, evidence was found for construct validity in relation to measures of internalizing and externalizing symptomatology and of anger expression. Findings offer support for the use of the B-YSQ-A with adolescents, both for research and intervention purposes.

Keywords Early maladaptive schemas · Measurement invariance · Dimensionality · Adolescents · Young Schema Questionnaire (YSQ)

Introduction

Early maladaptive schemas (EMSs) constitute a major theoretical feature of schema therapy (ST; Young 1999). They are defined as pervasive, inflexible and dysfunctional to a significant degree, and may, when triggered, cause

disruptive emotional states and associated maladaptive behaviors. EMSs have been found to associate with the onset and maintenance of psychopathology (Young et al. 2003), including depressive and anxious symptoms (Welburn et al. 2002), eating disorders (Waller et al. 2001), alcohol-dependence (Shorey et al. 2012), and personality disorders (Bach et al. 2015). EMSs develop early in life as a result of the interaction between the child's temperament and adverse early experiences with caregivers. When basic developmental needs are not met in a satisfactory way, the child's functioning in different life domains can become clearly impaired. EMSs are highly resistant to change, given that they continue to be elaborated throughout one's lifetime (Young 1999). The ST framework has proposed eighteen schemas grouped into five schema domains that correspond to core emotional needs that remained unmet throughout childhood (Young et al. 2003; cf. Supplementary material 1).

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The Young Schema Questionnaire (YSQ) was developed to assess EMSs. Over the last years, three versions of that instrument have been proposed (i.e., the Young Schema Questionnaire Long Form – YSQ-LF, with 205 items addressing 16 schemas, Young and Brown 1990; the Young Schema Questionnaire Short – YSQ-S with 75 items addressing 15 schemas, Young 1999; and the YSQ-S3, consisting of 90 items evaluating 18 EMSs; Young 2005). Its most recent version, the YSQ-S3, has been extensively researched. Specifically, the 18 EMSs factor structure has received considerable support (Calvete et al. 2013; Rijo 2009), although some EMSs revealed low reliability (e.g., entitlement/grandiosity, Bach et al. 2015; Hawke and Provencher 2012; Kriston et al. 2013; and dependence/incompetence, Calvete et al. 2013). Concerning schema domains, which have been tested as higher order factors, some studies corroborated the 5 proposed domains, while others found evidence for only 3 domains (Rijo 2009; Soygüt et al. 2009), and yet others found no evidence for schema domains (Hawke and Provencher 2012; Kriston et al. 2012).

Despite the relevance of the development of EMSs during childhood and their further elaboration throughout adolescence, and regardless of the impact of these EMSs on later psychopathology (Young et al. 2003), research carried out with children and adolescents has been scarce, in comparison with research with adult samples (Van Vlierberghe et al. 2010). Nevertheless, it is essential to assess these variables in adolescence in an accurate manner in order to determine the early presence of EMSs and test for their stability over time (Rijkeboer and Boo 2010; Stallard 2007). Hence, and based on previous findings validating the YSQ with adults, it would be useful to develop a shorter and developmentally appropriate measure of EMSs for adolescents, in order to overcome their tendency to become burdened, tired and disengaged with long self-report instruments (Fan et al. 2006).

Some studies have been conducted with this purpose in mind, in which the items were rephrased with the goal of becoming more meaningful to children (Rijkeboer and Boo 2010) or to adolescents (Muris 2006; Van Vlierberghe et al. 2010). Most of these studies have been conducted with the YSQ-S, which assesses 15 schemas, instead of the 18 EMSs currently proposed. Moreover, findings have not been unanimous and some have even been controversial (Muris 2006; Rijkeboer and Boo 2010; Saritaş and Gençöz 2011; Stallard and Rayner 2005; Van Vlierberghe et al. 2010). Specifically, the following issues can be pointed out: 1) the length of the questionnaires ranges from 15 items, one for each EMS (Stallard and Rayner 2005) to 75 items (Rijkeboer and Boo 2010; Van Vlierberghe et al. 2010); 2) factors vary from completely agreeing with the proposed schemas (Van Vlierberghe et al. 2010), to extracting only 10 (Simons and Free 2000), or confirming only 8 schemas (Rijkeboer and Boo 2010); 3) evidence regarding schema domains has

either confirmed five higher-order factors/ schema domains (Van Vlierberghe et al. 2010), or extracted 3 (Muris 2006; Saritaş and Gençöz 2011) or 4 schema domains (Stallard 2007).

Only the Saritaş and Gençöz study (2011), conducted with a non-clinical sample of 356 adolescents aged between 15 and 18 years old, analyzed the most recent and updated version of the YSQ (i.e., YSQ-S3). By using the predefined EMSs as observable variables in an exploratory factor analysis (i.e., they did not consider *a priori* the loading of individual items on each EMSs but rather used the sum of scores for each EMSs to test for the presence of schema domains), this study found evidence for 3 schema domains, which were named “Impaired limits-exaggerated standards”, “Disconnection-rejection”, and “Impaired autonomy-other directedness”. They also found that the “Impaired limits-exaggerated standards” domain had a significant association with anger, whereas the “Disconnection-rejection” and “Impaired autonomy-other directedness” domains had significant associations with anxiety.

Regarding the EMSs construct validity, and despite the use of earlier versions of the YSQ, previous results showed that most EMSs associated with both internalizing and externalizing problems (Van Vlierberghe et al. 2010). While social isolation/alienation and vulnerability to harm/illness EMSs were highly predictive of internalizing symptoms, the grandiosity/entitlement and dependence/incompetence EMSs were predictors of externalizing symptoms (Van Vlierberghe and Braet 2007). Also, EMSs in general seemed to be positively associated with negative affectivity and aggressive mood (with exception of the self-sacrifice and enmeshment schemas; Rijkeboer and Boo 2010). Moreover, specific EMSs such as failure, submission, and insufficient self-control were negatively associated with self-regulatory capacities (i.e., effortful control; Rijkeboer and Boo 2010).

Only a few studies explored gender differences in EMS within adolescence, and findings were contradictory. Namely, whereas a study using the YSQ-LF found no differences between gender (González-Jiménez and Hernández-Romera 2014), another found that adolescent girls scored higher on EMSs than boys (Calvete et al. 2015), particularly on those schemas referring to the other-directedness domain, which, in turn, have been associated with higher levels of social anxiety (Calvete et al. 2013). Gender-based findings on EMSs in adolescence may benefit from additional consideration, namely from the perspective of measurement invariance analyses, which would allow for more accurate comparisons.

With the exception of the Saritaş and Gençöz study (2011), most of the instruments available for use with younger populations do not assess the current proposal of 18 EMSs and different findings concerning the EMSs and their domains have been reported. Moreover, the YSQ-S or the

YSQ-S3 are still frequently used, even if they are extensive questionnaires using a language that is not completely appropriate for the specificities of adolescents (e.g., González-Jiménez and Hernández-Romera 2014). Furthermore, adolescence itself includes several phases characterized by fairly distinctive physical, cognitive, social and emotional development features (Sawyer et al. 2012). Hence, the development of a short form of the YSQ-S3, suitable for assessing schemas in adolescents continues to be relevant, especially within the most recent theoretical framework of 18 EMSs. The development of this instrument should be useful in research on the nature and development of maladaptive cognitive patterns in children and adolescents (Muris 2006). Such instrument may also be useful in the assessment of the efficacy of interventions targeting dysfunctional cognitive patterns that are supposed to be more responsive to change within this age range (Stallard and Rayner 2005).

The current work validates a brief version of the YSQ-S3 adapted for adolescents – the Brief form of the Young Schema Questionnaire for Adolescents (B-YSQ-A). Specifically its internal structure, internal consistency, age- and gender-based measurement invariance, between-gender mean comparisons, and association with external variables were investigated. The 18 EMSs measurement model was expected as a good fit for the data; good internal consistency values for all EMSs were also expected. In turn, it was expected that including schema domains would not improve the model's fit. The B-YSQ-A was further expected to be age and gender invariant, and girls were expected to score higher on EMSs in comparison with boys, particularly on those EMSs associated with internalizing psychopathology. Finally, EMSs as assessed through the B-YSQ-A were expected to be positively associated with both internalizing and externalizing problems and with dysfunctional anger expression.

Method

Participants

The participants were 877 adolescent boys ($n = 389$) and girls ($n = 488$), aged between 12 and 18 years old, who filled out the B-YSQ-A (see Instruments section). This age range, though extensive, falls within the age limits of adolescence, including the early (i.e., 12–14 years old, $n = 407$, 45.7% of the sample) and late phases (i.e., 15–18 years old, $n = 476$, 54.3% of the sample) of adolescence (Sawyer et al. 2012). Concerning academic performance, participants attended the 5th through the 12th grade and had had between 0 and 3 school holdbacks (i.e., being retained in the same school year due to academic failure). As for socioeconomic status (SES), the majority of the sample belonged to a low SES (cf. Table 1).

Table 1 Sociodemographic characteristics of the complete sample and subsamples

	Complete sample ($n = 877$)	Validity subsample ($n = 146$)	Stability subsample ($n = 45$)
Gender			
Male	389 (44.4)	66 (45.2)	19 (42.2)
Female	488 (55.6)	80 (54.8)	26 (57.8%)
Age	14.84 (1.86)	16.55 (1.76)	17.04 (0.71)
School years completed	8.30 (1.68)	8.91 (1.47)	10.67 (0.48)
School holdbacks	0.27 (0.56)	0.39 (0.65)	0.22 (0.47)
Socioeconomic status			
Low	597 (68.1)	105 (71.09)	26 (64.4)
Medium	251 (28.6)	37 (25.3)	15 (33.3)
High	29 (3.3)	4 (2.7)	1 (2.2)

Socioeconomic status (SES) was measured by parents' profession, considering the Portuguese professions classification (Instituto Nacional de Estatística 2011). Examples of professions in the high SES group are judges, higher education professors, or MDs; in the medium SES group are nurses, psychologists, or school teachers; and in the low SES group are farmers, cleaning staff, or undifferentiated workers. Data for gender and socioeconomic status are presented as n (%); data for age, school years completed and school holdbacks are presented as M (SD)

Boys were significantly older than girls ($t(875) = 2.43$, $p = .015$; for boys $M = 15.01$, $SD = 1.89$ and for girls $M = 14.70$, $SD = 1.83$). Also, boys had, on average, experienced more school holdbacks ($t(708.80) = 3.57$, $p < .001$; for boys $M = .34$, $SD = .65$ and for girls $M = .20$, $SD = .49$). Alternatively, boys and girls had, on average, completed the same number of school years ($t(875) = 1.49$, $p = .14$; for boys $M = 8.39$, $SD = 1.69$ and for girls $M = 8.22$, $SD = 1.69$) and were similarly distributed by SES ($\chi^2(2) = 3.22$, $p = .20$).

A subsample of 146 participants (i.e., validity subsample) was randomly selected to fill out the instruments assessing relevant external variables (i.e., Youth Self-Report and State Trait Anger Expression Inventory; see Instruments section). The comparison between participants included and not included in this subsample (cf. Table 1) showed a random distribution by gender ($\chi^2(1) = .05$, $p = .82$) and SES ($\chi^2(2) = 1.21$, $p = .55$). Alternatively, participants in this subsample were significantly older ($t(213.34) = 6.18$, $p < .001$), and, on average, had completed more school years ($t(229.32) = 5.43$, $p < .001$) and had had more school holdbacks ($t(188.81) = 2.61$, $p = .010$).

Another subsample within the complete sample filled out the B-YSQ-A 3–4 weeks after the first data collection (i.e., stability subsample; cf. Table 1). The results of the comparison between participants included and not included in this subsample showed that participants were evenly

distributed by gender ($\chi^2(1) = .09, p = .77$) and SES ($\chi^2(2) = .63, p = .73$); they also had had, on average, a similar number of school holdbacks ($t(875) = -.53, p = .59$). Furthermore, participants in this subsample were significantly older ($t(81.35) = 18.94, p < .001$) and had, on average, a completed more school years ($t(114.93) = 27.56, p < .001$).

Procedure

Seven schools located in the Center region of Portugal were conveniently selected, after the national ethics committee and the direction boards of the schools had approved the study. Of the initial seven schools, two were randomly selected, one to be used as the validity sample, and other to be used as the stability sample. Therefore, in five schools students were asked to fill out only the YSQ-S3, in one school students were asked to fill out the YSQ-S3 and the validity measures (see instrument section), and in another school students were asked to fill out the YSQ-S3 in two different moments in time. In order to minimize the interference of the data collection on the academic activities, schools themselves selected the classes that would be invited to take part in the study. They were asked not to select classes that were distinctive in any particular way (e.g., lower or higher academic achievement) from the typical classes of that school. Therefore, not all of the students enrolled in each school were invited to take part in this research (in fact, schools often selected only one class per school year).

In addition to institutional authorizations and ethical considerations, parents/legal guardians also gave informed consent for their underage children (i.e., younger than 18 years of age) to participate in the study; participants who were 18 years old gave their own consent. Students who were selected by the schools as potential participants were asked to voluntarily participate and were informed about the goals of the study. The anonymity and confidentiality of their responses were guaranteed and they were also assured that they could withdraw from the study at any time. To preserve the anonymity of families and of 18-year-old students, the schools did not provide the research team with information on the students who were not selected to participate in this study nor on those who declined to collaborate. Data was collected in group during classes, in the presence of a researcher, to ensure confidential and independent responses, and to answer any possible questions.

Measures

Young Schema Questionnaire—S3

The Young Schema Questionnaire - S3 (YSQ-S3, Young 2005; Portuguese version by Pinto Gouveia et al. [unpublished](#)) is a 90-item self-report questionnaire that assesses

the 18 EMSs proposed by Young et al. (2003). Each item is answered using a 6-point Likert scale rated from 1 (completely untrue of me) to 6 (describes me perfectly). Higher scores indicate a stronger presence of an EMS. The YSQ-S3 was validated for the Portuguese population in a sample of 1226 adults from the general population. The 18-factor structure was confirmed with an acceptable goodness of fit, after removing 6 items from the original 90. Both the total scale and each factor revealed good internal consistency values, except for the unrelenting standards/hyper-criticalness EMS, which presented alpha values lower than .60. The YSQ-S3 also showed an adequate concurrent validity in relation to depression and psychopathology in general, discriminant sensitivity between clinical groups with DSM IV TR Axis I and Axis II disorders and non-clinical groups, and good stability over time (Rijo 2009, 2017).

The Young Schema Questionnaire for Adolescents (YSQ-A) resulted from simplifying, rephrasing, and adapting the 90-item Portuguese version of the YSQ-S3, as well as its rating scale, so that adolescents might more easily understand the items and answer them. For example, the item “Most other people are more capable than I am in areas of work and achievement” from the adult version was rephrased to “Most people have more skills than me at school”. The rating scale was also adapted, so that it referred to daily rather than introspective experiences. So, it ranges from 1 (It has nothing to do with what happens or happened to me) to 6 (This is exactly what happens or happened to me). Information on the procedures that lead to the development of the B-YSQ-A and on its psychometric properties is presented in the results section.

Youth Self Report

The Youth Self-Report (YSR, Achenbach 1991; Portuguese version by Fonseca and Monteiro 1999) is a self-report survey aiming to assess emotional and behavioral problems in adolescents. The present study used the second part of this instrument composed by 119 items, 103 of which are related to specific behavioral problems and 16 relate to socially desirable behaviors. Each item is rated on a Likert scale ranging from 0 (not true) to 2 (often true). The Portuguese version assesses internalizing and externalizing problems, which are divided into 6 factors (i.e., withdrawn, somatic complaints, anxiety and depression, thought problems, attention problems/hyperactivity, and anti-social behavior). Its internal consistency values varied between .70 and .80 (Fonseca and Monteiro 1999). For parsimony reasons, only the externalizing and internalizing clusters were used in the current work to examine the construct validity of the B-YSQ-A. They showed very good internal consistency values within the current sample: $\alpha = .86$ for externalizing and $\alpha = .84$ for internalizing problems.

State Trait Anger Expression Inventory

The State Trait Anger Expression Inventory (STAXI, Spielberger 1988; Portuguese version by Silva et al. 1999) is a 44-item self-report instrument intended to assess the intensity of experienced anger and anger expression. It includes three parts measuring state anger, trait anger, and anger expression. Trait anger is computed from two subscales (i.e., temperament and reaction); anger expression includes exteriorized anger, internalized anger and anger control. Each item is rated on a Likert-scale ranging from 1 (not at all to me) to 4 (almost always). STAXI's original version presented 6 factors and good internal consistency scores, varying from .73 to .93 (Spielberger 1988). In the Portuguese validation study, the same factors were replicated and internal consistency values varied from .65 to .88; only trait anger showed low reliability ($\alpha = .65$; Silva et al. 1999). Again for parsimony reasons, only the state anger, trait anger, and anger expression measures were used in the current work to investigate construct validity. Within the current sample, their internal consistency values were: $\alpha = .92$ for state anger, $\alpha = .86$ for trait anger, and $\alpha = .67$ for anger expression.

Data Analyses

Statistical analyses were undertaken using the IBM SPSS Statistics 21, the R software (RStudio Team 2015), and the Mplus v7.4 (Muthén, and Muthén 2012). Mplus v7.4 was used for Confirmatory Factor Analysis (CFA) and multi-group analyses. The 90 items of the YSQ-S3 were initially analyzed. Three non-nested measurement models were tested via CFA: (1) a one-factor model, assuming an underlying total factor for the YSQ-S3; (2) a 18-factor model, which organizes the 90 items into 18 EMSs; and (3) a 18 first order factors further organized into 5 higher order factors, assuming that the 18 EMSs are proposed as being organized into 5 schema domains. The fit of these models was assessed taking into account the guidelines provided by Hu and Bentler (1999), namely a *Standardized Root Mean Square Residual* (SRMR) $\leq .09$ combined with either a *Comparative Fit Index* (CFI) $\geq .95$ or a *Root Mean Square Error of Approximation* (RMSEA) $\leq .06$. Moreover, the non-nested measurement models were compared considering that better fit is showed by lower values for the SRMR, the RMSEA and the Akaike Information Criteria (AIC) and by higher values of CFI.

The IBM SPSS Statistics 21 was then used for inter-item and item-total correlation analyses. These analyses were carried out using the model that was found to best fit the data out of the three competing models under study for the complete YSQ-S3 (see above) and their results served as criteria for selecting items to be included in the B-YSQ-A.

Three items were selected as representatives for each of the 18 EMSs, based on the following criteria: (1) higher mean inter-item and corrected item-total correlation with the items pertaining to each schema, (2) higher loading values within the best fitting measurement model, and (3) lowest impact on decreasing the internal consistency value of each schema. Items achieving the highest number of criteria were proposed to be kept. This first selection of items to be kept or to be excluded was presented to three experts in schema focused theory and therapy with adolescents, who were asked to judge if the items selected to be excluded portrayed essential contents of the intended schema. The final 54 items of the B-YSQ-A were selected through a combination of the statistical criteria with the experts' perspectives, and were then subjected to CFA analyses on the three previously defined internal measurement models.

The best fitting measurement model for the B-YSQ-A was further tested for age- and gender-based invariance using Mplus v.7.4. At least partial scalar invariance is advisable if multi-group comparisons are to be considered valid. Configural, metric, and scalar invariance were sequentially tested, which meant that the measurement model was freely estimated in both groups, then loadings were fixed to be equal across groups, and then intercepts were also constrained to be equal across groups (Chen 2007). According to Chen (2007), metric measurement invariance is determined when $\Delta CFI \leq -.01$ combines with $\Delta RMSEA \leq .015$ or with $\Delta SRMR \leq .03$ and scalar invariance is established when $\Delta CFI \leq -.01$ combines with $\Delta RMSEA \leq .015$ or with $\Delta SRMR \leq .01$. Having achieved measurement invariance, a latent mean comparison approach was used for the comparison of the mean scores of boys and girls (Dimitrov 2006).

Further correlation analyses concerning the validity of the results of the B-YSQ-A in relation to external variables (i.e., STAXI and YSR) were undertaken, in addition to temporal stability analyses, both using the IBM SPSS Statistics 21. Internal consistency was also considered, based on the ordinal version of the Guttman indicator, given the ordinal nature of the data of the current study and the fact that it was severely asymmetrical (see below; Gaderman et al. 2012); values higher than .70 were considered acceptable for research/data gathering purposes. Internal consistency analyses were carried out using the R.

Results

In order to decide on the appropriate estimator for the CFA and multi-group analyses, Mardia's Test of multivariate normality was computed. Results indicated that data taken from the 877 participants were not multivariate normal (χ^2 skewness (1721.70) = 25655.5, $p < .001$; χ^2 kurtosis

Table 2 Fit indicators for confirmatory factor analyses

	χ^2	df	RMSEA (90% CI)	CFI	SRMR	AIC
YSQ						
Complete sample						
One-factor	1456.96	3915	0.056 (0.055; 0.057)	0.558	0.075	255484.69
18 factors	7983.78	3762	0.036 (0.035; 0.037)	0.825	0.066	247524.03
Higher order model	9536.99	3887	0.041 (0.040; 0.042)	0.765	0.078	249209.68
B-YSQ-A						
Complete sample						
One-factor	7384.44	1377	0.071 (0.069; 0.072)	0.550	0.083	154657.15
18 factors	2412.84	1224	0.033 (0.031; 0.035)	0.911	0.044	14560.60
Higher order model	3519.99	1349	0.043 (0.042; 0.045)	0.837	0.069	149718.17
Male participants	1948.67	1224	0.039 (0.036; 0.042)	0.878	0.052	66448.79
Female participants	2006.09	1224	0.036 (0.033; 0.039)	0.906	0.052	81803.32
Early adolescence	2002.43	1224	0.040 (0.037; 0.043)	0.876	0.054	69196.29
Late adolescence	1935.55	1224	0.035 (0.032; 0.038)	0.909	0.049	79246.34

YSQ-A Young Schema Questionnaire for adolescents, *B-YSQ-A* Brief form of the Young Schema Questionnaire for Adolescents, χ^2 values were always significant at $p < .001$

(10336.26) = 236.30, $p < .001$). So, and considering that the response scale used six ordinal points, the Maximum Likelihood Robust estimator was used for all CFA and multi-group analyses, given that it has performed well with non-normal ordinal data (Li 2016).

Item selection for the B-YSQ-A

All of the alternative models applied to the 90 items composing the complete form of the YSQ-S3 achieved acceptable fit indicators based on the RMSEA and SRMR combination, although the CFI values were relatively low. All of the three fit indicators obtained for the second model, which considered the 18 schemas as first order factors, were somewhat better, and so this was chosen as the best fitting model (cf. Table 2). Loading values were always significant ($p < .001$) and higher than .437, with the exception of item 63 (i.e., *I often feel as if my parent(s) is(are) living through me - that I don't have a life of my own*), which had a non-significant loading value of .071 ($p = .118$) on the enmeshment/undeveloped self EMS.

Supplementary material 2 displays the mean inter-item and item-total corrected correlation values found for the five items composing each schema, in addition to the internal consistency value of each schema if one item was removed. It was decided that the three items within those five that fulfilled the most of the inclusion criteria would be included in the first version of the B-YSQ-A (see statistical procedures section), which was then subjected to expert analyses. Two experts believed that essential contents were missing by excluding the two non-selected items from the mistrust/abuse and social isolation/alienation schemas; the third

expert thought that all relevant contents were addressed by the items that the research team wished to keep in this brief form. Upon considering both the major ideas behind each schema (see Supplementary Material 1) and the statistical criteria underlying the suggestions made by the experts on the items to be kept, item 76 was used instead of the initially proposed item 40 to measure social isolation/alienation. For the remaining schemas, the initially proposed items were kept given that: (1) no consensus was achieved between experts, (2) the items seemed in line with the theoretical model, and (3) the statistical criteria showed an evident difference between items to be kept and items to be excluded. The B-YSQ-A was thus composed of 54 items and each of the 18 EMSs was assessed through three items.

It was further tested if there were time gains when filling in the B-YSQ-A (i.e., 54 items) in comparison with the YSQ-S3 (i.e., 90 items). Using a convenience sample of 8 adolescents (5 boys; 62.5%) not included the samples described above aged 13 to 16 years old ($M = 14.13$; $DP = 1.36$), a significant difference was found ($z = -2.52$, $p = .012$) in time needed to fill out the YSQ-S3 (i.e., roughly 13 min) and the B-YSQ-A (i.e., roughly 7 min).

Brief Form of the Young Schema Questionnaire for Adolescents (B-YSQ-A)

Internal structure and consistency

The 18-factor measurement model fitted best to the data (cf. Table 2). Loading values were always significant ($p < .001$) and higher than .518 (cf. Table 3). Also, by retaining 60% of the items in each measure (i.e., 3 out of 5 items),

Table 3 Loading values for the brief form of the Young Schema Questionnaire for adolescents

	λ EMS ^a	λ EMS ^b	λ EMS ^c	λ EMS ^d	λ EMS ^e
Abandonment/ instability ($r^2 = .89$)					
Item 20	0.658	0.639	0.642	0.620	0.697
Item 38	0.773	0.753	0.783	0.774	0.757
Item 56	0.723	0.686	0.736	0.731	0.727
Mistrust/ abuse ($r^2 = .88$)					
Item 39	0.647	0.635	0.653	0.690	0.616
Item 57	0.651	0.667	0.628	0.609	0.683
Item 75	0.587	0.581	0.591	0.553	0.614
Emotional deprivation ($r^2 = .88$)					
Item 19	0.602	0.532	0.656	0.613	0.611
Item 55	0.809	0.702	0.872	0.798	0.813
Item 73	0.822	0.782	0.853	0.841	0.808
Defectiveness/ shame ($r^2 = .90$)					
Item 5	0.653	0.622	0.696	0.610	0.715
Item 23	0.758	0.693	0.812	0.752	0.774
Item 59	0.781	0.785	0.769	0.784	0.766
Social isolation/ alienation ($r^2 = .92$)					
Item 22	0.755	0.700	0.793	0.774	0.734
Item 40	0.812	0.712	0.846	0.638	0.788
Item 58	0.716	0.776	0.718	0.807	0.827
Dependence/ incompetence ($r^2 = .81$)					
Item 25	0.525	0.574	0.496	0.437	0.608
Item 43	0.538	0.510	0.673	0.489	0.582
Item 79	0.689	0.649	0.734	0.673	0.698
Vulnerability to harm or illness ($r^2 = .86$)					
Item 26	0.561	0.570	0.562	0.560	0.560
Item 62	0.674	0.637	0.708	0.673	0.677
Item 80	0.655	0.711	0.606	0.672	0.637
Enmeshment/ undeveloped self ($r^2 = .82$)					
Item 27	0.688	0.688	0.687	0.647	0.722
Item 45	0.729	0.685	0.762	0.726	0.730
Item 81	0.783	0.742	0.816	0.778	0.779
Failure ($r^2 = .90$)					
Item 42	0.781	0.694	0.839	0.801	0.764
Item 60	0.821	0.770	0.854	0.812	0.822
Item 78	0.792	0.771	0.803	0.771	0.815
Entitlement/ grandiosity ($r^2 = .77$)					
Item 14	0.518	0.513	0.583	0.453	0.546
Item 32	0.628	0.715	0.488	0.549	0.671
Item 68	0.554	0.679	0.376	0.476	0.622
Insufficient self-control and/or self-discipline ($r^2 = .86$)					
Item 15	0.569	0.462	0.651	0.540	0.593
Item 51	0.624	0.636	0.580	0.576	0.647
Item 87	0.628	0.642	0.626	0.620	0.650
Subjugation ($r^2 = .78$)					
Item 28	0.645	0.557	0.787	0.705	0.635

Table 3 (continued)

	λ EMS ^a	λ EMS ^b	λ EMS ^c	λ EMS ^d	λ EMS ^e
Item 46	0.625	0.585	0.756	0.695	0.612
Item 82	0.588	0.697	0.439	0.504	0.608
Self-sacrifice ($r^2 = .84$)					
Item 11	0.479	0.455	0.485	0.429	0.526
Item 29	0.638	0.585	0.672	0.604	0.657
Item 83	0.726	0.697	0.736	0.660	0.780
Approval-seeking/ recognition seeking ($r^2 = .84$)					
Item 34	0.618	0.612	0.601	0.561	0.657
Item 52	0.651	0.663	0.678	0.664	0.643
Item 88	0.713	0.709	0.721	0.694	0.729
Negativity/ pessimism ($r^2 = .85$)					
Item 17	0.661	0.637	0.667	0.623	0.711
Item 35	0.684	0.698	0.675	0.709	0.682
Item 53	0.754	0.743	0.773	0.803	0.704
Emotional inhibition ($r^2 = .88$)					
Item 12	0.674	0.567	0.723	0.610	0.720
Item 30	0.733	0.678	0.751	0.700	0.748
Item 84	0.649	0.719	0.620	0.637	0.678
Unrelenting standards/ hyper-criticalness ($r^2 = .81$)					
Item 13	0.714	0.683	0.744	0.726	0.698
Item 31	0.713	0.687	0.711	0.713	0.715
Item 85	0.564	0.547	0.576	0.585	0.541
Punitiveness ($r^2 = .88$)					
Item 18	0.722	0.693	0.742	0.674	0.777
Item 54	0.752	0.704	0.790	0.774	0.728
Item 72	0.708	0.712	0.708	0.726	0.702

The r^2 values refer to linear regression analyses entering the 3-item measure as sole predictor of its 5-item counterpart

^aComplete sample ($n = 877$)

^bMale sample ($n = 389$)

^cFemale sample ($n = 488$)

^dEarly adolescence sample ($n = 407$)

^eLate adolescence sample ($n = 476$)

each 3-item measure retained at least 77% of the variance explained by their 5-item counterpart (cf. Table 3).

Two out of 18 EMSs fell below the cut-off value for internal consistency (i.e., entitlement/grandiosity and self-sacrifice; cf. Table 4). Spearman correlation values between the scores from each measure at times 1 and 2 were always significant ($p < .001$) and of moderate or strong magnitude, ranging from $r_s = .441$ for emotional deprivation to $r_s = .774$ for negativity/pessimism (cf. Table 4).

Measurement invariance and descriptive analyses

The 18-factor measurement model achieved acceptable RMSEA and SRMR values for both the early and late

Table 4 Internal consistency and descriptive analyses results for the brief form of the Young Schema Questionnaire for Adolescents

	Internal consistency	Temporal stability	Mean (SD) ^a	Mean (SD) ^b	Mean (SD) ^c	LMC	Effect size
Abandonment/ instability	.80	.716***	3.64 (1.43)	3.31 (1.38)	3.91 (1.41)	.464***	-.43
Mistrust/ abuse	.67	.645***	2.67 (1.19)	2.55 (1.14)	2.78 (1.22)	.243**	-.19
Emotional deprivation	.87	.441***	1.75 (1.04)	1.79 (0.97)	1.71 (1.10)	-.051 ^{ns}	.07
Defectiveness/ shame	.84	.586***	1.72 (0.96)	1.79 (0.97)	1.67 (0.95)	-.136 ^{ns}	.12
Social isolation/ alienation	.88	.708***	1.73 (1.02)	1.79 (1.08)	1.69 (1.03)	-.100 ^{ns}	.09
Dependence/ incompetence	.72	.406***	1.66 (0.74)	1.71 (0.75)	1.62 (0.73)	-.122 ^{ns}	.12
Vulnerability to harm or illness	.72	.499***	2.71 (1.26)	2.63 (1.27)	2.78 (1.25)	.157 ^{ns}	-.12
Enmeshment/ undeveloped self	.82	.591***	2.84 (1.32)	2.79 (1.25)	2.87 (1.37)	.047 ^{ns}	-.06
Failure	.88	.572***	2.10 (1.15)	2.05 (1.06)	2.14 (1.23)	.077 ^{ns}	-.08
Entitlement/ grandiosity	.69	.711***	1.81 (0.83)	1.91 (0.91)	1.72 (0.76)	-.543**	.29
Insufficient self-control and/or self-discipline	.70	.639***	2.21 (1.01)	2.37 (1.03)	2.08 (0.98)	-.342***	.29
Subjugation	.74	.482***	1.87 (0.88)	1.92 (0.86)	1.83 (0.89)	-.090 ^{ns}	.10
Self-sacrifice	.67	.734***	2.75 (1.07)	2.58 (1.01)	2.88 (1.11)	.335***	-.28
Approval-seeking/ recognition seeking	.75	.666***	2.39 (1.13)	2.50 (1.13)	2.31 (1.12)	-.185*	.17
Negativity/ pessimism	.79	.774***	2.59 (1.21)	2.53 (1.18)	2.64 (1.22)	.083 ^{ns}	-.09
Emotional inhibition	.77	.757***	2.59 (1.24)	2.65 (1.18)	2.54 (1.29)	-.114 ^{ns}	.09
Unrelenting standards/ hyper-criticalness	.75	.566***	2.69 (1.20)	2.87 (1.21)	2.54 (1.19)	-.334***	.27
Punitiveness	.80	.711***	1.65 (0.74)	1.72 (0.75)	1.60 (0.73)	-.171*	.16

Internal consistency was based on the ordinal Guttman's Lambda-2; Temporal stability is based on spearman correlation coefficient of the scores of the same measure across two time points

LMC latent mean comparison, *ns* non-significant

*** $p < .001$; ** $p < .01$; * $p < .05$

^aComplete sample ($n = 877$)

^bMale sample ($n = 389$)

^cFemale sample ($n = 488$)

adolescent samples and for both the male and female samples (cf. Table 2). Moreover, all loading values were significant at $p < .001$ for both samples. Concerning age, loading values were higher than .429 for early adolescents and .526 for late adolescents (in both cases for item 11, *I'm the one who usually ends up taking care of the people I'm close to*). As for gender, loading values were higher than .455 for boys (i.e., item 11) and higher than .376 for girls (i.e., item 68, *I feel that I shouldn't have to follow the normal rules and conventions that other people do*; cf. Table 3). Age and gender configural invariance was thus determined. Full metric ($\Delta CFI = .001$, $\Delta RMSEA = -.001$; $\Delta SRMR = .000$ for age and $\Delta CFI = -.003$, $\Delta RMSEA = .001$; $\Delta SRMR = -.001$ for gender) and full scalar invariance ($\Delta CFI = -.003$, $\Delta RMSEA = .000$; $\Delta SRMR = .000$ for age and $\Delta CFI = -.007$, $\Delta RMSEA = .001$; $\Delta SRMR = .001$ for gender) were, sequentially, established concerning both age and gender (see procedures section on the successive constraints associated with each type of invariance).

Latent mean comparison analyses showed that boys scored significantly higher than girls on the entitlement/grandiosity, insufficient self-control/discipline, approval/recognition seeking, unrelenting standards/hyper-criticalness, and punitiveness schemas. Girls, in turn, scored significantly higher than boys on abandonment/instability, mistrust/abuse, and self-sacrifice. These latent means parallel the descriptive values presented in Table 4, which were calculated as the sum of the responses of each participant to the three items composing each measure (cf. Table 4). Because boys were significantly older than girls (see Participants section), ANCOVAs for between-gender differences were also computed, having age as a co-variate; between-gender differences remained stable after controlling for age.

Validity in relation to external variables

The correlation values obtained between the EMSs and the internalizing and externalizing dimensions of the YSR are

Table 5 Correlation values between the Brief form of the Young Schema Questionnaire and relevant external variables

	Early maladaptive schemas																	
	AB	MA	ED	DS	SI	DI	VH	EM	FA	ET	IS	SB	SS	AS	NP	EI	US	PU
Youth Self Report																		
Internalizing	.19*	.39***	.32***	.39***	.46***	.32***	.32***	-.04 ^{ns}	.25**	.16 ^{ns}	.30***	.39***	.25**	.22**	.31***	.26**	.06 ^{ns}	.17*
Externalizing	.07 ^{ns}	.23**	.15 ^{ns}	.28**	.26**	.19*	.27*	-.04 ^{ns}	.12 ^{ns}	.30***	.27**	.30***	.19 ^{ns}	.26**	.21*	.13 ^{ns}	.20*	.14 ^{ns}
STAXI																		
State anger	.12 ^{ns}	.36***	.27**	.23**	.28**	.08 ^{ns}	.23**	-.056 ^{ns}	.09 ^{ns}	.17*	.20*	.32***	.13 ^{ns}	.29***	.29***	-.16 ^{ns}	.15 ^{ns}	.21*
Trait anger	.16 ^{ns}	.40***	.16 ^{ns}	.28**	.16 ^{ns}	.17*	.20*	-.00 ^{ns}	-.03 ^{ns}	.43***	.31***	.29***	.19*	.37***	.39***	.24**	.30***	.16*
Anger expression	.10 ^{ns}	.32***	.23**	.27**	.14 ^{ns}	.08 ^{ns}	.06 ^{ns}	-.01 ^{ns}	.07 ^{ns}	.01 ^{ns}	.18*	.28**	.25**	.21*	.19*	.27**	.18*	.15 ^{ns}

STAXI State-Trait Anger Expression Inventory, AB abandonment/instability, MA mistrust/abuse, ED emotional deprivation, DS defectiveness/shame, SI social isolation, DI dependence/incompetence, VH vulnerability to harm or illness, EM enmeshment/undeveloped self, FA failure, ET entitlement/grandiosity, IS insufficient self-control and/or self-discipline, SB subjugation, SS self-sacrifice, AS approval-seeking/recognition seeking, NP negativity/pessimism, EI emotional inhibition, US unrelenting standards/hyper-criticalness, PU punitiveness, *ns* non-significant

*** $p < .001$; ** $p < .01$; * $p < .05$

presented in Table 5. The internalizing cluster was positively and moderately correlated with most of the EMSs, indicating that higher values in internalizing symptoms associate with higher values in EMSs. The highest correlation value for internalizing symptoms was observed in relation to the social isolation schema. Concerning the externalizing dimension of the YSR, overall, higher symptomatology was associated with increased scores in the EMSs. The highest correlation value was found in relation to the entitlement/grandiosity schema.

Positive and significant correlation values were also found between the three measures of the STAXI and the majority of the 18 schemas (cf. Table 5), meaning that higher levels of trait anger, state anger and anger expression associated with higher levels of EMSs. The highest correlation value for state anger and for anger expression was found in relation to the mistrust/abuse schema, whereas trait anger correlated the highest with entitlement/grandiosity. The correlation values found for trait anger in relation with schemas were generally higher than those found for state anger and anger expression.

Discussion

Adolescence is an in-between stage of development, in which the pillars for relevant schemas are already set but not entirely solidified, making their change easier, either via therapy and/or intra and interpersonal positive life experiences (Young et al. 2003). Thus, it seems relevant to develop appropriate ways of assessing the presence and prominence of EMSs, which, according to Stallard and Rayner (2005), are useful for the definition and adoption of the proper preventive or curative intervention strategies. Previous studies attempting to establish an appropriate method to do so have come to conflicting findings (Rijkeboer and Boo 2010; Saritaş and Gençöz 2011; Van Vlierberghe et al. 2010). In trying to overcome, at least partially, limitations found in existing research, this study examined the psychometric properties of a new, shorter, and language-appropriate measure of EMSs in adolescence, based on a large community adolescent sample. In relation to previous efforts in measuring schemas in younger samples, the B-YSQ-A holds the advantages of having a stable and acceptable number of items across schemas and of assessing all 18 theoretically proposed schemas using a limited number of items and, consequently, of time spent.

By combining statistical and content analyses criteria, 54 items were selected from the YSQ-S3 (i.e., 90 items) to compose the B-YSQ-A. This selection allowed each EMS to be assessed by three items. Confirmatory factor analyses indicated that the selected items reflected the theoretically proposed 18 EMSs (Young 1999), while previous works

referring to the 18 EMSs with adolescents focused solely on the higher-order constructs (i.e., schema domains; Saritaş and Gençöz 2011). Moreover, the B-YSQ-A was found to be a valid tool for assessing the 18 EMSs across the age span of 12–18 years old.

One further attempt was made to organize the 18 EMSs into the 5 theoretically defined schema domains. Though it also achieved statistical fit, the fit indicators were, nonetheless, worse, in comparison to considering only the 18 correlated schemas. Inconsistent results concerning schema domains have been found in several other studies with adults (Hoffart et al. 2005; Kriston et al. 2012; Welburn et al. 2002) and adolescents (Muris 2006; Saritaş and Gençöz 2011). Nevertheless, the present study supports that EMSs can be organized into the suggested domains, even if it was not the best fitting model. Theoretically, these findings suggest that schema domains should not be seen as hierarchically superior factors in relation to schemas, as it is conceptualized in CFA analyses. Alternatively, a bifactorial approach to these constructs may be well suited; by doing so, Kriston et al. (2012), in fact, found evidence for the acceptability of schema domains in an adult sample.

Concerning internal consistency, most of the dimensions corresponding to the 18 EMSs achieved good reliability values. A minority of them achieved internal consistency values lower than (though very close to) .70 (i.e., entitlement/grandiosity and self-sacrifice). About the entitlement/grandiosity schema in particular, it had not performed well in other studies with adults (Bach et al. 2015; Kriston et al. 2013). The temporal stability of the measures was moderate. Schemas in adolescence may be particularly shifting, and so evaluating them is subjected to higher diversity in the experience of each schema (i.e., internal consistency of each measure) and across time (i.e., test-retest validity).

Schema development occurs alongside the challenges of adolescence. Consequently, it seems reasonable that some schemas could be prone to higher inconsistency, particularly those which are not yet considered maladaptive within this age group because their content mirrors normative developmental tasks (Rijkeboer and Boo 2010). As such, it may be understandable that the enmeshment/undeveloped self schema did not associate significantly with internalizing problems, externalizing problems or anger, because it may be an expected and normative experience in adolescence, thus not associated with maladaptive constructs. The same reasoning applies to the abandonment/instability schema (i.e., thinking of relationships as unstable); relationships are, in fact, ever changing in adolescence and, therefore, do not associate necessarily with negative psychological constructs. Additionally, the overall means on the majority of EMSs were low in the current sample, which may be related with the non-clinical nature of the sample; in fact, previous

research with non-clinical samples also found low overall means for EMSs (Van Vlierberghe et al. 2010).

The 18 schemas measurement model proved to be invariant across gender, thus allowing for valid comparisons between male and female adolescents (Chen 2007). Boys and girls have been suggested to present diverse levels of risk for psychopathology based on observable symptoms (i.e., diagnostic criteria), with girls being more prone to depressive and anxious problems (Calvete et al. 2015) and boys more prone to oppositional and conduct problems (Maughan et al. 2004). These observable differences should find their equivalent in the favoring of maladaptive schemas. Indeed, boys were found to have higher scores on EMSs within the impaired limits domain (e.g., entitlement/grandiosity), which, in turn, have been associated with hostility, oppositional, and conduct problems (Bernstein 2008; Calvete et al. 2013). Alternatively, girls revealed higher scores on schemas within the disconnection and rejection (e.g., abandonment/instability and mistrust/abuse) and other-directedness (namely self-sacrifice) domains, concerning themes that have been found to be associated with both depression and anxiety (Calvete et al. 2013, 2015).

Regarding the construct validity of the B-YSQ-A, it should be noted that it was investigated on an older subsample, who had the advantage of being more cognitively and motivationally prepared to fill out additional questionnaires in a reliable and valid way. The EMSs were found to be associated with both internalizing and externalizing symptomatology (Van Vlierberghe et al. 2010), suggesting that they are a pervasive pattern underlying general maladaptive psychological functioning (Young et al. 2003). Nevertheless, important differences were found that further sustain the divergent validity of some of the EMSs. Specifically, and assuming that the peer group has an important developmental role in adolescence, the feeling that one is not part of any group and is isolated from the rest of the world (i.e., the content of the social isolation schema), seemed to be specifically and most strongly associated with internalizing symptomatology (Van Vlierberghe and Braet 2007). Alternatively, thinking of oneself as entitled to more rights than those given to others, which is typical of the entitlement/grandiosity schema, associated most strongly with externalization. This same schema was also particularly associated with trait anger, which is in line with previous findings (Bernstein 2008; Saritaş and Gençöz 2011; Van Vlierberghe and Braet 2007).

Also in line with the pervasiveness of EMSs, they most strongly associated, overall, with trait anger, in comparison with state anger or anger expression. Alternatively, state anger and anger expression correlated more strongly with the mistrust/abuse EMS in specific. It makes sense that if a person expects to be abused by others, s/he will feel and

somehow express anger; in turn, if one feels and expresses anger in an inappropriate way, others are more likely to be mistreating towards oneself.

Limitations

The sole reliance on self-report instruments, which may be susceptible to social desirability or distractibility patterns of response, is one of the limitations of this work. Another has to do with it not considering exploratory measurement models, and so the hypothesis remains that an alternative model would be a better fit for the data. A confirmatory methodology was selected because previous results were, on the one hand conflicting and, on the other, non-theory-driven. Thus, it was considered best to test a theory-driven model that might serve the purpose of cross-cultural studies. Yet another consideration has to do with the subsamples used for construct validity and test-retest reliability being relatively small and older than the complete sample; this was due to the length of the self-report questionnaire (i.e., 90 items when administered). Finally, and considering that EMSs may be particularly prominent in clinical samples, future research should consider such samples. Namely, this could provide more evidence concerning the stability and homogeneity of EMSs, their relationships with early life histories, and their differential associations with specific psychopathologies.

Despite these limitations, the current work succeeded in proposing a valid and reliable brief measurement instrument for assessing EMSs in adolescence, both for research and clinical purposes. In the research field, the B-YSQ-A is a psychometrically solid and language-appropriate self-report instrument. In clinical settings, as with any other standardized measure, the B-YSQ-A should not be used without a careful clinical evaluation; on the contrary, clinical judgment should be exercised when analyzing its results. Evaluating the EMSs of young people may provide insight into the presence of (mal)adaptive relations with significant others, from which these schemas develop. In such cases, efforts may then be made to guide families into more beneficial and healthy interpersonal cycles that help parents better satisfy the basic emotional needs of their children (Loose et al. 2013). The B-YSQ-A provides appropriate screening for the presence of EMSs since early years, thus constituting an advantage in researching, preventing mental illness, and promoting mental-health throughout the lifespan.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in this study that involved human participants were in accordance with the ethical standards of the University of Coimbra and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study and, for underage participants, from their parents and/or legal guardians.

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