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Assessing Psychological Inflexibility in Adolescents: A Validation Study of the Portuguese Short Version of the Avoidance and Fusion Questionnaire for Youth

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Abstract

Background Psychological inflexibility has been associated with several mental health indicators. The Avoidance and Fusion Questionnaire for Youth (AFQ-Y) has been the most used measure to assess psychological inflexibility in adolescents, having been adapted to several different languages, including Portuguese. However, the short 8-item version of this scale has been thoroughly studied and considered a more advantageous version, but it has not yet been validated for the Portuguese population.

Objective Therefore, the current study aims to contribute to the establishment of the validity and reliability of the shorter version of AFQ-Y by validating the AFQ-Y8 in a Portuguese population of adolescents and exploring its psychometric properties.

Methods The present study was conducted in two different samples of adolescent boys and girls, with an age range between 12 and 18. Confirmatory factor analyzes (CFA) were used to assess the scales' structure. Reliabilities and other validities were also analyzed.

Results CFA results confirmed the plausibility of the unidimensional structure of the AFQ-Y8, showing adequate fit indices. The AFQ-Y8 also presented an adequate internal consistency and test-retest reliability. Correlation results demonstrated that the AFQ-Y8 was positively associated with measures of anxiety and depression and negatively linked with a measure of mindfulness. These correlations were also significant when the effect of mindfulness skills was accounted for.

Conclusions Overall, the AFQ-Y8 was demonstrated as a valid and reliable measure, and its validation contributes not only to research but also to clinical practice. The use of the AFQ-Y8 in clinical and educational settings may contribute to young-related early detection and initial referral to adequate treatment.

Keywords AFQ-Y8 · Psychological inflexibility · Avoidance and Fusion Questionnaire · Adolescents · Validation

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Introduction

As part of the contextual-behavioral therapies, Acceptance and Commitment Therapy (ACT) emerges as an empirically based therapy aimed at promoting psychological flexibility, through mindfulness and behavioral change strategies (Hayes et al., 2012). Psychological flexibility appears to be associated with mental health and psychological well-being, while psychological inflexibility appears to be linked to psychopathology and psychological suffering (e.g., Hayes et al., 2006; Levin et al., 2016; Masuda & Tully, 2012; Woodruff et al., 2014). Psychological inflexibility is considered a transdiagnostic mechanism underlying the development and maintenance of mental health difficulties (Levin et al., 2016). According to the Psychological (In)Flexibility Model of ACT, psychological inflexibility emerges from experiential avoidance, cognitive involvement, a connection to the conceptualized self, loss of contact with the present moment, and the resulting failure to take the necessary behavioral steps according to one's core values (Hayes et al., 2012). Two key mechanisms implicated in the understanding and definition of psychological inflexibility are cognitive fusion and experiential avoidance (Hayes et al., 2006; Muris et al., 2017). Cognitive fusion is the phenomenon in which the individual becomes entangled with its own thoughts, understanding them as literal, instead of transitional internal contents (Gillanders et al., 2014; Hayes et al., 2004; Hayes et al., 2006; Luoma & Hayes, 2003). In turn, experiential avoidance emerges as a maladaptive strategy or set of behaviors to avoid, escape or control undesired internal events (Hayes et al., 2006).

Adolescence is a period of physical and psychological maturation, with enormous changes and challenges, which can contribute to greater emotional vulnerability. Different studies have found a high percentage of emotional disorders during adolescence, pointing out that many psychological disorders develop during this transitional stage. (Polanczyk, et al., 2015; World Health Organization, 2018). Thus, early identification of psychological inflexibility signs, and the development of strategies to promote psychological flexibility in this period, could be especially needed. Indeed, in children and adolescents, psychological inflexibility is associated with negative emotional symptoms, internalizing symptoms, and externalizing behaviors (e.g., Cunha & Santos, 2011; Greco et al., 2008; Muris et al., 2017; Renshaw, 2017; Salazar et al., 2019). Moreover, psychological inflexibility has been inversely associated with positive outcomes, such as quality of life, subjective well-being, life satisfaction, mindfulness skills, and acceptance (e.g., Greco et al., 2008; Valdivia-Salas et al., 2016; Szemenyei et al., 2020; Cunha & Santos, 2011; García-Rubio et al., 2020). Besides this, ACT has shown very promising results when applied in educational and clinical contexts, for several conditions and different problematics (Hancock et al., 2018; Pielech et al., 2017; Swain et al., 2015).

Considering the crucial role of the psychological inflexibility construct in the theoretical model of ACT, it is pertinent to carry out studies on the validity and robustness of instruments that assess psychological inflexibility in different populations and that are specifically designed for research purposes. These studies may clarify its role in the development and/or maintenance of psychological difficulties in youth and increase the empirical support of ACT as a therapeutic approach.

Compared to the adult population, there are few instruments available for children and adolescents to evaluate the previously mentioned ACT constructs. The AFQ-Y (Greco et al., 2008) is a widely used tool to assess psychological inflexibility in young people. It consists

of 17 items (or 8 in its short version—AFQ-Y8) that were specifically designed to assess psychological inflexibility through essential components such as experiential avoidance ("I stop doing things that are important to me whenever I feel bad.") and cognitive fusion ("I can't be a good friend when I feel upset."). An evident advantage of this scale is that its items are formulated simply and comprehensively, making this tool developmentally suitable for the correspondent age group, and capable of being filled out by participants who have completed elementary school (from the age of 8).

The AFQ-Y has been translated into different languages and validated for several populations, such as Portuguese (Cunha & Santos, 2011), Spanish (García-Rubio et al., 2020; Valdivia-Salas et al., 2016), Swedish (Livheim et al., 2016), Italian (Schweiger et al., 2017), Greek (Christodoulou et al., 2018), Colombian (Salazar et al., 2019), Persian (Hekmati et al., 2020), and Hungarian (Szemenyei et al., 2020). In general, various studies have shown good psychometric results that attest to the robustness and usefulness of this instrument in children and adolescents. The factorial structure of the AFQ-Y (17 items) has become the most controversial aspect. Some empirical evidence supports the unidimensional structure of this scale (e.g., Cunha & Santos, 2011; Greco et al., 2008; Hekmati et al., 2020; Salazar et al., 2019; Schweiger et al., 2017) while other studies suggested a two-factor model as having a superior fit (Valdivia-Salas et al., 2016). In turn, in the short version (8 items), the unidimensional model has been attested for all samples from different countries (Christodoulou et al., 2018; García-Rubio et al., 2020; Hekmati et al., 2020; Livheim et al., 2016; Renshaw, 2017; Salazar et al., 2019; Szemenyei et al., 2020). Note that in the Greek version of the AFQ-Y8, both the unidimensional and the two-dimensional models (cognitive fusion and experiential avoidance) revealed a good fit, although the one-factor solution was statistically superior (Christodoulou et al., 2018).

Studies comparing the AFQ-Y17 and the AFQ-Y8 revealed that, although both versions were shown to be reliable, valid, and appropriate, the short version presented better psychometric qualities than the 17-item version (e.g., Livheim et al., 2016—Swedish version; Hekmati et al., 2020—Persian version). Specifically, while the AFQ-Y17 presented better reliability, the AFQ-Y8 demonstrated better construct validity and was better suited to a unidimensional factorial structure (Hekmati et al., 2020; Livheim et al., 2016). In most studies, the analyzes of the short version (AFQ-Y8) were based on items taken from the full version of the AFQ-Y. Recently, García-Rubio et al. (2020) and Szemenyei et al. (2020), carried out studies on the independent validation of the short version of the AFQ-Y8. In these studies, children and adolescents answered directly to the short version and not the long version of 17 items. The results confirmed that the AFQ-Y8 has a unidimensional structure, regardless of age and gender. They also showed a positive association with indicators of psychopathology or psychological difficulties, and a negative association with measures of health, well-being, and mindfulness skills (García-Rubio et al., 2020).

Since psychological inflexibility is a transdiagnostic process, and the AFQ-Y8 is a brief questionnaire, this measure can be contextually appropriate and a viable tool for screening mental health in schools. In this sense, Renshaw (2017) set upon investigating whether the AFQ-Y8 would indeed be useful as a mental health screener (for clinical symptomology of depression and anxiety) in a school-based population. Overall, the results suggested that the brief version was a reliable and valid instrument to assess psychological inflexibility and to identify internalizing problems in children and adolescents. These findings not only support the scales' ability as a tool for mental health screening in a school setting but are also an

essential contribution for the overall research on mental health population screening, which is becoming a recommended and common practice for evaluation and intervention in the school context (Renshaw, 2017).

Considering the easy comprehensibility of the AFQ-Y, and the fact that no item appeared to be age-specific, Schmalz and Murrell (2010) hypothesized that the scale could also be appropriate for young adults and therefore carried out a study comparing the AFQ-Y and the AAQ -II (Acceptance and Action Questionnaire-II; widely used in adults to assess experiential avoidance). The results showed that the AFQ-Y is more robust, from a psychometric point of view, as well as more comprehensive and accurate than the AAQ-II and can be an asset for the assessment of psychological inflexibility in adults (Schmalz & Murrell, 2010). Moreover, a study by Fergus et al. (2012) corroborated the usefulness of the AFQ-Y in adults, showing once again its simplicity and psychometric robustness, when compared to the AAQ-II. In the same study, the AFQ-Y also presented incremental validity over the AAQ-II, when considering the assessment of different psychological symptom domains (Fergus et al., 2012).

Bearing in mind the relevance and usefulness of the AFQ-Y8 and the recommendation of brief protocols for children and adolescents, the current study aims to validate the AFQ-Y8 in a Portuguese population of adolescents. Concretely, the study sought to examine the AFQ-Y8's factorial structure (through confirmatory factorial analysis and cross-validity), the scale reliability (i.e., internal consistency and temporal stability), and construct validity (i.e., convergent and incremental validity).

According to literature, it was predicted that a unidimensional AFQ-Y8 solution would be adequate, and that reliability and item-level characteristics of the AFQ-Y8 would be evidenced in the Portuguese version. Regarding the validity study, it was expected that the AFQ-Y8 would negatively associate with mindfulness (CAMM) and would present a positive association with psychopathology indicators (anxiety and depression symptoms). Though there is a known strong association between the constructs evaluated by AFQ-Y and CAMM (Greco et al., 2008), it was expected that the AFQ-Y8 would present a unique contribution in its relationship with psychopathology indicators, after controlling the effect of mindfulness. This study intended to explore the correlations between the AFQ-Y8, sex, age, and years of education, since previous studies have had mixed results. Yet, considering the previous study of the scale's long version for the Portuguese population (Cunha & Santos, 2011), a non-significant association between the AFQ-Y8 and these variables was hypothesized.

Materials and Methods

Participants

This study comprised two different samples: sample 1, with 152 participants, and sample 2, with 424 participants; Sample 1 consisted of 60 boys and 92 girls from the Portuguese general population, with an age range between 12 and 18 years old ($M = 14.47$; $SD = 1.54$) and a mean of 8.93 ($SD = 1.41$) years of education.

Sample 2 included 182 boys and 242 girls from the Portuguese general population. This sample had an age range from 12 to 18 years old as well ($M = 15.17$; $SD = 1.90$) and a mean of 9.44 ($SD = 1.77$) years of education.

Significant differences were found when comparing age [$t(574) = -4.71$; $p < 0.001$, $d = 0.40$] and years of education's mean scores [$t(574) = -3.606$; $p < 0.001$, $d = 0.92$] between samples. However, there was not found differences when comparing genders [$\chi^2(1) = 0.55$; $p = 0.460$] between samples.

Procedures

All procedures inherent to sample collection respected the ethical and deontological norms associated with scientific research in psychology. Moreover, the General Board of Education (Portuguese Minister of Education) gave authorization for the present study (nº: *0082000001*).

Participants were recruited from public schools in the center region of Portugal (Coimbra). The two samples were collected in three schools, all public schools of primary and secondary education, following the same procedures. The researchers presented the study to the school principals, who gave their agreement. These schools were selected based on personal contacts and/or previous collaborations with the universities involved in this research. In sample 1, participants were asked to fulfill a shorter questionnaire, that included only the AFQ-Y8 and took around 4 min to be completed. Participants included in sample 2 were given a set of questionnaires that included not only the AFQ-Y8 but also four other questionnaires used to assess validity, taking about 15 min to be completed.

The study protocol included an explanation of the study, its aims, procedures, and informed consent. All participants and respective legal guardians signed the informed consent after the anonymous and volunteer character of the study was explained. The protocol was administered in a classroom setting, where a teacher and a researcher were present and available to answer any questions when necessary. In the case of youngsters who did not which to participate or did not have a signed authorization from their legal guardian, a different academic task was given by the teacher in the classroom.

Regarding missing data, the guidelines from the original authors (Greco et al., 2008) were followed, where if 1 item were missing (completing at least 85% of the AFQ-Y8), the total score could be calculated using the individuals' answered items average for the missing item.

Measures

Demographic Data Gender, age, educational level, and nationality were reported.

Avoidance and Fusion Questionnaire for Youth (AFQ-Y; Greco et al., 2008; Cunha & Santos, 2011). AFQ-Y is a 17-item self-report instrument that assesses psychological inflexibility, through cognitive fusion and experimental avoidance, with the AFQ-Y8 (8 items) being the short version of this questionnaire. Items are rated on a 5 point-Likert scale, with higher scores representing higher psychological inflexibility. In its original version, both the AFQ-Y and the AFQ-Y8 presented a unidimensional structure and a good internal con-

sistency (α = 0.90 and 0.83, respectively). In the Portuguese version and adaptation of the AFQ-Y, the Cronbach α was 0.82.

Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978; Fonseca, 1992). RCMAS consists of a 37-item scale that measures chronic anxiety by assessing a wide range of symptoms through "yes" or "no" answers. From the total of items, 28 indicate an anxiety scale (e.g.: "I worry a lot of the time") and 9 items indicate a social desirability or lie scale (e.g.: "I like everyone I know"). Higher scores translate to a more pronounced anxiety trait. The original Portuguese study presented good internal consistency values (α = 0.78) In the current study the Cronbach α value was 0.77.

Child and Adolescent Mindfulness Measure (CAMM; Greco et al., 2011; Cunha et al., 2013). The CAMM is a 10-item scale that measures mindfulness skills, the awareness of the present moment, and the non-judgmental attitude towards one's internal experiences (e.g.: "I push away thoughts that I don't like."; "It's hard for me to pay attention to only one thing at a time."). This questionnaire uses a 5-point Likert-scale, with higher scores reflecting more mindfulness skills. The original scale presented a good internal consistency both in the original and Portuguese versions (α of .80 and .74, respectively). In the current study, the Cronbach α was .73.

Children Depression Inventory (CDI; Kovacs, 1992; Marujo, 1994). CDI is a self-report 27-item scale that assesses depression in children and adolescents. Participants answer by choosing one of 3 phrases for each item, that are rated between 0 (absence of symptom) and 2 (severe symptom). The higher the scores, the more serious the depressive symptoms. The Cronbach alpha for the Portuguese version was 0.80. A Cronbach alpha of 0.83 was found in the current study.

Data Analyzes

All analyzes were performed using the IBM SPSS Statistics 23.0 software (SPSS IBM; Chicago, IL) and AMOS software (Arbuckle, 2014), where p values of < 0.05 meant statistical significance. Firstly, a preliminary analysis was performed in both samples to account for possible evidence of non-normality, univariate, and multivariate outliers. Secondly, comparison tests (chi-square and student's t tests) were performed to identify differences between samples in gender, age, and years of education. Then, a CFA was performed in sample 1 that comprised 152 participants and which revealed a sufficient sample size to simple models with a modest number of indicators (Brown, 2006; Flora & Curran, 2004). Model fit was assessed through specific goodness-of-fit indicators, including the overall model Chi-square ($\chi 2$), Comparative Fit Index (CFI; > 0.90), Tucker and Lewis Index (TLI; > 0.90), and the Root Mean Square Error of Approximation (RMSEA; < 0.08; Kline, 2005). Local adjustment indices were also explored, through standardized regression weights (SRW) and the squared multiple correlations (SMC). A CFA was then performed in sample 2, to confirm the adequacy of the proposed model, using the same goodness-of-fit indicators for assessment.

To explore the adequacy of model replication, cross-validation procedures were applied. In order to assess this, both samples were used, while assessing invariance by testing both

an unconstrained model and a measurement of weights model. If the added restriction did not lead to a poorer model fit, the model was classified as invariant. To confirm this, the Comparative Fit Indices (ΔCFI) was used as a reference, where a result of ≤ 0.01 meant that invariance was found (Cheung & Rensvold, 2002). Reliability was established by calculating the scale's Cronbach alpha (internal consistency), item-total correlations, mean inter-item correlation (that should range between 0.20 and 0.40; Piedmont, 2014), and Composite Reliability. Moreover, retest reliability was assessed by comparing two different assessment moments (after a 4-week period) through Pearson product-moment correlations in a subsample of 29 participants from sample 2.

Finally, data concerning gender, age, and years of education was accounted for and tested through t-tests for dependent samples (gender mean differences) and through Pearson product-moment correlations (age and years of education association with AFQ-Y8). Association with other variables was explored through zero-order Pearson correlations of the AFQ-Y8 with RCMAS, CDI, and CAMM. These associations were interpreted following Pallant's recommendations (2016): *r* values ranging from 0.10 to.29 correspond to a weak correlation; *r* values ranging from 0.30 to 0.49 correspond to a moderate correlation; *r* values ranging from 0.50 to 1.0 correspond to a strong correlation.

Results

Preliminary Analysis

A preliminary analysis on AFQ-Y8's items was performed on the data to scan for evidence of non-normality, univariate and multivariate outliers. In sample 1, the normal distribution of items was confirmed through coefficients of skewness, with values ranging from −0.79 (item 1) 0.41 (item 8), and kurtosis values ranging from −1.29 (item 5) to −0.44 (item 1). In sample 2, absolute values of skewness varied from −1.12 (item 1) to 0.57 (item 8), and absolute values of kurtosis ranged from −1.01 (item 6) to 0.55 (item 1), which indicate that data presented a normal distribution (Kline, 2016). In both samples, multivariate outliers were not detected, and results revealed that data presented the normality assumption.

Confirmatory Factor Analysis

A Confirmatory Factor Analysis (CFA) of AFQ-Y8 was performed in sample 1 (testing sample: $N = 152$) to examine the scale's structure and adequacy. A unifactorial factor model was tested. Method with bootstrapping was used to obtain an accurate estimation of standard errors as reflected in *p* values and confidence intervals. Bootstrap samples were set at 5000 and the bias-corrected confidence interval was set at the 95% confidence level. Results revealed that this model adjusted to data adequately: (CMIN/df = 1.76, $\chi 2(20) = 35.18$, $p = 0.019$; CFI = 0.95; TLI = 0.92; RMSEA = 0.07). The analysis of local adjustment indices revealed that all items presented Standardized Regression Weights (SRW) values above 0.50 and Squared Multiple Correlations (SMC) values above 0.25 (except for item 8: (SRW = 0.38 and SMC = 0.15). To further confirm the adequacy of the AFQ-8Y factor structure, this model was run in sample 2 (validation sample: $N = 424$). The adjustment indices also indicated an adequate adjustment to data: CMIN/df = 1.77, $\chi 2(20) = 35.49$, $p = 0.018$; CFI

= 0.96; TLI = 0.95; RMSEA = 0.04. Therefore, the AFQ-Y8 seems to present adequate adjustment (Fig. 1).

Cross-Validity

Cross-validation procedures were used in order to study model replication. Table 1 presents a summary of goodness-of-fit indices to measure cross-validity, using both samples. The baseline unconstrained model tested the structure of the AFQ-Y8 across samples. Results demonstrated an acceptable model fit, indicating that the one-factor structure model fitted the data well in both samples. Subsequently, a measurement weights model was tested with factor loadings constrained to be equal across samples. When compared to the baseline unconstrained model, no significant changes occurred (ΔCFI = 0.008), indicating that the factor loadings were invariant across samples (see Table 1). These results showed the model's invariance, indicating that the factorial structure of the scale was stable in two independent samples.

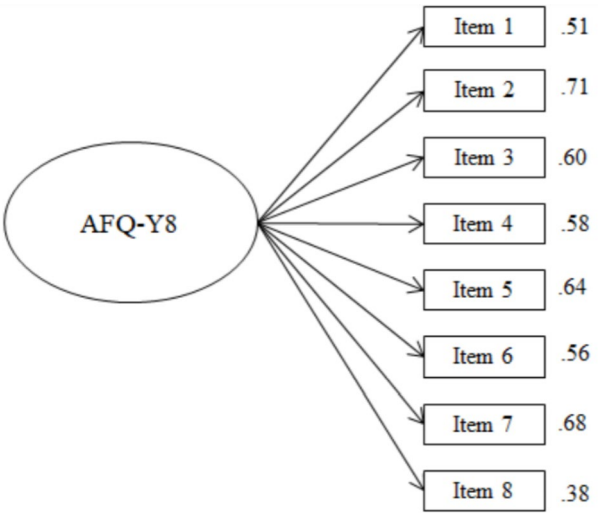

Figure 1 Confirmatory factor analysis model of the Avoidance and Fusion Questionnaire for Youth—8 items (AFQ-Y8)

Table 1 Results of the Multi-Group Analysis across the Unconstrained Model and the Constrained Models of the AFQ-Y8 (Testing sample: n = 152; Validation Sample: n = 424).

	χ^2	*df*	CFI	RMSEA [95% CI]	$\Delta\chi^2$	Δdf	*p*	ΔCFI
Multi-group analyses								
Unconstrained model	12.43	7	0.96	0.04 [0.02/0.05]	-	-	-	-
Measurement weights	38.13	8	0.95	0.04 [0.02/0.05]	12.42	7	0.001	0.008

Note. $\chi 2$ = Chi-square goodness-of-fit statistic; *df* = degrees of freedom; CFI = Comparative Fit Index; RMSEA = Root-Mean Square Error of Approximation

Reliability

The psychometric properties of this scale were analyzed in sample 2. The AFQ-Y8 presented a Cronbach's alpha of 0.70, revealing an acceptable internal consistency (Kline, 2016). The removal of any of these items would not result in an increase in the internal consistency of the scale (with exception of item 1). Corrected item-total correlations ranged from r = 0.19 (item 1) to r = 0.50 (item 5). The mean inter-item correlation was 0.22, minimum and maximum inter-item correlation values were 0.14 and 0.37, respectively. The value for composite reliability was 0.70, which indicated that the AFQ-Y8 presented construct reliability (Fornell & Larcker, 1981; Table 2).

Test-Retest Reliability

AFQ-Y8 test-retest reliability analysis was performed in a subsample of 29 adolescents who completed this self-report questionnaire a second time, four weeks after the first application. A moderate Spearman correlation was found (r = 0.43, p = 0.019), suggesting temporal stability.

Data Concerning Gender, Age, and Years of Education

Data analysis concerning gender, age, and years of education were conducted in sample 2. Significant differences were not found when comparing boy's and girl's mean scores on the AFQ-Y8 [M_{boys} = 14.44 (5.12) vs. M_{girls} = 15.33 (5.72), $t(422) = -1.67$; p = 0.100]. Also, age was not significantly associated with the AFQ-8Y ($r = -0.06$, p = 0.224), and a similar pattern was found regarding years of education ($r = -0.09$, p = 0.060).

Table 2 AFQ-Y8' items' means (M), standard deviations (SD), and Cronbach's alpha if item deleted (N = 424)

AFQ-Y8' items	*M*	*SD*	*α if deleted*	Item-total correlation
1. My life won't be good until I feel happy.	3.04	1.10	0.71	0.19
2. My thoughts and feelings mess up my life.	1.84	1.20	0.66	0.45
3. The bad things I think about myself must be true.	2.05	1.09	0.68	0.33
4. If my heart beats fast, there must be something wrong with me.	1.48	1.24	0.67	0.39
5. I stop doing things that are important to me whenever I feel bad.	1.37	1.17	0.65	0.50
6. I do worse in school when I have thoughts that make me feel sad.	2.38	1.29	0.66	0.43
7. I am afraid of my feelings.	1.44	1.28	0.66	0.43
8. I can't be a good friend when I feel upset.	1.36	1.28	0.67	0.43
Total	14.95	5.48	0.70	-

Associations with Other Variables (Zero-Order Pearson Correlations and Partial Correlations)

Association with other relevant variables was evaluated by calculating the zero-order Pearson correlations in sample 2. Results of zero-order Pearson correlations showed that AFQ-Y8 was positively associated with anxiety (RCMAS) and with depression (CDI) with strong and moderate magnitudes, respectively, and negatively and strongly associated with mindfulness (CAMM). In the partial correlations, the effect of mindfulness (assessed using the CAMM) was controlled, which is defined as a construct similar to that assessed by the AFQ-Y8, as was done in the original study. Therefore, considering the partial correlations of the AFQ-Y8 with RCMAS and CDI, when controlling for the effect of the CAMM, results demonstrated lower correlations but still significant correlations. Table 3 presents the zero-order and partial correlations results.

Discussion

The AFQ-Y is a widely used measure for psychological inflexibility in children and adolescents, having an already established association with different mental health indicators. Moreover, it allows and supports research concerning the effectiveness of mindfulness and acceptance-based interventions, by evaluating psychological inflexibility as a core change process.

Today, there is consensus regarding the advantages of the use of brief scales for adolescent populations (Ziegler et al., 2014). Indeed, short versions are recommended both in research and clinical settings, for several reasons. For example, short versions decrease response time and participant's burden, improve answer quality and motivation to participate (Gordts et al., 2017). In this sense, the current study aims to validate the AFQ-Y8 in a Portuguese population of adolescents and to explore its psychometric properties.

Table 3 Descriptive statistics (means, standard deviations, minimum and maximum scores) and correlations and partial correlations between AFQ-Y8 and the RCMAS, CDI, and CAMM (N = 424)

	M (SD)	Min-max	1.	2. RCMAS	3. CDI
1.AFQ-Y8	14.95 (5.48)	0–32	-	-	-
2.RCMAS	11.38 (5.33)	0–25	0.54^{***} (0.50^{***})	-	-
3.CDI*	12.55 (6.00)	2–27	0.49^{***} (0.32^{***})	0.67^{***} (0.55^{***})	-
4. CAMM	23.80 (6.05)	4–40	-0.50^{***}	-0.56^{***}	-0.50^{***}

$^{***}p < 0.001$

M = means; *SD* = standard deviations; RCMAS = *Revised Children Manifest Anxiety Scale*; CDI* (n = 128) = *Children's Depression Inventory*; CAMM = *Children's Acceptance and Mindfulness Measure.*

Numbers outside of parentheses are the zero-order correlations. Numbers within parentheses are the partial correlations controlling for CAMM.

A CFA results confirmed that the AFQ-Y8 has a sound factorial structure, supporting the use of this brief version for adolescents. Specifically, the global and local adjustments indices confirmed the suitability of the unidimensional model as has been commonly accepted in previous studies (Christodoulou et al., 2018; García-Rubio et al., 2020; Greco et al., 2008; Hekmati et al., 2020; Livheim et al., 2016; Renshaw, 2017; Renshaw 2018; Salazar et al., 2019; Schweiger et al., 2017; Szemenyei et al., 2020). Results show that item 8 revealed a weaker local adjustment, which could be due to the negative wording of this item ("I can't be a good friend when I feel upset."). This may impose an understanding difficulty for youngsters, especially in the Portuguese language. However, this item presented an adequate item-total correlation and, if eliminated, does not increase the scale's alpha. Moreover, the other items presented good local adjustments, supporting the adequacy of the scale's structure. Taking into account the consistency of the AFQ-Y8 regarding factor structure, the data seem to support previous authors' recommendation to use the mentioned short version. (e.g., García-Rubio et al., 2020; Livheim et al., 2016;).

Though the CFA confirmed the scale's structure, cross-validation was performed by using an independent sample. Although significant differences were found in terms of age and years of education in samples 1 and 2, the results confirmed and supported the unidimensional structure of the scale. In this sense, psychological inflexibility, assessed by this measure in two independent Portuguese samples, seems to represent a singular construct that results from the interdependent processes of cognitive fusion and experiential avoidance, both in its long version (Cunha & Santos, 2011) and in its short version. This finding is consistent with the theoretical foundations of ACT's model of psychopathology.

Results showed that the AFQ-Y8 had adequate reliability, confirmed by its Cronbach's alpha and its composite reliability. Analyzing the individual characteristics of each item, it is important to mention that item 1 ("My life won't be good until I feel happy"), revealed a weak item-total correlation. A similar result was obtained in the long version study of this scale for the Portuguese population (Cunha & Santos, 2011). A plausible explanation for these results is the fact that item 1 is phrased in a negative sense, possibly leading to comprehension difficulties in the Portuguese language. More studies should be developed in order to clarify this item's behavior. Particularly, the item should be tested with different Portuguese sentence construction, which could clarify this item in the Portuguese version.

The test-retest reliability results indicated satisfactory temporal stability over a 4-week period, despite the small number of participants that were included in this analysis ($n = 29$). Overall, in the previously developed temporal stability studies with both versions (short and long), the long version presented a higher temporal stability score (Greco et al., 2008; Hekmati et al., 2020; Livheim et al., 2016). For this reason, Greco et al. (2008) suggest that the AFQ-Y8 is better suited for specific population screenings instead of individual assessment. Even so, future studies should further explore the temporal stability of the scale.

No differences were found regarding sex and no associations were found between the AFQ-Y8 and age and years of education. This suggests that the global score of psychological inflexibility is not associated with the previously mentioned sociodemographic characteristics. According to the literature review, mixed results were found regarding the effect of gender and age in psychological inflexibility as assessed by AFQ-Y8. For example, some studies have found significant differences regarding gender, with girls presenting higher values of psychological inflexibility (Greco et al., 2008; Livheim et al., 2016; Salazar et al., 2019). On the other hand, other studies have shown a similar pattern to the Portuguese

version, where no significant differences were found between genders (Christodoulou et al., 2018). With age, similarly mixed results were found: some studies did not find a significant effect (Livheim et al., 2016; Salazar et al., 2019) and others indicated significant differences between children and adolescents (e.g., García-Rubio et al., 2020).

According to the theoretical model of ACT and existing empirical evidence, it would be expected that the AFQ-Y8 would be positively correlated with negative indicators, such as anxiety and depression, where cognitive fusion and experiential avoidance are common. In contrast, it would be expected that the AFQ-Y8 presented a negative association with opposite constructs (e.g., mindfulness and acceptance). The findings of the present study validate the previously mentioned expectations, reinforcing the validity and reliability of this measure. Our data allows for the conclusion that the higher the psychological inflexibility in adolescents (translated by the over-involvement with the contents of one's internal experience), the greater the symptoms of anxiety and depression, and the lower the acceptance/mindfulness competencies. The moderate and strong values of these associations suggest that psychological inflexibility (measured by AFQ-Y8) is related to the variables under study. Even when controlling for the effect of mindfulness skills (CAMM) through partial correlations, psychological inflexibility continues to show a statistically significant association with the variables under analysis, thus corroborating the construct validity of the AFQ-Y8. The results found in our sample are in line with those found in the original version (Greco et al., 2008) and other language versions (e.g., García-Rubio et al., 2020; Hekmati et al., 2019; Livheim et al., 2016; Salazar et al., 2019).

A limitation of the present study is the limited age range, and future studies should expand and include younger children and emerging adults. Another limitation of this study was the absence of a clinical sample. It would be important to explore the scale's behavior in a clinical sample and its sensitivity to therapeutic changes. Moreover, future studies should explore if the mentioned findings regarding AFQ-Y8 would be corroborated in a Portuguese population with different cultural characteristics. As this sample was collected in public schools from an urban region, it might be biased to certain regional differences. Concretely, some studies have explored the impact of regional socioeconomic differences on education, as well as the impact of different educational settings or processes on regional socioeconomic development (e.g., Agasisti & Cordero-Ferrera, 2013; Agasisti & Vittadini, 2012; Couto et al., 2020; Pereira & Reis, 2012).

Nonetheless, the current study confirms that the Portuguese version of the AFQ-Y8 has a sound psychometric structure and is a short and reliable measure to assess psychological inflexibility in adolescents. These findings were supported by the use of a cross-validation analysis, which is of added value since it shows that the scales' structure is replicable in an independent sample. Additionally, this study expands the validation for the Portuguese language, allowing not only for new avenues regarding cross-nation studies but also for wider application of the scale in Portuguese-speaking countries. In summary, the present work adds to the existing literature by validating the AFQ-Y8 for the Portuguese language, contributing to the reliable evaluation of this construct, and allowing for transcultural studies. Validation studies of different measures are essential for adequate practices of evaluation and investigation in psychology.

As stated before, psychological inflexibility has a relevant role in children's and adolescents' mental health (Muris et al., 2017). On the other hand, ACT or interventions based on mindfulness and acceptance, have been increasingly used in children and adolescents

(Swain et al., 2015), confirming the relevance of a robust measure of psychological inflexibility. Therefore, the validation of the AFQ-Y8 contributes both to the research field and the clinical one, encouraging the use of this brief and reliable instrument in clinical and educational settings. The early identification of adolescents with higher levels of psychological inflexibility and initial referral to adequate intervention may prevent the worsening of psychological distress. Finally, the AFQ-Y8 can be a useful measure for assessing the different core change processes in an ACT-based intervention.

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Declarations

Competing Interest All authors declare that they have no conflict of interest.

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