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ORIGINAL ARTICLE

Assessing psychological flexibility in adolescents: Validation of PsyFlex-A

Avaliação da flexibilidade psicológica em adolescentes: Validação da PsyFlex-A

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Abstract

Objective: To adapt and validate the Psy-Flex for the adolescent population (PsyFlex-A). The aim was to analyse the PsyFlex-A factor structure, reliability, the model's invariance between genders, and associations between the PsyFlex-A, sociodemographic variables, and other variables of interest. **Method**: The sample included 309 adolescents between 12 to 18 years old (M = 14.91) and a mean of 9.56 years of education. The participants completed a protocol comprising the PsyFlex-A and a set of other self-report measures assessing mindfulness skills (CAMM), cognitive fusion and experiential avoidance (AFQ-Y8), psychopathological symptoms (DASS-21), and the perceived quality of life and well-being (KidScreen-10). A subsample of 45 participants completed the PsyFlex-A four weeks after the first administration to conduct a test-retest reliability analysis. Confirmatory factor analyses (CFA) were used to assess the scale's structure. A multi-group CFA was conducted to determine the measurement invariance across genders. Reliability and validity were also analysed. **Results**: The PsyFlex-A presented a single-factor structure and model invariance between genders, suggesting that the results are comparable between males and females. Moreover, it revealed adequate internal consistency and test-retest reliability. It showed positive associations with mindfulness skills and quality of life and negative associations with cognitive fusion/experiential avoidance and psychopathological symptoms. Finally, significant gender differences were found, with boys revealing higher values of psychological flexibility than girls. **Conclusion**: The PsyFlex-A proved to be a valid and reliable instrument for assessing Portuguese adolescents' psychological flexibility skills. The PsyFlex-A may be used as a screening instrument in educational and clinical settings.

Keywords: Adolescent; Psychological Flexibility; Assessment; Factor structure; Psychometric characteristics; Quantitative study.

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Resumo

Objetivo: Adaptar e validar a Psy-Flex para a população de adolescentes (PsyFlex-A). Pretendeu-se analisar a estrutura fatorial da escala, a invariância do modelo entre os géneros, a fidedignidade e a sua associação com variáveis sociodemográficas e outras de interesse. **Método**: A amostra incluiu 309 adolescentes, com idades compreendidas entre os 12 e os 18 anos (M = 14,91) e uma média de 9,56 anos de escolaridade. Os participantes preencheram um protocolo formado pela PsyFlex-A e um conjunto de medidas de autorresposta que avaliaram as competências de *mindfulness* (CAMM), fusão cognitiva e evitamento experiencial (AFQ-Y8), estados afetivos negativos (DASS-21) e a perceção da qualidade de vida e bem-estar (KidScreen-10). Uma subamostra constituída por 45 participantes completou a PsyFlex-A quatro semanas após a primeira administração para efeitos da análise da fidedignidade temporal. Foi realizada uma Análise Fatorial Confirmatória (AFC) para testar a estrutura da escala e uma análise multigrupo para avaliar a invariância do modelo entre o sexo masculino e feminino. Testes de confiabilidade e outras validades foram também analisados. **Resultados**: A PsyFlex-A apresentou uma estrutura de um factor e uma invariância do modelo entre os sexos, sugerindo que os resultados são comparáveis entre rapazes e raparigas. Revelou uma consistência interna e uma fidedignidade teste-reteste adequadas. Mostrou associações positivas com as competências de *mindfulness* e qualidade de vida e uma associação negativa com a fusão cognitiva/evitamento experiencial e estados afetivos negativos. Foram encontradas diferenças significativas de género, obtendo os rapazes valores mais elevados de flexibilidade psicológica que as raparigas. **Conclusão**: A PsyFlex-A mostrou ser um instrumento válido e fidedigno para avaliar as competências de flexibilidade psicológica em adolescentes na população portuguesa. De realçar o seu contributo em contexto educativo e clínico, enquanto instrumento de rastreio.

Palavras-chave: Adolescentes; Flexibilidade Psicológica; Avaliação psicométrica; Estrutura fatorial; Características psicométricas; Estudo quantitativo.

Introduction

Adolescence, marked by various transformations according to Steinberg (2005), can be perceived as a time of both worries and acquisition of essential skills such as cognitive, interpersonal, and emotion regulation. These skills play a critical role in preventing psychopathology (Moreira & Canavarro, 2020). In the past five years, research has revealed that negative affective states such as depression are a common challenge among adolescents worldwide (World Health Organization, 2018). Studies indicate that 10-20% of youth suffer from mental health issues, with half of these difficulties starting by age 14 (Lappalainen et al., 2021). Research conducted across 27 countries (Polanczyk et al., 2015) found that 13.4% of young people experience some form of mental disorder, highlighting the widespread nature of these problems and the need for psychological intervention. It is worth mentioning that these psychological difficulties often lead to a diagnosis of psychopathology in adulthood, negatively affecting individuals' well-being (Lappalainen et al., 2021).

Adolescents and adults alike often employ avoidance strategies as a means of coping with negative affective states and life adversities. These strategies, such as overeating, drinking, or playing video games, can provide temporary relief. However, in the medium to long term, they can actually perpetuate the difficulties and become harmful if used repeatedly. New theoretical models underpinning the promotion of psychological flexibility (PF; Hayes et al., 2012, 2021) have empirically developed alternative constructs regarding how a person can cope with internal experiences (e.g., body sensations, thoughts, and emotions). Acceptance and Commitment Therapy (ACT) is one of the contextual models that developed the construct of psychological flexibility versus psychological inflexibility (PI), investigating in depth the psychological processes responsible for the well-being and mental health versus psychopathology, respectively (Doorley et al., 2020; Hayes et al., 2012; Rolffs et al., 2016).

The goal of ACT is to promote flexibility, that is, to develop the ability to become aware of internal and external stimuli as they arise and, at the same time, to know how to act consistently with one's values. Hayes et al. (2012) describe psychological flexibility as the ability to be present and observant of one's internal and external experiences and to act according to one's valued life directions, even when challenged with difficult thoughts, emotions, or bodily sensations. Furthermore, psychological flexibility may be seen as the competency required to decide among several behaviours, the ones that are the most adapted to the circumstances and produce useful long-term results. The inverse construct, psychological inflexibility, corresponds to an excessive pattern of controlling internal experiences, with a propensity to avoid unpleasant stimuli at the expense of more effective experiences or valued actions, often resulting in missed opportunities (Bond et al., 2011).

The Hexaflex model (Rolffs et al., 2018) followed in ACT allows the subject to promote PF through the transformation of six interconnected processes: "experiential avoidance" vs., "acceptance, "cognitive fusion" vs. "cognitive defusion," "lack of contact with the present moment" vs. "present moment awareness," "attachment to the conceptualised self" vs. "self as context," "absence of values" vs. "clarity of values," and "inaction" vs. "committed action" (Hayes et al., 2006; Hayes et al., 2012). These interdependent and overlapping processes result from acquiring skills that can be learned and trained through the subject's engagement in a daily, consistent practice promoted by therapy (Hayes et al., 2012, 2021).

Research has shown that PF leads to adaptive changes in behaviour and is especially important in challenging or distress-inducing situations (Doorley et al., 2020). According to Renshaw (2018), psychological well-being is based on and maintained by psychologically flexible behaviour, whereas the development of psychopathology is facilitated by the inflexibility of behaviour (Tyndall et al., 2020). Thus, PF appears to act as a protective factor for physical and mental health, whereas psychological inflexibility is associated with various indicators of psychological distress. For example, the study by Gloster et al. (2017) showed, in a sample of 1,035 participants, that people with greater psychological flexibility revealed fewer daily stress symptoms, fewer physical and mental health problems, and greater well-being. In turn, a review of multiple studies on psychological inflexibility found that it was associated with symptoms of depression, anxiety, and other psychopathological conditions (Chawla & Ostafin, 2007; Ruiz, 2010). In adolescents, the study by Lee and colleagues (2020) showed a decrease in psychological inflexibility and a reduction from clinical to subclinical levels in a sample of participants with Trichotillomania disorder after implementing a ten-session ACT program. Additionally, the application of an online ACT program (Youth COMPASS) to a sample of 242 youngsters aged 15-16 years old showed a relevant impact on psychological flexibility (Lappalainen et al., 2021). The results indicated a decrease in depressive symptoms and an increase in life satisfaction, thus suggesting that ACT plays a relevant role in preventing adolescents' mental health problems (Lappalainen et al., 2021).

Developments highlighting the importance of psychological (in)flexibility make it evident that the need for instruments that reliably assess this multifaceted construct and are sensitive to therapeutic change is

relevant. In adults, several instruments aim to assess psychological flexibility. Examples include the Multidimensional Psychological Flexibility Inventory (MPFI; Rolffs et al., 2018), the Comprehensive assessment of Acceptance and Commitment Therapy Processes (CompACT; Francis et al., 2016), and the Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011). Recently, the Psy-Flex was developed, an easy-to-apply instrument comprising six items corresponding to the six core psychological flexibility processes (Gloster et al., 2021). The items were formulated to assess the presence (rather than the absence) of a specific competence (e.g., the ability to be in the present moment, to take committed action congruent with values) in a particular situation. The Psy-Flex, unlike other instruments, focuses solely on the PF and is a brief scale, being sensitive to both situational and temporal contexts. This context-sensitivity allows assessing the degree to which a particular competence is being used at a particular moment in time (e.g., " If need be, I can let unpleasant thoughts and experiences happen without having to get rid of them immediately").

Additionally, the temporal context, the meaning, and the existence of time frames in the items help respondents focus on more recent and localised memories, increasing response reliability and sensitivity to change. This questionnaire asks participants to answer based on their experiences over the past seven days. The contextual formulation of PF as specific skills or behaviours (rather than general traits) and the indication of temporal boundaries (past seven days) may be relevant aspects when assessing the effectiveness of an intervention (Benoy et al., 2019). Studies on adults from the community and clinical population showed that the Psy-Flex presented good psychometric qualities (e.g., Gloster et al., 2021). Specifically, the Psy-Flex original version for adults revealed a single-factor structure in a community sample and two clinical samples, good reliability, and good convergent, discriminant and incremental validities (Gloster et al., 2021). The briefness and ease of completion of the Psy-Flex may make it especially recommendable for screening purposes, and its use, in conjunction with other more detailed instruments, is beneficial (Gloster et al., 2021).

For the population of children and adolescents, until now, there is only one instrument that assesses psychological inflexibility: the Avoidance and Fusion Questionnaire (Greco et al., 2008), and its Portuguese version already exists in long and short formats (Cunha & Santos, 2011; Cunha et al., 2022). Given the absence of any measure of psychological flexibility and considering the innovative and robust characteristics of the Psy-Flex, adapting the Psy-Flex for adolescents may be a relevant contribution. Furthermore, assessing several psychological mechanisms that may influence youths' adaptive behaviour towards the multiple challenges typical of this developmental period is considered an added value. The availability of a new instrument that allows for early identification (screening) of psychological functioning in adolescents may be particularly useful for professionals involved in psychotherapy, counselling, or coaching in educational or clinical settings.

The aim of the current study was to adapt and assess the psychometric properties of the Psy-Flex in a sample of Portuguese adolescents. Therefore, a pilot study was conducted to adapt the original items to teenage respondents. After obtaining the final version for young people, designated PsyFlex-A, the factor structure, item qualities, and internal consistency of the scale were analysed, and the test-retest reliability

of the PsyFlex-A was tested over a four-week interval (test-retest reliability was not addressed in previous studies). Convergent and divergent validity were explored using other variables, such as quality of life (as measured by the Kidscreen-10), indicators of psychopathology (as assessed by the DASS-21), and similar constructs such as mindfulness competencies (CAMM) and cognitive fusion and experiential avoidance (as assessed by the AFQ-Y). Finally, the analysis of the relationship between PF and sociodemographic variables such as age, years of education, and gender was conducted.

Similar to the Psy-Flex adults' version, a unidimensional structure and good internal consistency were expected. Positive correlations between PF, mindfulness skills, and quality of life, as well as negative associations between PF and cognitive fusion, experiential avoidance and symptoms of psychopathology, were hypothesised. It was also expected that PsyFlex-A scores would not vary across genders. It was also postulated that the PsyFlex-A would not be associated with age and years of education.

Materials and Methods

Participants

The sample comprised Portuguese adolescents. Inclusion criteria were as follows: a) students attending the third cycle of basic and secondary education or equivalent; b) age between 12 and 18 years old; c) full completion of the assessment protocol; c) no clear evidence of comprehension difficulties preventing the completion of the self-report instruments. The sample included a total of 309 adolescents, 129 females (41.7%), 176 males (57.0%), and 4 participants (1.3%) who did not identify as either male or female. Participants were aged between 12 and 18 years old (M = 14.91; SD = 1.87), had an education between the 7th and 12th grades (M = 9.56; SD = 1.88), and attended public or private schools located in the centre region of Portugal.

Instruments

PsyFlex for Adolescents (PsyFlex-A)

The PsyFlex-A resulted from an adaptation for adolescents of the original version of Psy-Flex developed by Gloster et al. (2021). This six-item self-report questionnaire assesses psychological flexibility according to the theoretical model of Acceptance and Commitment Therapy. The items are answered on a five-point Likert-type scale ranging from *almost never* (1) and *almost always* (5). Higher scores denote greater psychological flexibility. Items are worded to assess the presence (rather than the absence) of a specific competency (e.g., "I engage thoroughly in things that are important, useful, or meaningful to me.") in a particular situation. The original version, in an adult sample, showed high reliability (r_{Raykov} = .91) and validity (Gloster et al., 2021).

Child and Adolescence Mindfulness Measure (CAMM)

The CAMM (Greco et al., 2011; Portuguese version by Cunha et al., 2013) is a unidimensional self-report instrument consisting of ten items assessing mindfulness competencies (e.g., "I push away thoughts that

I don't like."). Responses for each item are given on a five-point scale ranging from *never* (0) to *always* (4). The overall score is obtained by summing all items after inverting all their scores. Thus, higher scores correspond to higher levels of mindfulness skills. In the validation study of the Portuguese version, the authors obtained a good internal consistency (Cronbach's α = .80) (Cunha et al., 2013). In the present study, the CAMM also showed good internal consistency (Cronbach's α = .81).

Avoidance and Fusion Questionnaire for Youth (AFQ-Y8)

The AFQ-Y8 (Greco et al., 2008; Portuguese version by Cunha et al., 2022) is a self-report instrument composed of eight items that assess psychological inflexibility measured by experiential avoidance and cognitive fusion (e.g., "My thoughts and feelings mess up my life."). This short version comprises only one factor. Responses for each item are given on a five-point Likert-type scale ranging from *not at all true* (0) to *very true* (4). The higher the score, the higher the psychological inflexibility (Greco et al., 2008). The Portuguese version showed an acceptable internal consistency (Cronbach's α = .70) (Cunha et al., 2022). In the current study, the AFQ-Y8 showed a good internal consistency (Cronbach's α = .84).

Kidscreen-10

The Kidscreen-10 (Raven-Sieberer & European Kidscreen Group, 2005; Portuguese version by Gaspar & Matos, 2008) consists of ten items assessing the well-being and subjective health of children and adolescents aged from eight to 18 years old. This shortened version includes only one factor. Items are answered using a Likert-type scale, ranging from *never* (1) to *always* (5). Higher scores correspond to higher levels of quality of life. The Kidscreen-10 showed adequate internal consistency (Cronbach's α = .78) in the Portuguese validation study (Gaspar & Matos, 2008; Matos et al., 2012). In our study, the Kidsreen-10 also showed good reliability, with a Cronbach's alpha of .87.

Depression Anxiety Stress Scales (DASS-21)

The DASS-21 (Lovibond & Lovibond, 1995; Portuguese version by Pais-Ribeiro et al., 2004) consists of three subscales that empirically assess symptoms of depression (e.g., "I felt down-hearted and blue"), anxiety (e.g., "I found it difficult to relax"), and stress (e.g., "I found it hard to wind down"). Each subscale consists of seven items, answered on a four-point response scale ranging from *did not apply to me* at all (0) to *applied to me most of the time* (3). Higher scores correspond to more negative emotional states. In the Portuguese version of the DASS-21, the authors obtained adequate internal consistency for the depression scale (Cronbach's α = .85), anxiety (Cronbach's α = .74), and stress (Cronbach's α = .81) (Pais-Ribeiro et al., 2004). In the present study, the DASS-21 revealed a good internal consistency for all subscales, namely for the depression scale (Cronbach's α = .92), the anxiety scale (Cronbach's α = .89), and the stress scale (Cronbach's α = .88).

Procedures

The authors were asked to authorise the use of Psy-Flex for research purposes. The first study consisted of translating and adapting the adult version into Portuguese (Cunha & Temido, 2021), followed by

adapting and validating this instrument for adolescents. Minor adjustments were made to the wording of the items taking into account developmental aspects whilst preserving the content of the original items. In the adolescents' version, information on how to complete the questionnaire was added to the instructions (e.g., "Circle the number that best reflects your experience"). A more friendly language was used, such as the second person singular, and some words were replaced by synonyms considered to be more familiar to adolescents (e.g., "I choose" instead of "I determine"). Finally, two items were reworded, and examples were added to facilitate understanding (e.g., item 2: "I can be with difficult thoughts and experiences (e.g., a thought that I am not able, feeling nervous), without having to run away from them right away (e.g., trying not to think, or doing something else, always playing video games). This first version for adolescents was tested in a small pilot study with adolescents (N = 10) to analyse the items' comprehensibility, eventual difficulties, and completion time. After minor adjustments, the final version for adolescents was obtained, which did not raise additional queries.

A protocol including a brief presentation of the study, consent of the parents or legal representatives, informed consent of the participant, collection of sociodemographic data (age, gender, and education) and the PsyFlex-A accompanied by a set of self-report instruments that assess dimensions of psychological inflexibility (CAMM and AFQ-Y8), quality of life (Kidscreen-10) and negative affective states (DASS-21) was used.

The Ethics Committee of the Instituto Superior Miguel Torga approved the study (CE-P01-22). It was also approved by the Directorate-General for Education (DGE) (survey number 0082000024). After the DGE's positive decision, authorisation from the participant schools' boards was gathered, as well as consent from the parents/legal guardians. Participation was voluntary and anonymous, and ethical and deontological research principles were ensured.

The questionnaires were answered individually in the classroom, taking about 15 minutes to be completed. Classes for collecting the test-retest data were randomly selected. To ensure anonymity, the participants were asked to fill in an alphanumeric code (initials of their name and surname and the last three digits of their cell phone number). This code was used to pair data from the two assessment moments.

Statistical Analysis

Data analysis was performed using the Predictive Analytics Software (SPSS, version 26, Chicago, IL, USA) and the JASP software package (JASP team, 2018). Descriptive statistics were used to characterise the sample, calculating means and standard deviations for the continuous variables (age and years of education) and frequencies and percentages for the categorical variable (gender).

The single-factor model of the PsyFlex-A and the model invariance between genders were verified using Confirmatory Factor Analysis (CFA) and multi-group analysis. The Diagonally Weighted Least Squares (DWLS) estimation method was used to examine the overall model fit as well as the observed variance and covariance matrices. Exploration of the univariate and multivariate normality of the data showed

acceptable values of skewness and kurtosis (Finney & DiStefano, 2006; Kline, 2005). The existence of outliers was analysed using Mahalanobis squared distance (MD2).

The quality of the overall model fit was assessed using the following fit indices: chi-square statistic (χ^2/df), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Tucker & Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardised Root Mean Square Residual (SRMR). A good adjustment was considered using the following cut-off points: CFI, GFI, and TLI > 0.90; RMSEA and SRMR < 0.08 (Hair et al., 2006). Local adjustment of the items was analysed using standardised regression weights and squared multiple correlations. According to Tabachnick and Fidell (2007), standardised regression weights greater than .40 and multiple squared correlations greater than .25 are adequate.

The measurement invariance of the PsyFlex-A was tested through a sequence of restrictive models: requiring an equal number of factors between male and female (configuration invariance), requiring equivalent factor loadings for each item (metric invariance), and restricting identical item intercepts (scalar invariance). Invariance was considered established when the added restrictions did not lead to a worse model fit. A non-significant χ^2 difference test result and a Comparative Fit Index (ΔCFI) change value equal to or less than 0.01 support tests of invariance (Byrne, 2010). In interpreting the results, we followed the more conservative criteria of Chen (2007), indicating that measurement invariance is evidenced when the change value in CFI is less than 0.01 and the change value in RMSEA is less than 0.015. The change value of SMRS should be less than 0.030 (for metric invariance) or 0.015 (for scalar invariance).

Concerning the psychometric qualities of the PsyFlex-A items, the means, standard deviations, asymmetry and kurtosis values, item-total correlation, and Cronbach's alpha if the item deleted were calculated. In addition to the determination of Cronbach's alpha for the total scale, reliability was also confirmed by calculating the composite reliability (CF) using an online calculator (https://www.thestatisticalmind.com/composite-reliability/).

Pearson's correlation coefficient *r* was used to analyse the associations between the PsyFlex-A global score and other variables (similar or related constructs) and sociodemographic variables. Funder and Ozer's (2019) recommendations were used to interpret these correlations: *r* values of .05 indicate an effect that is very small, *r* of .10 indicates an effect that is still small, an effect-size *r* of .20 indicates an effect of medium size, an effect size *r* of .30 indicates an effect that is large, and an effect-size *r* of .40 or greater, a very large effect size. The intraclass correlation coefficient (ICC) was used to estimate the test-retest reliability of the overall scale score at the four-week interval. According to Koo and Li (2016), values less than .50 suggest poor reliability, between .50 and .75 moderate stability, values between .75 and .90 are considered good, and greater than .90 are noted as excellent. Independent samples *t*-tests were used to compare male and female PsyFlex-A mean scores. The effect size was analysed by calculating Cohen's *d*. According to Sawilowsky (2009), effect sizes $d = 0.01$ are considered very small, $d = 0.20$ as small, $d = 0.50$ as medium, $d = 0.80$ as large, $d = 1.20$ as very large, and $d = 2.00$ as huge.

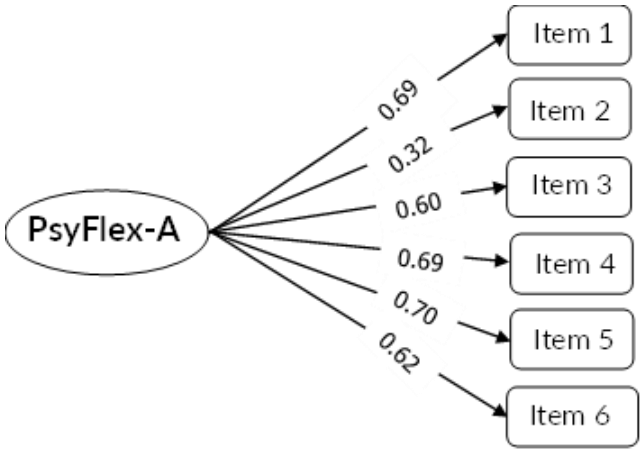
Results

Confirmatory Factor Analysis

Given the results obtained in the Psy-Flex study with adults and closely following the procedures used by its authors, a confirmatory factor analysis was performed to test the one-factor hierarchical model (Figure 1).

Figure 1

Confirmatory Factor Analysis: Single-Factor Model of PsyFlex-A and Standardized Factor Weights



The results showed a very good fit [$\chi^2_{(9)} = 7.038$; $p = 0.633$, CMIN/DF = 0.782; GFI = 0.995, TLI = 1.00, CFI = 1.00, SRMR = 0.041 and RMSEA = 0.000 (90%*CI*; 0.000–0.054)]. Analysis of local fit indicators confirmed model fit, revealing standardised factor weights ranging from .32 (Item 2) to .70 (Item 2) (Figure 1). A good adjustment was considered using the following cut-off points: CFI > 0.90; TLI > 0.90; IFI > 0.90; SRMR < 0.08 (Hair et al., 2006). Multiple squared correlation results confirmed the reliability of PsyFlex-A, with values ranging from .10 (Item 2) to .50 (Item 5). Except for Item 2, the remaining items showed values above the recommended cut-off point of .40 for factor weights and .25 for squared multiple correlations.

Multi-group CFA for Measurement Invariance across Gender Groups

Table 1 presents a summary of the fit indices in the tests of measurement invariance across genders. Following Chen's (2007) criteria, the results evidenced configural, metric, and scalar invariance between the groups of boys and girls. Specifically, there was a non-significant χ^2 difference test result and ΔCFI < 0.01, combined with ΔRMSEA < 0.015 and ΔSRMR < 0.030 (for metric invariance) or < 0.015 (for scalar invariance).

Table 1

Results of PsyFlex-A Measurement Invariance Tests

	χ^2 (*df*)	CFI	RMSEA (90%CI)	SRMR	Model Comp	$\Delta\chi^2$ Δ(*df*)	ΔCFI	ΔRMSEA	ΔSRMR
M1: Configural Invariance	7.038 (9)	1.00	0.000 (0.000–.054)	0.041	—	—	—	—	—
M2: Metric Invariance	15.779 (23)	1.00	0.000 (0.000–0.036)	0.057	M1	8.741^{ns} (14)	0.000	0.000	0.016
M3: Invariance Scalar	28.711 (28)	0.998	0.013 (0.000–0.065)	0.064	M2	12.93^{ns} (5)	-0.002	0.013	0.007

Note. N = 309; Males: n = 176; Females: n = 129; χ^2= chi-square goodness-of-fit statistic; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error Approximation; Δ = Differences between two indices.

Item Analysis and Global Internal Consistency of PsyFlex-A

The skewness values ranged from 0.24 (Item 3) to 0.99 (Item 5), and the kurtosis values ranged from 0.20 (Item 1) to 0.86 (Item 6), indicating the absence of severe violations to a normal distribution (Kline, 2005). Regarding reliability, the PsyFlex-A showed a Cronbach alpha of .77. Construct validity was further confirmed by calculating composite reliability (CF), indicating a value of .78. The means, standard deviations, item-total correlations, and Cronbach's alpha if item removed for the PsyFlex-A items are presented in Table 2.

Table 2

PsyFlex-A Items and Total Psychometric Characteristics (N = 309)

Items	*M*	*SD*	*r*	α
1. Even if I am somewhere else with my thoughts, I can focus on what's going on in important moments.	3.49	0.93	.59	.72
2. I can let unpleasant thoughts and experiences happen (for example, a thought of not being able to do something, feeling nervous) without having to get rid of them immediately (for example, trying not to think about it, doing something else, playing video games constantly, etc.).	3.20	0.98	.29	.79
3. I can look at hindering thoughts from a distance without letting them control me.	3.26	1.09	.52	.73
4. Even if thoughts and experiences are confusing me, I can notice that, deep down, I am still me.	3.64	0.99	.59	.71
5. I determine what's important for me and decide what I want to use my energy for.	3.93	0.98	.58	.72
6. I engage thoroughly in things that are important, useful, or meaningful to me.	3.92	0.91	.53	.73
Total	21.43	4.01	—	—

Note. r = Correct item-total r; α = Cronbach α if item deleted.

Test-Retest Reliability

To analyse test-retest reliability, the PsyFlex-A scale was completed by 45 participants, 32 males and 11 females (M = 14.04; SD = 1.22) at a four-week interval. A moderate intraclass correlation coefficient of .65 [.59 – .70; 95%*CI*] was found.

Associations with Other Variables

The PsyFlex-A revealed a medium positive association with the CAMM (r = .29; p < .001) and very large with KidScreen-10 (r = .61; p < .001). In turn, it evidenced a very large negative association with the AFQ-Y (r = -.41; p < .001), the DASS-21 anxiety scale (r = -.43; p < .001), stress scale (r = -.43; p < .001) and the depression scale (r = -.52; p < .001).

Table 3

Correlations Between the Variables

Variables	PsyFlex-A	1	2	3	4	5
1. CAMM	.29**	—				
2. AFQ-Y8	-.41**	-.70**	—			
3. KidScreen 10	.61**	.46**	-.59**	—		
4. DASS-21 Anxiety	-.43**	-.54**	.67**	-.58**	—	
5. DASS-21 Depression	-.52**	-.54**	.64**	-.67**	.80**	—
6. DAS-21 Stress	-.43**	-.57**	.68**	-.58**	.87**	.82**

Note. CAMM = Child and Adolescence Mindfulness Measure; AFQ-Y8 = Avoidance and Fusion Questionnaire for Youth; KidScreen10 = Quality of life questionnaire for children and adolescents; DASS-21 = Depression Anxiety Stress Scales.

** p < .001.

Analysis of Sociodemographic Variables (age, years of education, and gender)

The PsyFlex-A did not show a significant association with age (r = .04; p = .470) nor with years of education (r = .10; p = .076). When comparing the PsyFlex-A scores between boys and girls, a significant difference was found [$t_{(303)}$ = 2.83; p = .005], with boys showing higher values of psychological flexibility (boys: M = 22.06; SD = 3.53) compared to girls (girls: M = 20.78; SD = 4.31), and the effect size was small (d = 0.33).

Discussion

The concept of PF reflects a set of interdependent skills related to the individual's ability to adapt to new situations, assuming a decisive role in psychological well-being and mental health (Gloster et al., 2011; Gloster et al., 2021). Developing an instrument to reliably measure these psychological competencies/processes in adolescents is advantageous and may also contribute to the analysis of the effectiveness of interventions aimed at promoting PF. Given the lack of instruments available for children

and adolescents and the innovative and robust characteristics of the PsyFlex scale in adults, this study aimed at adapting and validating the PsyFlex scale for adolescents. For this purpose, we used a sample of 309 Portuguese students from 7th to 12th grades from schools in the centre region of Portugal.

In the factor structure analysis, the procedures used in the original adults' version (Gloster et al., 2021) were followed, with the replication of a one-factor structure being observed. Specifically, CFA results revealed very good global adjustment indices, confirming the plausibility of the one-factor model in a sample of adolescents. It is also worth noticing that the study results showed very good fit indices without needing to define any correlation between item residuals, and in the adults' sample, the residuals of Items 5 and 6 were correlated (Gloster et al., 2021). Nevertheless, Item 2 showed factor loadings below the recommended values and futures studies are warrant to better understand this item behavior. Measurement invariance between genders was tested, and results showed that the basic organisation of the PsyFlex-A was supported for boys and girls (configural invariance), and each item contributed similarly to the construct (metric invariance). These findings support an overall measurement invariance of the PsyFlex across genders, similar to what was found in the original adults' version (Gloster et al., 2021). The data obtained from this multi-group analysis allow for a more rigorous comparison of the mean values of the scale when considering gender.

Although the PsyFlex-A revealed lower reliability values than the adults' version, it showed adequate reliability, confirmed by Cronbach's alpha and composite reliability. When addressing construct validity, Item 2 revealed an item-total correlation below .30 and weak correlations with the remaining items. Although removing Item 2 would slightly improve the Cronbach alfa (from .77 to .79), this item was kept based on theoretical assumptions and the fact that, globally, the PsyFlex-A psychometric qualities would not be compromised. The study of test-retest reliability over a four-week interval showed to be adequate. The overall PsyFlex-A score showed, as expected, a positive correlation with measures of mindfulness and quality of life. Conversely, it showed a negative correlation with measures of psychological inflexibility (cognitive fusion/experiential avoidance) and negative affective states (anxiety, depression, and stress). In other words, the greater the individual's ability to manifest adaptive behaviours, the greater its ability to be in the present moment with awareness and acceptance, and the greater the subjective perception of well-being and health. In turn, the higher the psychological flexibility, the lower the experience of entanglement with thoughts and consequent avoidance behaviour or control of undesirable internal events, as well as the lower the experience of negative emotional states. It is worth noting that the effect sizes of the correlations found between the PsyFlex-A and related measures (CAMM and AFQ-Y8) were smaller than the ones found with other constructs (KidScreen 10 and DASS-21), which was, somehow, unexpected. In fact, in Gloster et al. (2021) study, a higher correlation was found between the PsyFlex and ACT-related measures when compared to the correlation between the PsyFlex and wellbeing. One may hypothesize that the CAMM and the AFQ-Y8 may address complex constructs being harder to understand by adolescents, and future studies need to tackle this issue. Nevertheless, overall results were in line with the ones found in the PsyFlex adults' version, with the PsyFlex being negatively associated with depression, anxiety, and somatisation subscales (Gloster et al., 2021). Also, the study by Tyndall et al. (2020) corroborated this negative association between PF and psychopathology. Alternatively,

Renshaw (2018) demonstrated a positive relationship between psychological well-being and psychologically flexible behaviour.

As for the sociodemographic variables analysis, age and education years were not associated with the PsyFlex-A scores. These data may possibly be explained by the homogeneity of the sample in these variables, and further studies should confirm this pattern. Regarding gender, statistically significant differences were found, with males showing higher PF values. This contradicts the results obtained with the PsyFlex in adults, where no relationship between gender and PF has been reported (Gloster et al., 2021). In adolescents, studies using skills measures associated with psychological inflexibility, such as the CAMM or the AFQ-Y8, have shown mixed results regarding the effect of gender. For example, some studies found significant differences, with girls evidencing higher values of psychological inflexibility assessed by the AFQ-Y8 (Greco et al., 2008; Livheim et al., 2016; Salazar et al., 2019), which is in line with our results. However, other studies found no significant gender differences (Cunha et al., 2022; Christodoulou et al., 2018). Regarding mindfulness skills (CAAM), for example, in the Portuguese sample, no significant gender differences were found (Cunha et al., 2013). Future studies are warranted to elucidate these sociodemographic variables' role in the overall PsyFlex-A score.

This study showed some limitations that should be considered. Despite the adequate sample size, it is not representative of the Portuguese population, thus preventing the generalisation of results. Therefore, the use of a representative sample of the community and of clinical samples may contribute to establishing more rigorous results regarding the Psy-Flex-A psychometric properties. Considering that convergent validity results showed that the effect sizes of correlations with related constructs were lower than expected, the use of larger samples and this study replication may elucidate this topic. As previously mentioned, future studies should also address Item 2 behavior. This was the only item showing weak psychometric properties. When compared to the adults' original version, this item adaption for adolescents included the provision of examples to promote comprehensibility, and this might have introduced bias. Although the pilot study conducted to tackle face validity is supposed to minimize this limitation, further examination of this item is warranted.

The present study provided a new and brief instrument for the Portuguese adolescent population, broadening the assessment and research in the area of interventions aimed at promoting psychological flexibility, both in clinical and school settings. The results suggest that this Portuguese version is a reliable and valid measure to assess PF in adolescents, allowing its application in other Portuguese-speaking countries or even in cross-cultural studies. PF is a crucial concept in mental health, and early screening of the processes involved may play a relevant role in designing interventions to promote adaptive behaviours. On an ending note, and as a key construct in ACT-based interventions, PsyFlex-A may also be a valuable tool to assess therapeutic change.

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Appendix

PsyFlex - Adolescentes

(Gloster et al, 2021; Cunha, M., & Soares, R., 2021)

Instruções: As questões que se seguem referem-se às tuas experiências nos últimos sete dias. Faz um círculo à volta do número que melhor traduz a tua experiência.

1. Mesmo com os meus pensamentos noutro lugar, consigo focar-me no que está a acontecer, em momentos importantes.

Muito raramente	Raramente	Ocasionalmente	Frequentemente	Muito frequentemente
1	2	3	4	5

2. Consigo estar com pensamentos e experiências difíceis (por exemplo, um pensamento que não sou capaz, sentir-me nervoso/a), sem ter que fugir logo deles (por exemplo, tentar não pensar, ou fazer outra coisa, estar sempre a jogar videojogos, etc.).

Muito raramente	Raramente	Ocasionalmente	Frequentemente	Muito frequentemente
1	2	3	4	5

3. Consigo olhar com distanciamento para os meus pensamentos difíceis sem deixar que eles me controlem.

Muito raramente	Raramente	Ocasionalmente	Frequentemente	Muito frequentemente
1	2	3	4	5

4. Consigo notar que, no fundo, continuo a ser eu, mesmo quando os pensamentos e as experiências me estão a deixar confuso/a.

Muito raramente	Raramente	Ocasionalmente	Frequentemente	Muito frequentemente
1	2	3	4	5

5. Determino (escolho) o que é importante para mim e decido em que é que quero gastar a minha energia.

Muito raramente	Raramente	Ocasionalmente	Frequentemente	Muito frequentemente
1	2	3	4	5

6. Envolvo-me verdadeiramente em coisas que são importantes, úteis, ou significativas para mim.

Muito raramente	Raramente	Ocasionalmente	Frequentemente	Muito frequentemente
1	2	3	4	5