

Future Time Orientation Scale: Psychometric Properties in a Sample of Brazilian Adolescents

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The Future Time Orientation Scale (FTOS) is a measure that assesses the extent to which a person is impacted by their psychological future. Several validity and reliability evidence for the FTOS have been investigated in the Brazilian and Portuguese context based only on adult samples. Considering that future time orientation is sensitive to age differences, the validity and reliability of the FTOS among adolescents cannot be ensured based on studies with adults. Thus, the purpose of this study is to assess the psychometric properties of the FTOS in a sample of Brazilian adolescents. In total, 262 individuals aged between 14 and 19 years old filled in the FTOS in a survey conducted in two public schools in Ribeirão Preto/SP, Brazil. Confirmatory factor analysis demonstrated that the FTOS original version well-fitted the data, consistently outperforming an alternative unidimensional model. The internal consistency achieved mostly acceptable values. The scale is not affected by ceiling or floor effect. Correlations to life project endorsed validity evidence based on the relations to other measures. Measurement invariance models comparing the sample of this study with a sample of adults demonstrated metric invariance, with two intercepts being different across age groups. Based on the findings, the FTOS is a valid and reliable measure to assess FTO among adolescents, though intercept differences may bias comparisons with adults.

Keywords: future time orientation, test adaptation, confirmatory factor analysis, adolescents.

Escala de Orientación Temporal Futura: Propiedades Psicométricas en una Muestra de Adolescentes Brasileños

La Escala de Orientación Temporal Futura (EOTF) es una medida que evalúa el grado en que una persona es influenciada por su futuro psicológico. Se han investigado diversas evidencias de validez y fiabilidad de la EOTF nel contexto brasileño y portugués en base apenas a muestras de adultos. Considerando que la orientación temporal futura es sensible a las diferencias de edad, no se puede afirmar la validez y fiabilidad de la EOTF entre adolescentes basándose en estudios con adultos. El objetivo de este estudio es evaluar las propiedades psicométricas de la EOTF en una muestra de adolescentes brasileños. En total, 262

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individuos de entre 14 y 19 años completaron la EOTF en una encuesta realizada en dos escuelas públicas de Ribeirão Preto/SP, Brasil. El análisis factorial confirmatorio demostró que la versión original se ajustaba bien a los datos, superando consistentemente a un modelo unidimensional alternativo. La consistencia interna alcanzó valores mayormente aceptables. La escala no es afectada por efecto techo o suelo. Las correlaciones con proyecto de vida indicaran evidencia de validez basada en las relaciones con otras medidas. El modelo de invariancia de medición que comparó la muestra de este estudio con una muestra de adultos demostró invariancia métrica, con dos interceptos siendo diferentes entre los grupos de edad. En base a los hallazgos, la EOTF es una medida válida y fiable para evaluar la orientación temporal futura entre adolescentes, aunque las diferencias en los interceptos pueden sesgar comparaciones con los adultos.

Palabras-clave: orientación temporal futura, adaptación de testes, análisis factorial confirmatorio, adolescentes.

Escala de Orientação Temporal Futura: Propriedades Psicométricas em uma Amostra de Adolescentes Brasileiros

A Escala de Orientação Temporal Futura (EOTF) é uma medida que avalia o grau com que uma pessoa é influenciada pelo seu futuro psicológico. Diversas evidências de validade e confiabilidade da EOTF foram investigadas no contexto brasileiro e português baseado apenas em amostras de adultos. Considerando que a orientação temporal futura é sensível a diferenças de idade, não se pode afirmar a validade e confiabilidade da EOTF em adolescentes com base em estudos com adultos. O objetivo deste estudo é avaliar as propriedades psicométricas da EOTF em uma amostra de adolescentes brasileiros. No total, 262 indivíduos com idades entre 14 e 19 anos completaram a EOTF em uma pesquisa realizada em duas escolas públicas de Ribeirão Preto/SP, Brasil. A análise fatorial confirmatória demonstrou que a versão original se ajustava bem aos dados, superando consistentemente um modelo unidimensional alternativo. A consistência interna alcançou valores majoritariamente aceitáveis. A escala não é afetada por efeito teto ou piso. As correlações com projeto de vida mostraram evidências de validade baseadas nas relações com outras medidas. O modelo de invariância de medida que comparou a amostra deste estudo com uma amostra de adultos demonstrou invariância métrica, com dois interceptos sendo diferentes entre os grupos de idade. Com base nos achados, a EOTF é uma medida válida e confiável para avaliar a orientação temporal futura entre adolescentes, embora as diferenças nos interceptos possam enviesar comparações com adultos.

Palavras-chave: orientação temporal futura, adaptação de testes, análise fatorial confirmatória, adolescentes.

In 2018, a World Bank study identified 11 million young people in Brazil who were not working nor attending school (World Bank Group, 2021). One of the causes for this high amount of Not in Education, Employment or Training (NEET) youths is that they perceive the continuation of education or finding a job as not important, valuable or feasible. Secondly, there is a lack of knowledge or preparation towards the achievement of their aspirations. A lot of the barriers young people face while pursuing their career come down to planning ahead. This is an important skill for youths because they might not have a clear idea on their future possibilities. To equip adolescents for the future, it is crucial to gain deeper insights into their psychological future (i.e., their perceptions regarding the future). According to classical and contemporary authors of human development (Inhelder & Piaget, 1958; Steinberg, 2014), adolescents integrate the adult life by means of planning their future life. Considering this urge, tools to assess young people's psychological future are of utmost importance. This study assesses the psychometric properties of a measure of the psychological future (namely, the Future Time Orientation [FTOS]) in a sample of Brazilian adolescents.

Psychological Future: Theoretical Approaches and Measures

The psychological future is considered to be a very significant individual factors in adolescent development. Among adolescents, being future-oriented is positively associated with multiple pro-social outcomes and psychological adjustment, while not being future-oriented is negatively associated with academic failure, substance use, violence, bullying, delinquency, and sexual risk behaviors (Su et al., 2017; Khetarpal et al., 2021). Despite that, research conducted by Steinberg et al. (2009) indicated that younger adolescents are less future-oriented than adults. This implies that, compared to adults, adolescents

are usually less effective in making a distinction between the immediate reward opposed to the delayed reward (Kooij et al., 2018). This also shows the importance of interventions at an early age considering the possibilities that adolescents have.

Most of the research conducted on the psychological future has been performed by either one of two approaches. The thematic approaches (e.g., Nurmi, 1991; Seginer, 2009) assess the psychological future by examining its content, particularly within specific life domains such as career or education. It places emphasis on the cognitive representations of the future, as well as their associated motivational and behavioral components (Coscioni et al., 2020). Conversely, the athematic approaches (e.g., Gjesme, 1979; Zimbardo & Boyd, 1999) concentrate on general dispositions toward the future without addressing specific life domains. Instead, they prioritize on personal characteristics that influence psychological processes and behaviors related to the future (Coscioni et al., 2020). This paper focuses on a domain of the psychological future assessed by the athematic approaches.

Different athematic measures have been created to assess distinct personal dispositions influencing how one is impacted by the psychological future. For instance, the Future Time Perspective Inventory (FTPI; Heimberg, 1963) measures the impact of the psychological future on the present considering a single dimension. Conversely, the Consideration of Future Consequences Scale (Stathman et al., 1994), the Zimbardo Time Perspective Inventory (Zimbardo & Boyd, 1999), the Time Orientation Scale (Holman & Silver, 1998), and the *Inventário de Perspectiva Temporal* (Janeiro, 2012) differentiate within time orientations, but only include one future-oriented subscale. The *Inventário de Perspectiva Temporal* and most recent versions of the Zimbardo Time Perspective Inventory (e.g., Carelli et al., 2014) include more than one future-related dimension, having both a positive and a negative future-orientated dimension.

In addition to the previous tools, there are athematic measures that assess the psychological future multidimensionally. First, the Future Time Orientation Measure (Gjesme, 1979) consists of 12 items and was the first scale to include multiple dimensions of FTO (antici-

pation, involvement, occupation, and speed). Second, the Future Time Perspective Scale (FTPS; Husman & Shell, 2008) consists of 27 items (of which 14 originated from the Future Time Orientation Measure) and four components (connectedness, value, speed, and extension). According to Coscioni et al. (2023), the FTPS has multiple content inconsistencies. The connectedness subscale (measuring a disposition to anticipate the long-term consequences of a potential action) consists of a few items that may overlap with the definition of valence (the disposition to ascribe high value to goals in the distant future). Secondly, all items on the value subscale compare the psychological present and future, which does not accommodate individuals that care for both of these time orientations. Thirdly, the speed subscale primarily assesses an attitude of self-discipline on present activities, but not on the activities that are related to the future. Fourthly, the extension subscale assesses perceptions of how far something is placed by indication of time, opposed to the ability of an individual to project their thoughts in the future. This subscale also includes two items that refer to a specific month, which may cause inconsistencies if the time duration towards that month differs per participant.

Coscioni et al. (2023) additionally acknowledged statistical limitations within the construction of the FTPS. Namely, the internal structure of the FTPS has been derived by the use of principle component analysis (PCA), which is not suitable for the measurement of psychological constructs (Costello & Osborne, 2005). PCA forms latent variables accounting for both the items' common variances and individuals variances. As psychological measurement usually aims at latent variables that explains a set of beliefs, behaviors or emotions, only the items' common variances should be accounted. Therefore, factor analyses are more recommended, as they do not consider the items' individual variances while estimating a factor. Another limitation refers to the use of Varimax rotation, because it assumes the correlation between dimensions to be null (Costello & Osborne, 2005).

As an attempt to overcome the limitations of the FTPS, Coscioni et al. (2023) created the Future Time Orientation Scale (FTOS).

This scale is based on the definition of FTO as “the personal disposition to have the current psychological functioning impacted by the psychological future” (Coscioni et al., 2023, p. 10703). It assesses two FTO dimensions: impact (i.e., the influence of the psychological future in current decisions and behavior) and distance (i.e., the perceptions of time distance into the future). The scale aimed at the improvement of the FTPS’s limitations. Its content initially considered three dimensions: connectedness, valence (theoretically equivalent to the FTPS’s value subscale), and distance (theoretically equivalent to the FTPS’s extension subscale). The connectedness and valence subscales’ items were designed to avoid the overlap between the two concepts. Additionally, the valence subscale comprised items not comparing future and present time orientations. According to Coscioni et al. (2024), such a comparison is inherently related to the notion of delaying gratification rather than future valence. While doing these content adjustments, the items of connectedness and valence loaded onto the same factor, showing that these two dimensions do not distinguish from each other. This factor was named impact. Lastly, The FTOS did not include the speed dimension based on the critique that this dimension is not specifically related to the future.

The FTOS has a few advantages over other athematic measures of the psychological future. First, it provides a more transculturally valid measure, involving 10 international research teams since the first step of its creation. Second, the assessment of its psychometric properties has been derived from community samples, while others have used student populations and adolescents. Lastly, the statistical methods employed to assess its psychometric properties are more appropriate for the assessment of the psychological constructs.

The psychometric properties of the FTOS have been assessed by experts’ consultation, focus groups, exploratory and confirmatory factor analyses, internal consistency test, ceiling and floor effect assessment, and relations to other measures of delaying gratification and career concern (Coscioni et al., 2024). However, these psychometric properties have only been assessed among adults and thus, cannot be generalizable for adolescents. Compared to adults, adolescents are

intensely developing their hypothetical-deductive reasoning, which impacts how they project themselves in the future (Inhelder & Piaget, 1958). Therefore, assessing the psychometric properties of the FTOS among adolescents are of utmost importance. While validity and reliability evidence for the FTOS among adolescents is identified, its usage among young people can be ensured. Then, the FTOS shall be safely used as a tool to assess the psychological future of adolescents.

Current Study

This study assesses the psychometric properties of the FTOS in a sample of Brazilian adolescents. The study replicated some of the statistical analyses used to assess the psychometric properties of the FTOS among adults (Coscioni et al., 2023). First, confirmatory factor analyses (CFA) are employed to test its internal structure. Second, three internal consistency coefficients are computed to assess the subscales' reliability. Third, the existence of ceiling and floor effects is evaluated. Based on the results of the study with adults, it is anticipated that: (H1) the original factor structure of the FTOS will demonstrate a good fit for the adolescent sample; (H2) the FTOS subscales will demonstrate good reliability; (H3) the FTOS will not be affected by floor nor ceiling effects.

In addition to the replication of previous analyses, this study tests the invariance of the FTOS across adolescents and adults. In the original study with adults, the FTOS demonstrated scalar invariance across two age groups: young adults (18 to 30 years old) and middle adults (30 to 65 years old). As similar results are expected, it is anticipated that (H4) the FTOS will demonstrate scalar invariance across adolescents and adults.

Lastly, the associations between the FTOS scores with another measure of the psychological future are tested to assess validity evidence based on the relations to other measures. The additional measure is the Life Project Scale (LPS; Coscioni et al., 2024), which assesses two dimensions of the psychological future: identification (i.e., awareness of one's intended future) and involvement (i.e., mobilization of actions and plans for the accomplishment of one's intended future).

Based on a previous study that assessed the associations between future time orientation and life projects (Silva et al., 2023), it is anticipated that (H5) the impact subscale will exhibit significant, positive, and strong correlations to the LPS scores, whereas the distance subscale will not exhibit significant correlations to the LPS scores. The associations between impact and the life project's dimensions are due to the fact that individuals with higher rates of impact might anticipate more the future, which in turn leads to a clearer and more active life project. The non-association between distance and the life project's dimensions are related to the fact that distance has mostly a cognitive nature, not deeply impacting how people organize their intended future.

Method

Participants and Procedures

The data used in this study is part of a larger project in which the FTOS was used. The main goal of the project was to assess the associations between adolescents' life projects, academic achievement, and social-emotional learning. The data collection was performed in two schools located in the city of Ribeirão Preto/SP, Brazil, in December 2022. The data collection included two waves and the FTOS was filled in only in the second wave, which took place in October 2022. Participants were recruited through posters displayed around the school, teachers promoting the research in class, and class representatives sharing information through WhatsApp groups. The data was collected through printed questionnaires in the classroom, as well as online through google forms. The only inclusion criterion was to be a high school student in the schools where the study took place.

Altogether, 265 Brazilian high school students filled in the FTOS. All participants with incomplete answers ($n = 3$) were excluded from the analysis. Thus, the final sample consisted of 262 individuals aged between 14 and 19 ($M = 16.1$, $SD = 1.0$), of which 64.5% ($n = 169$) were females, 33.2% ($n = 87$) were males, 1.9% ($n = 5$) identified themselves as another

gender, and 0.4% ($n = 1$) did not answer the question on gender. Considering $\alpha = 0.05$, $\beta = 0.20$, and a moderate effect size ($\lambda = 0.30$), Soper (2024) suggests a sample size of $n = 100$ to test a model with two factors and eight items (as the original internal structure). Thus, a sample size of $n = 262$ is higher than the recommended minimum sample size. The analyses were implemented with and without outliers ($n = 3$), assessed via Mahalanobis distance. As the removal of outliers did not impact the results, they were kept in the final analyses.

Measures

Future Time Orientation Scale

The FTOS (see Supplemental Materials) was originally created by Coscioni et al. (2023) in Brazilian and European Portuguese. It consists of 8 items, divided into two dimensions: distance (e.g. “Two years in the future seems to me like a short period of time”), and impact (e.g. “I value activities that may benefit me in the long run”) with three and five items, respectively. Item 5 (distance subscale) is reverse-coded. Participants indicated their responses on a 7-point scale, ranging from “strongly disagree” to “strongly agree.” Its psychometric properties are introduced in the Results.

Life Project Scale

The LPS was originally created by Coscioni et al. (2024) in Brazilian and European Portuguese. It consists of 8 items, divided into two dimensions: identification (e.g. “I am aware of what I want for my future life”), and involvement (e.g. “I’m spending a great deal of time on actions related to my future goals”), with four items each. Participants indicated their responses on a 7-point scale, ranging from “strongly disagree” to “strongly agree.” Its psychometric properties were assessed via CFA using Maximum Likelihood Robust (MLR) estimator. The original factor structure demonstrated acceptable fit, $\chi^2(19) = 67.8$, $p < .001$, CFI = 0.942, TLI = 0.915, RSMEA [90% C.I.] = 0.100 [0.078; 0.123], SRMR = 0.042. The reliability was good

for both identification, $\alpha = .84$ $\Omega = .86$ and AVE = .62, and involvement, $\alpha = .90$ $\Omega = .90$ and AVE = .68.

Data Analysis

Firstly, to test the FTOS internal structure, CFA compared two models: the original 2-factor solution and an alternative unidimensional solution. The 2-factor solution was expected to achieve a better fit, as the FTOS is conceived as a multidimensional scale. The MLR estimator was used due to violations of multivariate normality as indicated by Mardia's tests $M(\text{skewness}) = 425.807$, $p < .001$, $M(\text{kurtosis}) = 10.0$, $p < .001$. MLR was also used in the original study with adult samples. Other ordinal methods (such as unweighted least squares [ULS]) were not employed as some response categories were not (or barely not) filled in by participants. According to Rhemtulla et al. (2012), MLR performance as good as ULS when 7-point scales are assessed. The following fit indices and cutoffs were considered: comparative fit index (CFI > 0.950), Tucker-Lewis index (TLI > 0.950), root mean square error approximation (RMSEA < 0.080), and standardized root mean residual (SRMR < 0.080; Schreiber et al., 2006).

Secondly, to test the subscales' reliability, three internal consistency coefficients were computed: alpha (α), omega (Ω), and average variance extracted (AVE). For omega and alpha, values above .70 were expected (Gliem & Gliem, 2003), whereas values above .50 were expected for AVE (Fornell & Larcker, 1981). If AVE value is less than .50, but omega is higher than .60, the reliability of the scale acceptable (Fornell & Larcker, 1981).

Thirdly, the existence of ceiling and floor effects was tested via the computation of the frequencies of minimum and maximum punctuations in both subscales. Percentages over 15% were considered a risk of ceiling or floor effect (Terwee et al., 2007).

Fourthly, multigroup CFA were employed to test whether the factor structure (configural model), factor loadings (metric model), and item intercepts (scalar models) were invariant across age groups.

The invariance model compared the sample of adults of the original study (Coscioni et al., 2024) with participants of this study aged from 14 to 17 years old. The participants from this study aged from 18 to 19 years ($n = 18$) were removed as the sample of adults already included individuals with this age range. Within the adult sample, the same two age groups primary used were considered in this study: young adults (18 to 30 years old) and middle adults (30 to 65 years old). While the number of participants across groups was considerably unbalanced, new invariance models were implemented considering the same number of participants per groups (Yoon & Lai, 2017). Thus, random participants from the groups with more individuals were selected for the analyses. To examine invariance across age group, the configural and metric models, as well as the metric and scalar models were compared. The following cutoffs were expected: $\Delta CFI > -0.010$ and $\Delta RMSEA < 0.005$ were expected (Cheung & Rensvold, 2002).

Lastly, the associations between the FTOS and LPS scores were computed considering the factor scores computed by the regression technique. Considering the violation of univariate normality (as tested by Shapiro-Wilk tests), Spearman correlations were used. The following cutoffs were used for interpretation: $\rho < .30$, weak; $\rho < .50$ are moderate; otherwise, strong (Dancey & Reidy, 2007).

All analyses were conducted using R software 4.2.3 (R Core Team, 2024). The following packages were utilized: *lavaan* (version 0.6-9; Rosseel, 2012) for CFA, and *semTools* (version 0.5-5; Jorgensen et al., 2021) for reliability assessment.

Ethical Statement

The study was assessed by the Comitê de Ética em Pesquisa com Seres Humanos da Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, da Universidade de São Paulo (CAAE nº. 53417521.2.0000.5407). Consent was acquired through the completion of an informed consent form, which was approved by both students and their legal guardians.

Results

Confirmatory Factor Analysis

The original 2-factor solution demonstrated a good fit, $\chi^2(19) = 19.4, p = .433$, CFI = 0.999, TLI = 0.999, RSMEA [90% C.I.] = 0.009 [0.000; 0.053], SRMR = 0.037. Conversely, the alternative unidimensional solution showed poor fit, $\chi^2(20) = 226.3, p < .001$, CFI = 0.456, TLI = 0.239, RSMEA [90% C.I.] = 0.198 [0.177; 0.221], SRMR = 0.179. Therefore, the original internal structure was retained, corroborating the first hypothesis. Figure 1 illustrates the factor loadings, which all exceeded 0.500, except for item 3. The correlation between the factors was weak.

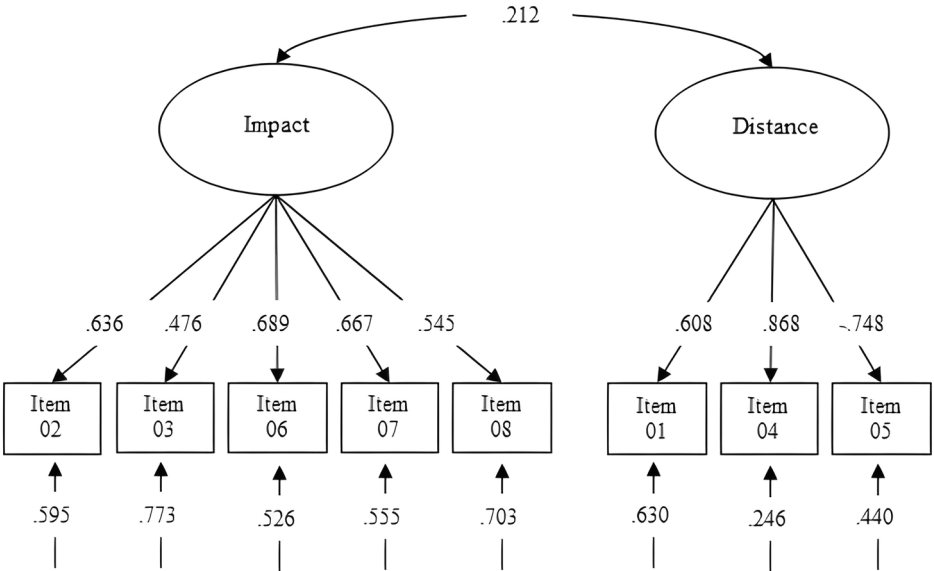


Figure 1. FTOS internal structure

Note. All factor loadings, residual variances, and correlations significant at $\alpha = .05$. Item 5 is reverse-coded. The reverse-coded factor loading is 0.748.

Reliability Coefficients

The distance subscale demonstrated good reliability, $\alpha = .78$ $\Omega = .79$ and AVE = .56. Conversely, the impact subscale showed good alpha and omega values, $\alpha = .74$ and $\Omega = .74$, despite an AVE below the expected cutoff, AVE = .37.

Descriptive Statistics, and Ceiling and Floor Effect

As seen in Table 1, the means of responses in each item ranged from 4.2 to 5.7, with the items of the distance subscale presenting the lowest means. As for the direct scores, the distance subscale had a considerably lower mean compared to the impact subscale. The distance subscale had a minimum punctuation of 1.9% and a maximum punctuation of 3.1%. In turn, the impact subscale had a minimum punctuation of 0.0% and a maximum punctuation of 3.1%. Therefore, the scale does not seem to be affected by ceiling not floor effects, corroborating the third hypothesis. For both the items and the subscales, no large violations of skewness and kurtosis were observed.

Table 1

Descriptive statistics (n = 262)

Item	M	SD	Median	Range	Skewness	Kurtosis
1	4.2	1.7	4	1-7	-0.18	-0.99
2	5.5	1.3	6	1-7	-0.9	0.24
3	5.7	1.1	6	1-7	-1.2	1.9
4	4.7	1.7	5	1-7	-0.57	-0.62
5	4.4	1.7	5	1-7	-0.29	-0.99
6	5.7	1.2	6	2-7	-1.06	0.86
7	5.3	1.4	6	2-7	-0.88	0.3
8	5.2	1.4	5	1-7	-0.7	-0.04
Subscale	M	SD	Median	Range	Skewness	Kurtosis
Distance	4.4	1.4	4.7	1-7	-0.37	-0.44
Impact	5.5	0.9	5.6	2.8-7	-0.64	0.13

Invariance across Age Groups

As seen in Table 2, the FTOS demonstrated metric invariance across age groups. Partial scalar invariance was observed only after freeing the intercepts of items 2 (“When making decisions, I think carefully about how my choices may influence the future”) and 6 (“When I want something, I think carefully about what I have to do to achieve it in the future”). The intercept of item 2 was smaller for adolescents, whereas the opposite occurred with the intercept of item 6. The models with the same number of participants across age groups also exhibited partial scalar invariance, with the intercepts of items 2 and 7 (“I make connections between the things I do now and what may happen with me in the future”) being variant. The intercept of both the items were smaller for adolescents. Thus, while the FTOS has variant intercepts, the fourth hypothesis was only partially corroborated.

Table 2

Invariance Models across Age Groups

	$\chi^2(df)$	CFI	TLI	RMSEA [90% CI]	SRMR	Diff. test	ΔCFI	$\Delta RMSEA$
Entire sample – adolescents, $n = 144$; young adults, $n = 1003$; middle adults, $n = 689$								
Configural	125.8(57)**	.979	.969	.043 [.034; .052]	.031			
Metric	147.9(69)**	.976	.970	.042 [.034; .050]	.039	22.3(12)*	-.003	-.001
Scalar	221.9(81)**	.957	.955	.052 [.045; .059]	.044	84.4(12)**	-.019	.010
Partial ¹	169.4(77)**	.972	.969	.043 [.035; .051]	.040	22.6(8)*	-.004	.001
Random selection of participants – adolescents, $n = 244$; young adults, $n = 244$; middle adults, $n = 244$								
Configural	121.3(57)**	.953	.931	.068 [.052; .084]	.047			
Metric	137.4(69)**	.950	.940	.064 [.049; .078]	.062	17.6(12)	-.003	-.004
Scalar	186.1(81)**	.924	.921	.073 [.060; .086]	.069	52.3(12)**	-.027	.009
0Partial ²	148.9(77)**	.948	.943	.062 [.048; .076]	.064	10.9(8)	-.003	-.002

Note. * $p < .05$, ** $p < .001$, ¹intercepts of items 2 and 6 freed – partial model compared to metric model, ²intercepts of items 2 and 7 freed – partial model compared to metric model.

Correlations to Life Project

The correlations of the impact subscale to life project identification, $\rho = .50$, $p < .001$, and life project involvement, $\rho = .59$, $p < .001$, were significant, positive, and strong. Conversely, even though the correlations of the distance subscale to life project identification, $\rho = .15$, $p = .019$, and life project involvement, $\rho = .16$, $p = .008$, were positive and significant, their magnitudes were weak. As the correlations between the FTOS and LPS scores were partially in line with the anticipations, the fifth hypothesis was partially corroborated.

Discussion

The purpose of this study was to assess the psychometric properties of the FTOS in a sample of Brazilian adolescents. Five hypotheses were tested, being the three first ones related to the replications of analyses conducted in the construction of the FTOS with adults (Coscioni et al., 2023). These hypotheses posited that: (a) the original internal structure would fit the sample of adolescents; (b) the subscales' reliability would be good; and (c) the subscales would not be affected by ceiling nor floor effects. In line with the study with adults, the original internal structure well-fitted the data. However, the factor loadings of item 3 was slightly below 0.50, indicating that less than 25% of its variance is explained by the factor impact. The subscales demonstrated good reliability coefficients, except for the AVE of the impact subscale (which might be influenced by the reduced factor loading of item 3). While similar results were observed in the original study (Coscioni et al., 2023), this might indicate that the subscale generally predicts more errors than the latent trait being measured. Coscioni et al. (2023) discussed that the low AVE might reflect the fact that the impact subscale is derived from two initially envisioned dimensions: connectedness and valence. As factor analyses failed to discriminate the two dimensions, a factor designating a general impact of the psychological future in current decisions and behavior was proposed. Despite the reduced

AVE, the other coefficients were appropriate. According to Fornell and Larcker (1981), when omega exceeds 0.60, an AVE below 0.5 may still be acceptable. Lastly, and also in line with the original study (Coscioni et al., 2023), the scale is not affected by ceiling nor floor effects.

The fourth hypothesis stated that the FTOS would demonstrate scalar invariance across adolescents and adults. For that, the adult sample of the original study (Coscioni et al., 2023) was compared to the participants of this study. Three age groups were considered: adolescents (14 to 17 years old), young adults (18 to 30 years old), and middle adults (31 to 65 years old). In the original study, a multigroup CFA comparing the two oldest age groups concluded for the scalar invariance of the FTOS across age. However, after including the group of adolescents of this study, scalar invariance was only partially observed. Considering that the number of participants across groups was very unbalanced, the recommendations of Yoon and Lai (2017) were followed. Hence, individuals from the largest groups were randomly selected to form subgroups equally distributed. Even after following this strategy, the results were very similar, with only partial scalar invariance being detected. Therefore, the fourth hypothesis was partially corroborated. According to Vandenberg and Lance (2000), “intercept differences may not reflect biases (undesirable) but response threshold differences that might be predicted based on known group differences (desirable)” (p. 38). The findings might then reflect important age differences on the measurement of future time orientation. Noteworthy is that comparisons across age groups may be biased due to intercept differences. Further research is needed to understand potential reasons why those intercepts are different across age groups.

Lastly, according to the fifth hypothesis, the impact subscale would exhibit significant, positive, and strong correlations to life project identification and involvement, whereas the distance subscale would not be significantly correlated to the LPS scores. This hypothesis was only partially corroborated. In line with the previous study by Silva et al. (2023), the impact subscale was strongly and positively correlated to life project dimensions. This implies that individuals who are more future-oriented

are more likely to have clearer and more active life projects. Nevertheless, the distance subscale was also significantly and positively correlated to both the life project dimensions. The findings are not in line with Silva et al. (2023), who found non-significant correlations between the distance subscale and the LPS scores. Noteworthy is that the magnitude of the correlations found in this study was very similar to those found in the study by Silva et al. (2024). Thus, differences across studies might be related to the sample size, as the study by Silva et al. (2024) had a slightly smaller sample, $n = 216$. More importantly, the significant correlations found in this study had still a very low magnitude, corroborating the previous research. According to Silva et al. (2024), the non-association between distance and life project might be related to the fact that distance is a personal disposition with a cognitive nature, not necessarily prompting a motivational power. The findings are also in line with the study by Coscioni et al. (2023), which identified low correlations of the distance subscale to other motivational variables, namely, delay gratification and career concern. According to Silva et al. (2023), the non-association between distance and life project refutes the theory of Nuttin and Lens (1985), according to who people perceiving distant events as close in time are more likely to be more committed with their future aspirations. In their studies, Silva et al. (2024) discussed that these results might have reflected the isolation period during the pandemic. While this study took place after the pandemic, it brings about additional evidence against the motivational power of distance.

Implications, Limitations, and Future Directions

This study identified distinct sources of validity and reliability evidence for the FTOS in a sample of Brazilian adolescents. Based on the findings, the FTOS can be appropriately used as a tool to assess adolescents' psychological future. Despite the positive results, the study identified some psychometric limitations. First, the subscale impact demonstrated reduced AVE. Second, the factor loading of item 3 – which belongs to the impact subscale – was decreased. Ultimately, the limitations do not preclude the use of the FTOS among adolescents.

However, they emphasize enduring psychometric limitations that deserve attention in the context of future developments of the FTOS.

Despite identifying validity and reliability evidence for the FTOS among adolescents, some biases in the participants' recruitment are noteworthy. First, while participants were recruited through self-inclusion, the final sample is not representative. Future studies using representative or stratified samples may identify validity and reliability evidence of the FTOS with less biases. Although the results cannot be generalizable for the general population, they can be safely transferred to other samples with similar features: adolescents studying in public high schools in the region of Ribeirão Preto/SP, Brazil. Collecting data only with students of public schools may be firstly perceived as a limitation, as the results cannot be generalized or transferred to students of private schools. However, collecting data with underprivileged samples fills in a gap, as Coscioni et al. (2023) acknowledged that the FTOS has been mostly assessed using samples of privileged individuals. Additionally, since all participants are from Brazil, the results cannot be generalized or transferred to other countries. Different cultures may have varying perspectives on future-related thoughts (Mello & Worrell, 2014).

Although the study corroborates the use of the FTOS among adolescents, this study found item intercept differences across adolescents and adults. Noteworthy is that the group comparisons might have been biased due to differences in the period of data collection. While the adult sample was collected during the pandemic, the adolescent sample was collected after that. Thus, future studies may implement invariance models considering groups whose data were collected in similar conditions. Notwithstanding the bias, the findings indicate that comparisons across age groups are affected by variant intercepts. If a more strict statistical approach is followed, variant intercepts can even preclude group comparisons (De Roover, 2021). Alternatively, item intercepts may be seen as expected group differences (Vandenberg & Lance, 2000). If this approach is assumed, this study may indicate important age differences on the measurement of the psychological future. Future studies may further explore age differences of the measurement of the psychological

future, including the FTOS, as well as other measures assessing different facets of people's psychological future.

This study also contributes for the further comprehension of the associations between future time orientation and life project. First, the strong associations between the impact subscale and life project were endorsed. Second, further insights on the associations between the distance subscale and life project were allowed. At first sight, the study contradicts the literature (Silva et al., 2023) by finding significant correlations between these constructs. However, considering that these correlations were weak, the findings convey to show evidence against the motivational power of distance. Future studies may explore the associations of the distance subscale with other variables and in other contexts in order to further investigate its potential motivational power.

Conclusion

This study assessed the psychometric properties of the FTOS in a sample of adolescents. The internal structure has been tested via CFA, showing a good fit of the FTOS in a group of adolescents. The reliability has been tested by three internal consistency coefficients, demonstrating good reliability. The existence of floor and ceiling effects has been tested though the computation of the maximum and minimum punctuations, showing that the scale is not affected by these effects. The invariance of the scale across adolescents and adults has been tested via multigroup CFA, indicating intercept differences across groups. Lastly, the correlations between future time orientation and life project were assessed, revealing additional validity evidence based on the relations between impact and both the life project dimensions. The weak associations between distance and life projects suggest that distance may be a more cognitive variable, with less motivational power. Therefore, based on the findings, the FTOS is a valid and reliable tool to assess future time orientation among adolescents, although differences in intercepts may introduce bias when comparing with adults.

Dataset statement

Datasets, R script, and the FTOS forms (in Brazilian Portuguese and English) are made public at <https://osf.io/76whv/>

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