PSYCHOMETRIC STUDY OF THE TIME PERSPECTIVE INVENTORY (ZTPI) IN HIGHER EDUCATION

Estudo psicométrico do inventário de perspectiva temporal (ztpi) na educação superior

Estudio psicométrico del Inventario de Perspectiva Temporal (ZTPI) en educación superior

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Abstract: Psychological studies have shown in the last decades that Time Perspective has a conscious and voluntary effect on human behavior in the present time, therefore, it is considered an important variable to understand them. Thus, we envision paths for research in the psychoeducational field, therefore, taking a degree represents the search for a future goal and involves behaviors that are organized from the integration of two different times, past, present and future. The objective of this study was to search for evidence of the validity of the internal structure of two items of a Temporal Perspective Inventory by Zimbardo and Boyd (2014), since the authors sought in their model a multidimensional measure of temporal orientation. 676 university students from different courses and different graduation periods will participate in this study. Descriptive statistical analysis (means, standard deviation and percentage), comparative, correlational and inferential (confirmatory factorial analysis) were performed. The results of the AFC corroborate in part with the structural model proposed by the authors, thus confirming four of the five temporal dimensions: Negative Past, Hedonistic Present, Fatalistic Present and Future Tempo. The positive Passed dimension was not confirmed with the sample of the present research, or that indicates the need for new studies as the model in the Brazilian sample, thus aiming to expand the psychometric evidence of the instrument in Higher Education.
Keywords: temporal perspective; college education; goals.

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Resumo: Estudos da psicologia demonstraram nas últimas décadas que a Perspectiva Temporal tem efeito consciente e voluntário nos comportamentos humanos no tempo presente, por isso, é considerada uma variável importante para compreendê-los. Assim, vislumbram-se caminhos para investigações no campo psicoeducacional, pois, cursar uma graduação representa a busca de uma meta futura e envolve comportamentos que estão organizados a partir da integração dos diferentes tempos, passado, presente e futuro. O objetivo deste estudo foi buscar evidências de validade da estrutura interna dos itens de um do Inventário de Perspectiva de Temporal de Zimbardo e Boyd (2014), visto que, os autores buscaram em seu modelo uma medida multidimensional de orientação do tempo. Participaram deste estudo 676 universitários de diferentes cursos e diversos períodos da graduação. Foram realizadas análises estatísticas descritiva (médias, desvio padrão e índices percentuais), comparativas, correlacional e inferencial (análise fatorial confirmatória). Os resultados da AFC corroboraram em parte com modelo estrutural proposto pelos autores, pois, confirmou quatro das cinco dimensões temporais: Passado Negativo, Presente Hedonista, Presente Fatalista e Tempo Futuro. A dimensão Passado Positivo não se confirmou com a amostra da presente pesquisa, o que indica a necessidade de novos estudos com o modelo na amostra brasileira, visando assim, ampliar as evidências psicométricas do instrumento na Educação Superior.

Palavras-chave: perspectiva temporal; educação superior; metas.

Resumen: Los estudios de psicología demuestran en las últimas décadas que la perspectiva temporal es efectiva y consciente y voluntaria de los comportamientos humanos en el tiempo presente, por lo que se considera una variable importante para comprenderlos. Assim, vislumbram-se cami-nhos para investigações no campo psicoeducacional, pois, cursar uma graduação representa a busca de uma meta futura e involucra componentes que están organizados a partir de la integración de dos diferentes tempos, pasado, presente y futuro. El objetivo de este estudio es buscar evidencias de validación de la estructura interna de los elementos de un Inventário de Perspectiva de Temporal de Zimbardo e Boyd (2014), visto que, los autores buscarán en su modelo una medida multidimensional de orientación del tempo. Participan de este estudio 676 universidades de diferentes cursos y diversos períodos de graduación. Se realizaron análisis estadísticos descriptivos (medias, desviación estándar y porcentaje), comparativos, correlacionales e inferenciales (análisis factorial confirmatorio). Los resultados de AFC corroboran en parte con el modelo estructural propuesto por los autores, pois, confirmou quatro das cinco dimensiones temporales: Passado Nega-ivo, Presente Hedonista, Presente Fatalista y Tempo Futuro. A dimensão Passado Positivo não se confirmou com a mostra da presente pesquisa, o que indica a necessidade de novos estudos com o modelo na amostra brasileira, visando asim, ampliar as evidências psicométri-as do instrumento na Educação Superior.

Palabras clave: perspectiva temporal; educación universitaria; objetivos.

1 INTRODUCTION

Temporal perspective (TP) is a well-established psychological theory based on cognitive premises. It has been the focus of numerous international studies in recent decades (Lens, 1993; Husman; Lens, 1999; Nuttin, 2014; Simons *et al.*, 2004). According to Zimbardo and Boyd (2014), TP posits that the present moment is an intersection of the past and future. Therefore, past and future events influence human behavior in the present.

The need to investigate TP in relation to higher education stems from the importance of future goals in this context. Higher education has expanded and become more accessible in Brazil in recent decades, and it has gained social, cultural, and economic visibility and importance. According to Almeida et al. (2012), Santos *et al.* (2013), and Vargas and Heringer (2017), enrollment in graduate programs has grown significantly in Brazil because of this level's increased relevance in individuals' lives as a means of development in various areas. The democratization of access has incorporated social spheres that had not previously entered university (Almeida *et al.*, 2012).

According to the INEP (Anísio Teixeira National Institute for Educational Studies and Research) census on higher education in Brazil, there has been rapid growth in the number of institutions offering graduate courses and the number of students enrolling in them. Based on the 2020 census, Brazil had a total of 2,457 higher education institutions (HEIs). Of these, 2,153 were private and 304 were public. These institutions offered 41,953 courses, with more than 8.6 million enrollments (IBGE, 2020).

These figures have resulted in expanded access to higher education for a diverse population. However, a large portion of the population did not have the opportunity to access education beyond basic, compulsory, and free education in the 20th century (Almeida *et al.*, 2012). In this new context, research is needed on university students and the variables that comprise them. Attending a graduate course and seeking professional training at a higher level implies setting short- and long-term goals, as well as achieving daily objectives to reach them.

A literature review providing context for this study revealed only one Brazilian study from the past 20 years based on Zimbardo and Boyd's (2014) PT theory: Leite and Pasqualini's (2008) study. Considering the changes in the context of Brazilian higher education during this period, this finding prompted the study. As previously mentioned, enrollment has expanded, as have the number of courses and Higher Education Institutions, resulting in cultural and educational changes at this level of education. While there were approximately 8.6 million enrollments in 2020, there were almost 3 million fewer (5.8 million) in 2008. In 2020, there were nearly 42,000 courses; in 2008, there were approximately 25,000 (IBGE, 2009; 2020).

Studies from this perspective have been developed by international authors in the fields of psychology and school psychology. These studies have contributed to the establishment of a theoretical framework for research in the Brazilian context (Lens,

1993; Husman, Lens, 1999; Simons *et al.*, 2004; Husman; Hilpert; Brem, 2016; Zimbardo, Boyd, 2014).

This study aimed to provide evidence for the validity of the internal structure of items in Zimbardo and Boyd's (2014) Time Perspective Inventory. This model was chosen because the authors sought a multidimensional measure of time orientation based on the precursors of time perspective.

The study involved 676 university students from various majors and stages of their undergraduate studies. The original version of the instrument contains 56 items on a 5-point Likert scale. Descriptive, comparative, and correlational analyses were performed, as well as confirmatory factor analysis (CFA).

To achieve the proposed objective, the research was structured as follows: The first section presents the theoretical framework of temporal perspective. The second topic describes the research methodology and procedures, including participants and data collection. The fourth topic presents the results obtained from the statistical analyses, and the fifth topic discusses these results. Finally, the sixth topic presents the final considerations with psychoeducational implications.

2 TIME PERSPECTIVE AND HIGHER EDUCATION

According to Husman and Lens (1999), PTF differs from other areas of psychology in that it examines how people perceive and act toward the future and how the present influences their future through motivation. Like Lewin, a pioneer of the theory in the 1930s, Lens (1993) defines PTF as the integration of the chronological future into the present moment in an individual's life. Thus, PTF consists of a perspective or mental representation of something more or less distant; however, it does not coincide with real time. According to the authors, PTF encompasses future personal needs linked to present actions.

Husman, Hilpert, and Brem (2016) also conceptualize PTF as hierarchically organized psychological constructs that define individual differences in perceptions of the future at different levels of specificity. These levels create a variable-aligned structure that is often described from top to bottom, from the general domain to the specific context.

Scholars of PTF, Zimbardo and Boyd (2014) base their work on Lewin's concept. They share the premise that events from the past or future are real in current cognitive thinking and thus influence present behavior. The authors developed their own conceptual model for thinking about time perspective, encompassing five perspectives: Positive Past, Negative Past, Hedonic Present, Fatalistic Present, and Future.

In this model, time perspective is fundamental and operates both individually and socially. According to Zimbardo and Boyd (2014), which individuals assign their personal and social experiences to temporal categories or periods, helping them attribute coherence and meaning to these events through an unconscious process.

These cognitive charts can reflect temporal patterns, cycles, repeated events, or unique, nonrecurring, linear events in individuals' lives. They are also used for the coding, storage, and retrieval of known events and in the process of forming expectations, goals, objectives, and dreams.

Regarding the dimensions of the past, Zimbardo and Boyd (2014) start from the premise that, subjects, it is a dominant temporal dimension that can be positive or negative, real or distorted. However, it always affects the interpretation and response to demands that require decision-making. Therefore, regardless of the dimension, it influences present-time behavior.

A negative past dimension reflects a pessimistic view of the past that can be aversive. This dimension can be characterized by traumatic consequences or a negative reconstruction of past events, or both. Thus, a person with predominantly negative past associations may relive disappointments, traumas, and unpleasant situations. Subjects with positive attitudes toward the past are the opposite. They also tend to relive and/or reflect on past experiences with positive emotions.

Zimbardo and Boyd (2014) argue that the past is a dominant temporal dimension subjects, affecting their interpretation and response to demands requiring decision-making, whether the past is viewed positively or negatively, realistically or distortedly. Therefore, regardless of the dimension, it influences present-time behavior. The negative past dimension reflects a pessimistic view of the past that can be aversive. It can be characterized by traumatic consequences, negative reconstruction of past events, or both. Thus, a person with predominantly negative past associations may relive disappointments, traumas, and unpleasant situations. Subjects with positive past attitudes are the opposite. They tend to relive and/or reflect on experiences with positive emotions.

The present-fatalistic dimension is characterized by an unprepared and hopeless attitude toward the future. In other words, there is a lack of perception that present attitudes have future consequences. These individuals are usually impulsive and believe they are in control (Zimbardo & Boyd, 2014). The present-hedonistic dimension is characterized by individuals who live for the moment, take risks, and engage in hedonistic behaviors to pursue pleasure. This dimension defines an orientation toward momentary pleasure with no concern for consequences.

Finally, the future time orientation is defined by a belief in future goals and rewards. It is therefore associated with a focus on the future and the consequences of present behavior. Individuals oriented by this dimension believe that their present behavior increases the likelihood of achieving future goals, which gives value to those goals.

For Zimbardo and Boyd (2014), an ideal PT is one that achieves a balance between temporal orientations-past, present, and future- and that allows the individual to move flexibly through time in various life situations. This balance would be a relationship in which present behaviors are influenced by short-, medium-, or long-

term future goals, allowing the individual to understand the temporal relationship between current attitudes and future ones. Negative past experiences would also lessen the impact on current behavior toward future goals.

For this study, we used the PT model presented in this topic, since it is an extension of the primary models and covers five dimensions of temporal perspective. In addition to the theoretical justification, this option was chosen because it is an internationally proven model in its dimensions. However, according to a preliminary literature review before this research, no national studies were found that used this theoretical model in the past 12 years.

3 METHOD

3.1 Participants

To achieve the objective of this study, specific methodological procedures were employed regarding the participants. First, three judges evaluated the semantic and content validity of the items in the instrument. These judges were female researchers, one with a Ph.D. in educational psychology and two with Ph.D.'s in psychology. They calculated the frequency of responses indicating agreement with the questions presented in the ZTPI Inventory in terms of both semantic validity and content.

In the second stage, the instrument was administered to a pilot sample of nine students in the fifth semester of a pedagogy course at a private college participating in the study. They were all female students from the same class with an average age of 19.7 years, ranging from 19 to 22 years of age.

The third stage consisted of applying the instrument to a general sample. A total of 676 university students from two higher education institutions participated. The average age was 24.64 years, ranging from 18 to 61 years old (SD = 7.0). Females represented 76.9% (n = 520), and males represented 23.1% (n = 156). Participants were enrolled in Administration (43.3%), Systems Analysis and Development (3.0%), Biomedicine (3.7%), Accounting (4.1%), Law (19.5%), Nursing (7.7%), Civil Engineering (2.2%), Nutrition (5.0%), Dentistry (3.1%), Education (43.3%), and Psychology (4.9%) courses.

Of the total sample (n=676), 255 students (37.7%) were enrolled in morning courses, and 421 students (62.3%) were enrolled in evening courses. It should be noted that the sample was chosen based on convenience criteria, i.e., through contacts that the researchers had with the participating institutions. Thus, 31.1% (n = 210) of the students were from public universities, and 68.9% (n = 466) were from private institutions.

3.2 Instrument

The instrument used was Zimbardo and Boyd's ZTPI (Zimbardo Time Perspective Inventory) questionnaire (2014). Consisting of 56 questions on a 5-point Likert scale, it ranges from (1) "Very untrue," (2) "Somewhat untrue," (3) "Neutral," (4) "Quite true," and (5) "Very true." This instrument considers five time perspectives or dimensions, as defined by Boyd and Zimbardo (1999): past negative, present-hedonistic, future-oriented, past negative, and present-fatalistic.

The version used in this study, developed by Zimbardo and Boyd (2014), includes the following items for the Negative Past Time Perspective: 4, 5, 16, 22, 27, 33, 34, 36, 50, and 54 (α = 0.82). The present hedonistic time perspective consists of items 1, 8, 12, 17, 19, 23, 26, 28, 31, 32, 42, 44, 46, 48, and 55 (α = 0.79). Questions 6, 9, 10, 13, 18, 21, 24, 30, 40, 43, 45, 51, and 56 (α = 0.77) comprise the Future Time Perspective. The positive past time perspective is composed of items 2, 7, 11, 15, 20, 25, 29, and 41 (α = 0.80) and addresses positive perceptions of the past. The fatalistic present time perspective is determined by items 3, 14, 35, 37, 38, 39, 47, 52, and 53 (α = 0.74).

These instruments were administered after the study was approved by the Research Ethics Committee, complying with the requirements of Resolution No. 510/2016 and the supplements of the National Health Council, as stated in Opinion No. 5.195.616. All participants responded only after reading and signing the Free and Informed Consent Form (FICF), and data collection took approximately 30 minutes per class.

3.3 Data analysis

The analysis of data from the first stage of the study was based on the judges' assessment of the items' representativeness in measuring PT. Thus, frequency indices concerning participants' understanding of the items were calculated. The adjustments suggested by the judges indicated some semantic changes to the items before the pilot application stage. During the pilot study, students' questions and observations during data collection were considered. The results of this stage will be presented in the Results section.

The data collected in the final stage from the general sample (n = 676) were organized in spreadsheets and subjected to descriptive statistics (means, standard deviation, and percentage indices), comparative statistics, and correlational and inferential statistics (confirmatory factor analysis). The programs used were IBM SPSS Statistics for Windows®, JASP for Windows®, and Mplus software (version 7) (Muthén; Muthén, 2012).

Confirmatory factor analysis (CFA) was used for the Time Perspective Inventory to assess the suitability of the aforementioned analyses for the investigated sample. The comparative fit indices were verified: the Comparative Fit Index (CFI), the Tucker-

Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA) with a 90% confidence interval.

The RMSEA of the instrument was calculated to verify the mean error of population approximation in covariance matrices. Values below 0.05 are desirable, though values up to 0.08 are acceptable. It is worth noting that CFI, TLI, and RMSEA are commonly used in confirmatory factor analyses alongside parallel analysis or the scree plot test.

4 RESULTS

To follow the systematization of methodological procedures, this study opted to present the results obtained in the stages mentioned above. In this stage, the criterion suggested by Pasquali (2017) was followed, whereby a minimum of 80% agreement between judges is required for an item to remain. Agreement with the content presented by Zimbardo and Boyd (2014) was observed. Some suggestions were made regarding certain terms, and all were followed as shown in Chart 1.

Chart 1 – Items of the PTF measurement instrument after content and/or semantic analysis by the judges

Item	Original version submitted to judges for review	Recommended suitability by judges	Final version with adjustments recommended by the judges
1	I believe that getting together with friends for a party is one of life's great pleasures.	Semantic adequacy: change to the first person singular.	I believe that **me** joining my friends for a party is one of life's great pleasures.
34	It's hard for me to forget unpleasant images from my youth.	Content adequacy: replace the word "youth" with "past," since many university students are experiencing youth in the present.	It is difficult for me to forget unpleasant images from **my past.**
56	There will always be time to catch up on my work.	Content adequacy: delete the word "work", insert "demands," since this is not about employment, and could lead to misunderstanding.	There will always be time to catch up on **my demands.**

Source: own elaboration.

Regarding the pilot study, the nine participants did not demonstrate difficulties in understanding the items; however, they provided two suggestions for semantic adjustments to facilitate understanding for future participants. These suggestions are shown in Chart 2.

Chart 2 – Items of the PTF measurement instrument after content and/or semantic analysis in the pilot study

Item	Original version submitted to judges for review	Recommended suitability by judges	Final version with adjustments recommended by the judges
6	I believe that a person's day should be plannedevery morning.	Content adjustment: delete "every morning," since the next day may have been planned the night before.	I believe that a person's day should be planned.
13	Meeting tomorrow's deadlines and doing other necessary work comes before tonight's game.	Semantic adjustment: replace the word 'game' with "leisure."	Meeting tomorrow's deadlines and doing other necessary work come before tonight's leisure activities.

Source: own elaboration.

All suggestions were addressed, adjusting 8.92% of the inventory wording before application with n = 676. Next, to test the factorial model of the ZTPI scale, the ZTPI instrument was administered according to the structure established by Zimbardo and Boyd (2014) and the changes recommended by judges and students in the pilot study. After organizing all the data in spreadsheets, we assessed the sample's suitability for confirmatory factor analysis (CFA). We used the adjusted least squares WLSMV estimators with delta parameterization as a reference.

The first stage consisted of initial analyses that confirmed the suitability of the proposed ZTPI factor model through CFA. The second stage presented the indices obtained in the descriptive, comparative, and correlational analyses of the PT.

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The first stage consisted of initial analyses that confirmed the suitability of the proposed ZTPI factor model through CFA. The second stage presented the indices obtained from the descriptive, comparative, and correlational analyses of the PT. To point out the divergent magnitude between the estimated and observed matrices and test the probability that the collected data adjusts to the theoretical model, we obtained the result from the ratio of the chi-square index (x^2) to the degrees of freedom (gl). The obtained value was less than 3 (2.64; x^2 = 3,894.772; df = 1,473), indicating an acceptable model fit. Kline (2015) indicates that indices resulting from an x^2/df ratio between 1 and 3 are desirable.

Comparative fit indices were also calculated-the CFI (Comparative Fit Index) and the TLI (Tucker Lewis Index). The CFI obtained 0.794 and the TLI 0,785, less expressive indices, but considered acceptable when no compared to another model. When calculating the RMSEA, a result of 0.049 was obtained, considered an adequate fit for this structure, since, according to Noronha, Pinto and Ottati, (2016), results below 0.05 are expected and acceptable up to 0.08.

Based on the AFC results, the proposed ZTPI model was verified, though with some reservations. The scale structure developed by Zimbardo and Boyd (2014) contained 56 items divided into 5 dimensions: Negative Past, Hedonic Present, Future Time, Positive Past, and Fatalistic Present. After CFA, four dimensions were confirmed, leaving 39 items. The positive past dimension was not confirmed because none of its items achieved reliability indices.

In factor 1 (Negative Past), all items obtained α indices greater than 0.300. In factor two, present hedonism, items one (α = 0.176), seventeen (α = 0.290), and fifty-five (α = 0.255) were discarded due to low α indices. Items forty-eight and fifty-five did not load on this factor. In factor 3 (future -time), items 6, 10, 13, 21, 30, 50, 43, and 45 remained with acceptable α values. Items 18 (α = 0.225) and 51 (α = 0.202) were discarded due to low α values, and items 9 and 56 were discarded due to negative α values. Finally, factor 4 (present-fatalistic) retained items 3, 14, 35, 37, 38, 39, 47, 52, and 53, all of which had α values above 0.300. Therefore, 17 items out of 56 were lost.

Table 1 shows the factor loadings of the items and the Cronbach's α coefficients for each dimension after analyzing the data collected from the total sample (N = 676) in this study.

Nº	Questions	1	2	3	4	*Alpha* Total-Dim.
4	I often think about what I should have done differently in my life.	0,519				
5	My decisions are mostly influenced by people and things around me.	0,413				
16	Painful experiences from the past continue to repeat themselves in my mind.	0,849				
22	I have had my share of abuse and rejection in the past.	0,544				Negative past α = 0.80
27	I have made mistakes in the past that I wish I could undo.	0,681				
33	Things rarely work out the way I expected.	0,483				
34	It is difficult for me to forget unpleasant images from my past.	0,801				
36	Even when I am enjoying the present moment, I am drawn back to comparisons with similar experiences from the past.	0,922				
50	I think about the bad things that have happened to me in the past.	0,954				
54	I think about the good things I've lost in my life.	0,685				
8	I do things on impulse.		0,658			
12	When I hear my favorite song, I often lose track of time.		0,408			
48	I prefer spontaneous friends to predictable ones.		0,386			Hedonistic Present α = 0.73
19	Ideally, I would live every day as if it were my last.		0,504			

23	I make decisions in the heat of the moment.	0,802	
26	It's important to have excitement in my life.	0,358	
28	I think it's more important to enjoy what you're doing than to get the job done on time.	0,498	
31	Taking risks keeps my life from becoming boring.	0,375	
32	For me, it's more important to enjoy the journey of life than to focus solely on the destination.	0,325	
42	I take risks to add excitement to my life.	0,512	
44	I often follow my heart rather than my head.	0,576	
46	I find myself being carried away by the emotion of the moment.	0,805	
6	I believe that a person's day should be planned in advance.		0,412
10	When I want to achieve something, I set goals and think of specific ways to achieve them.		0,394
13	Meeting tomorrow's deadlines and doing other necessary work come before tonight's leisure activities.		0,431
21	I fulfill my obligations to friends and authorities on time.		0,337
30	Before deciding, I weigh the costs and benefits.		0,408
40	I complete projects on time by making steady progress.		0,346
43	I make to-do lists.		0,478
45	I am able to resist temptations when I know there is work to be done.		0,322

Tempo Futuro α = 0,61

3	Fate determines many things in my life.	0,344	
14	Since what will be will be, what I do doesn't matter much.	0,396	
35	Having to think about goals and results takes away the pleasure, I get from the process and rhythm of my activities.	0,569	
37	You can't really plan for the future because things change so much.	0,685	
38	The path of my life is controlled by forces I cannot influence.	0,579	Fatalistic Present α = 0.68
39	There's no point in worrying about the future, since there's nothing I can do about it anyway.	0,596	
47	Life today is very complicated; I prefer the simpler life of the past.	0,443	
52	Spending what I earn on pleasures today is better than saving for security tomorrow.	0,638	
53	Luck often pays off more than hard work.	0,467	

Source: own elaboration.

Thus, it was possible to verify the validity of the internal structure of the 39 items comprising the four factors. The first factor was the Past-negative dimension, which had 10 items and an alpha value of 0.80. The second factor was the Present-hedonistic dimension, which had 12 items and an alpha value of 0.73. The third factor was the Future-time dimension, which had eight items and an alpha value of 0.61. The fourth factor was the Present-fatalistic dimension, which had nine items and an alpha value of 0.68.

Items excluded were all from the Positive Past dimension (2, 7, 11, 15, 20, 25, 29, 41, and 49); five from the Future Time dimension (9, 18, 24, 51, and 56); two from the Hedonistic Present dimension (1 and 55); and one from the Negative Past dimension (17).

Descriptive statistical analyses revealed the frequency indices, minimum and maximum scores, and mean and standard deviation for the dimensions emerging from the AFC. The values obtained indicated that the hedonistic present dimension had the highest mean, 38.26 (SD = 7.26). The Future dimension had a mean of 28.83 (SD = 4.81). The negative past dimension had a mean of 30.51 (SD = 7.53), and the fatalistic

present dimension had a mean of 22.68 (SD = 5.79). The Student's t-test was applied to investigate possible differences in PTF between students from public or private institutions, as well as between female and male students.

Based on the results of the data analysis, the average score for public university students in the Negative Past dimension was 30.07, while the average score for private university students was 30.70. The minimum and maximum scores for this dimension were 11 and 49, respectively. In the Hedonistic Present dimension, the average was 37.12 for public universities and 38.77 for private universities, with a minimum of 16 and a maximum of 58. In the Future Time dimension, the score ranged from 8 to 40, with an average of 28.78 for public institutions and 28.86 for private institutions. In the Fatalistic Present dimension, the results indicated a minimum score of nine and a maximum score of 45, with an average score of 22.41 for public institutions and an average score of 22.81 for private institutions.

Regarding the gender of the participants, the average score for the Hedonistic Present dimension was higher for females (38.39) than for males (37.81). In the Future Time dimension, females obtained an average score of 28.60, while males obtained an average score of 29.60. Regarding the Negative Past dimension, the indices indicate an average score of 30.45 for females and 30.69 for males. Finally, in the Fatalistic Present dimension, the average score was 22.82 for both females and males. There was no significant difference between the sexes or in relation to public or private employment status.

Results were obtained from the analysis of correlations between the structural dimensions of the ZTPI. Pearson's correlation was applied, and Pasquali's (2017) values were adopted: coefficients less than 0.30 were considered low magnitude; between 0.30 and 0.50, moderate; and equal to or greater than 0.50, high.

The Negative Past dimension was found to have moderate and significant correlations with the Hedonic Present ($r = 0.375$) and the Fatalistic Present ($r = 0.419$). The hedonic present dimension had a weak, significant negative correlation with the future time dimension ($r = -0.147$) and a moderate, positive correlation with the fatalistic present dimension ($r = 0.473$). The future time dimension showed a weak negative correlation with the fatalistic present dimension ($r = -0.228$).

5 DISCUSSION

Important findings were obtained from the descriptive, comparative, and correlational analyses and will be discussed briefly. Participants were found to have a higher tendency toward the hedonistic present time perspective (M = 38.26) and a lower tendency toward the fatalistic present (M = 22.68). In other words, participants tend to act in the present searching for pleasure and momentary emotions without considering the relationship between their current behavior and future consequences.

Usart and Romero (2014) and Luyckx et al. (2010) concluded in their studies that the tendency toward the Fatalistic Present is more common among younger university students. In the present sample, however, it was the dimension with the lowest score. However, the Hedonic Present dimension is also an immediate time perspective, with the highest score.

Comparative analyses regarding whether the institution was public or private showed no significant differences. When looking at the averages, however, there was a tendency for higher scores in the negative past dimension among university students from public institutions, while students from private institutions had higher averages in the fatalistic present, hedonistic present, and future time dimensions. No similar or divergent data regarding the type of university were found in the literature.

When comparing PTF between females and males, higher averages were observed for male participants in the future time and negative past dimensions, while higher averages were observed for females in the hedonic present and fatalistic present dimensions. These results regarding future time align with Daura's (2017) findings. Daura surveyed Argentine graduate and postgraduate students and found that women had lower scores in the future dimension than men.

However, these results diverge from another of the author's findings regarding the Hedonistic Present. In her study, she found that men had higher averages than women did in this dimension. Correlations were found between the PTF dimensions themselves.

The negative past correlated moderately with the hedonic present and the fatalistic present. These results corroborate Daura's (2017) study, which produced the same results. In her research with Argentine university students, Daura identified a positive and significant correlation between the negative past and the hedonistic and fatalistic present.

It should be noted that the Hedonistic Present dimension is mainly characterized by the pursuit of pleasure and emotions in the moment; the Fatalistic Present consists of acting unprepared in everyday situations because one believes they are in control, and the Negative Past is characterized by a negative perception of previous experiences, even aversive ones. Therefore, it appears that students guided by the Negative Past may have fatalistic and hedonistic attitudes in everyday situations and thus do not relate present actions to future consequences.

According to Zimbardo and Boyd (2014), these guidelines are contrary to those of the future since PT emphasizes balance and enables individuals to establish connections between their current behaviors and long-term consequences. The results indicated that the hedonic present dimension was negatively related, albeit weakly, to the future time dimension. The future time dimension was also negatively related, albeit weakly, to the fatalistic present dimension. These results are consistent with data from studies by Daura (2017) and Luyckx et al. (2010), which found a negative correlation between future time and fatalistic and hedonistic present.

Regarding the psychometric evaluation of the instrument, Zimbardo and Boyd (2014) proposed a model with five dimensions: Negative Past, Positive Past, Hedonistic Present, Fatalistic Present, and Future Time. With the sample from this investigation, however, the positive past dimension, consisting of nine items, was not confirmed.

Thirty-nine of the 56 items remained with a four-dimensional model. The Hedonic Present dimension had 12 items and an alpha value of 0.73; the Future Time dimension had eight items and an alpha value of 0.61; the Negative Past dimension had 10 items and an alpha value of 0.80; and the Fatalistic Present dimension had nine items and an alpha value of 0.68. However, the Positive Past dimension had items with loadings below the minimum acceptable value of α = 0.30 and/or with negative loadings.

This result does not align with other studies with similar objectives, so two hypotheses were considered. The first is the cultural specificity of the Brazilian higher education context, since the dimensions were confirmed in mostly international studies. In Brazil, only the research of Leite and Pasquali (2008) was found, which confirmed the dimensions of the original model.

Thus, it is suggested that the sample has particularities that cannot be isolated from the social and economic context in which it is embedded. Of the total participants, 62.3% were enrolled in graduate programs in the evening, 68.9% of whom attended private institutions. Although no questions were asked about balancing studies with work, some institutions' evening courses are also offered in the morning, as is the case with Education and Law. Therefore, it can be inferred that many participants may attend graduate courses at night due to paid work during the day.

Despite the expansion in access, the literature indicates that repetition, dropout rates, and difficulty in remaining in higher education are persistent challenges affecting both institutions and students. According to Carlotto and Camara (2023), dissatisfaction with the academic experience, in addition to socioeconomic factors, is one of the main reasons for dropping out of courses. Thus, factors related to Brazilian reality may have affected the temporal orientation of the present sample since a positive view of the past depends on positive feelings about satisfactory past experiences.

Another hypothesis relates to the semantic limitations of the items themselves, considering this is an international scale. Some terms may have been misunderstood; even with the pilot study, they could not be identified.

Eight items that were excluded due to low factor loading were initially arranged in the Hedonic Present and Future Time dimensions. The remaining dimensions obtained acceptable α values, close to those of the Zimbardo and Boyd (2014) model. However, the Future Time dimension obtained an α value of 0.61 with this study's sample, whereas the original model study obtained an α value of 0.77.

This result does not align with international and national studies that had similar objectives. Usart and Romero (2014) aimed to validate the items comprising each factor

of the Time Perspective (TP) scale and compare the results to those of previous studies. Their sample consisted of 250 Spanish university students enrolled in online, face-to-face, and blended courses. The results of the confirmatory factor analysis in this study confirmed 45 items distributed across the five dimensions of Zimbardo and Boyd (2014).

In a Portuguese study of 342 university students, Ortuño and Gamboa (2008) verified the internal consistency of the five ZTPI categories using Cronbach's alpha. The results indicated the following satisfactory indices: Hedonistic Present = 0.80, Negative Past = 0.80, Fatalistic Present = 0.69, Future = 0.72 and Positive Past = 0.64.

Leite and Pasquali (2008) investigated validating the ZTPI Inventory in Brazil with 1,528 university students. Six items did not reach the minimum factor loading of 0.32: 35, 41, 48, 53, 55, and 56. However, even with the exclusion of these items, the five-dimensional model was confirmed. The authors report, however, that some items had no loading in the original component and thus migrated to others. The fatalistic dimension was the one that suffered the greatest loss of items in Leite and Pasquali's (2008) study.

In contrast to these results, the data from the present study confirmed all items in this dimension of the original model. The Negative Past dimension lost only one item, Item 17, which had a negative loading and had originally belonged to the Hedonic Present dimension. The Hedonic Present dimension lost two items, 1 and 55, which had low loadings. The Future Time dimension suffered the greatest loss of items: 9, 18, 24, 51, and 56. These items had a negative loading on this factor.

Therefore, although the Positive Past dimension was not confirmed with this study's sample, the remaining four dimensions indicate reliability indices consistent with the original model's item distribution. This suggests that there is no need to modify the dimensions established by Zimbardo and Boyd (2014), but rather a need to further investigate the dimension that was not confirmed with the Brazilian sample.

It should be noted that this research was conducted amid expanding access to higher education in Brazil. Although this was a significant milestone for the country, admission to a higher education institution does not guarantee student retention or success in the academic training process (Nascimento, Oliveira, & Bzuneck, 2025). The history of higher education in Brazil is marked by inequalities that have existed since its inception. The late implementation of higher education in Brazil in 1920 reveals remnants of a historical trajectory stemming from Portuguese colonization. Initially, Portuguese interests did not include creating university institutions in Brazilian territory (Do Carmo *et al.*, 2023).

As such, structural problems have become more entrenched over the years, leading to various challenges in the university context. These challenges include cultural barriers, socioeconomic factors, flaws in student retention policies, repetition, and high dropout rates (Carlotto & Camara, 2023). Another factor is university integration. According to Almeida *et al.* (2020), it is a multifaceted process and a

challenge for the new population entering higher education. It influences the entire learning process.

In light of this, it is important to note that each individual's temporal perspective is shaped by his or her experiences and the outcomes thereof. In other words, it is influenced by various factors and, in turn, influences new behaviors, the establishment of goals, and the maintenance or modification of strategies. In a complex and multifaceted context such as higher education, it is pertinent and necessary to investigate how TP has manifested itself, in addition to providing insight into the emerging challenges that higher education institutions (HEIs) face in fulfilling their roles as educators at the higher level.

6 FINAL CONSIDERATIONS

This study sought evidence of the internal validity of the items in Zimbardo and Boyd's (2014) Time Perspective Inventory (ZTPI), as the authors aimed to create a multidimensional measure of time orientation. A total of 676 university students participated in the study and collectively responded to the Zimbardo Time Perspective Inventory (ZTPI).

The ZTPI considers Zimbardo and Boyd's (2014) theoretical model, which argues that individuals behave in the present guided by one or more temporal perspectives. According to the model, time perspectives can be positive or negative regarding the past, hedonistic or fatalistic regarding the present, or consistent regarding the future.

Consequently, the positive past dimension was not confirmed. This finding prompted a discussion of possible reasons associated with the cultural, social, and economic specificities of not only the students in the sample but also Brazilian higher education as a whole. The literature referenced in this study highlights the country's historical context regarding access expansion, increased course offerings, and enrollment growth. Thus, as new segments of the population are covered, new challenges arise in the university context, requiring adjustments in research models.

Regarding the confirmed model, it is worth noting the reliable and consistent indices of the remaining dimensions, which changed little compared to the original model. These results suggest that PT is theoretically consistent with the instrument's items in these confirmed categories.

However, this study has some limitations. For example, the use of self-reporting may compromise the reliability of the responses since participants may indicate what they would like to happen rather than what actually happens. Additionally, the instrument was originally developed using an American sample in a different educational context than Brazil. The instrument contains broad questions that may be interpreted based on different situations in everyday life.

Therefore, we suggest further research on the theoretical construction of the dimension that was not confirmed (Positive Past) in new university contexts or a new application with a different sample. The participants in this study do not reflect the

entire Brazilian scenario, and the sample size is limited. There are also numerical differences between courses and institutions that could not be explored in this research.

We hope this study contributes to advancing new research in Higher Education, particularly regarding challenges related to the future time perspective of university students in Higher Education Institutions. Furthermore, we hope that the results presented here will strengthen the theoretical model recognizing the influence of temporal orientation on academic life and the individual strategies students use to achieve their goals in a university environment. This will have implications for future results.

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Authors' contributions

Francielle Pereira Nascimento – Main author of the text, she developed the research objectives, wrote the rheoretical framework, studied the inventory, collected the data and analyzes it.

Katya Luciane de Oliveira – Co-author of the text, she helped develop the research objectives and contribited to the statiscal analyses and results.

Andrea Carvalho Beluce – Co-author of the text, she collaborated on the entire methodology, study of th instrument and statiscal analysis of the data and its interpretation.

José Aloyseo Bzuneck – Co-author and reviewer of the full text, he contributed to the development of the theoretical framework, statiscal analyses and the final results.

Declaration of Conflict of Interest

The authors declare that there is no conflict of interest with the article "Psychometric Study of the Temporal Perspective Inventory (ZTPI) in Higher Education".

Data availability

The data underlying this research are contained within the article.

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