INTERAÇÃO EM PSICOLOGIA

Prosocial Tendencies Measure Validation for Portuguese Late Adolescents

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RESUMO

O Questionário de Tendências Prossociais (MTP) de Carlo e Randall (2002) é amplamente usado para avaliar tendências prossociais. Partindo do pressuposto de que existem diferenças no comportamento pró-social entre adolescentes e adultos, o presente estudo teve como objetivo validar a versão em português do MTP com uma amostra de adolescentes. Este instrumento avalia seis tipos diferentes de tendências prossociais: altruísta, anónima, emergência, emocional, complacente e pública. Desenhado para confirmar esta estrutura fatorial do MTP com adolescentes portugueses, este estudo recolheu as perceções de um total de 1313 adolescentes a frequentar o ensino secundário. A análise fatorial confirmatória corroborou a estrutura de seis fatores da validação original. Além disso, considerando o ano escolar e o género dos alunos, a análise de invariância foi executada e atestou a invariância configural, métrica (parcialmente para género) e escalar (parcialmente para ano escolar e género) do MTP. Estes resultados demonstram ainda que a versão portuguesa MTP é confiável, aumentando a utilidade deste instrumento para avaliar comportamentos prossociais na adolescência.

Palavras-chave: Comportamentos prossociais, Análise fatorial confirmatória, Análise de invariância, Adolescentes.

ABSTRACT

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The Prosocial Tendencies Measure (PTM; Carlo & Randall, 2002) is widely used for assessing prosocial tendencies. Assuming that there are differences in prosocial behavior between adolescents and adults, the current study aimed to further validate the Portuguese version of the PTM for adolescents. This instrument assesses six different types of prosocial tendencies – altruism, anonymous, dire, emotional, compliant and public. Designed to confirm this structure with Portuguese adolescents, this study collected a total of 1313 high school students' prosocial behaviors perceptions. Confirmatory factor analysis corroborated the six-factor structure of the original validation. Furthermore, considering the students' school year and gender, invariance analysis was executed and attested the PTM's configural, metric (partially for gender) and scalar (partially for school year and gender) invariance. These findings further demonstrate that the Portuguese version of the PTM is reliable, enhancing the utility of this instrument to assess prosocial behaviors in adolescence.

Keywords: prosocial behaviors, confirmatory factor analysis, measurement invariance, adolescents.

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INTRODUCTION

Prosocial behaviors, such as volunteerism, sharing, donating, comforting others and helping, may be defined as actions intended to benefit others (Hay et al., 2021; Mestre, et.al., 2015; Xiao et al., 2019). Such behaviors are deemed desirable and beneficial to society (Eisenberg al., 2006) and have been linked to healthy social functioning and well-being (e.g., Carlo, 2014 2013). In fact, accordingly to literature, prosocial behaviors have been theoretically and empirically linked to a number of positive individual socioemotional dimensions, such as perspective taking, moral judgment, empathic responding, gratitude, emotion regulation, positive emotionality and positive peer relationship (Eisenberg et al., 2006; Ngai & Xie, 2018; Van der Graaff et. al., 2018 Yang et al. 2021). On the contrary, prosocial behaviors are negatively connected with aggressive conduct, and interconnection with delinquent peers (Caprara et. al., 2015; Carlo, 2013). Thus, empirical evidence highlight prosocial behaviors, as a protective factor, has a buffering effect against stress, reducing the impact of stress on emotional functioning (Raposa et al., 2016).

Studying prosocial development is particularly relevant in adolescence, since they contribute to maintain positive social interactions and to reduce social exclusion (Yao, & Wong, 2020). Adolescence represents a demanding transition where protective factors such as prosocial behaviors can be crucial (Saleem et al., 2021; Shi et al., 2021). However, and despite the importance to understand these behaviors, only a few measures are available for measuring and studying prosocial behaviors, particularly regarding adolescence (Carlo & Randall, 2002; Xiao et al., 2019). Furthermore, measures with adequate psychometric properties relative to prosocial behavior are yet scarse (Mestre et. al, 2015), and consequently, there has been little focus on the multidimensional nature of prosocial behaviors (Carlo et al., 2010).

Prior theory and research (e.g., Staub, 1978) showed that there are different types of prosocial behavior, all having different situational and personal correlates. Recent research suggests that prosocial behaviors should be conceptualized as a multidimensional construct (e.g., Carlo et al., 2010). Following this approach, the current study intended to further investigaste the psychometric characteristics of Prosocial Tendencies Measure (PTM) and contribute to the validation of the original six dimensions structure in a sample of Portuguese adolescents. Thus, investigation aims to complement previous literature and research by providing new validation evidences.

PROSOCIAL TENDENCIES MEASURE

Carlo and Randall (2002) developed and validated a multidimensional measure of prosocial behaviors, the Prosocial Tendencies Measure (PTM), which is a 23-item self-report measure to assess different types of prosocial behavior. The PTM was designed to address six types of prosocial tendencies, including altruistic (prosocial tendencies that provide aid to others without anticipating self-rewards); anonymous (unidentified helping); dire (helping in crisis or emergency situations); emotional (an orientation toward helping others under emotionally evocative circumstances); compliant (helping others in response to a verbal or nonverbal request); and public prosocial tendencies (behaviors that benefit others in front of an audience) (Carlo & Randall, 2002).

The research and assessment of prosocial behaviors, until the present study, seems to continue inconsistent, much because of the global rather than situation-specific assessments of prosocial behaviors (Carlo & Randall, 2002; Eisenberg et al., 2006; Ngai & Xie, 2018). As pointed out by Padilla-Walker and Carlo (2014), despite the interest in specific forms of prosocial behaviors, progress in this field is relatively slow due to the lack of measures that demonstrate strong psychometric properties. The standardization of measures is necessary, in order to enable researchers to compare and integrate findings across studies (Carlo & Randall, 2002; McGinley et. al., 2014). PTM validation has been documented across samples from different European, American, and Asian countries (e.g., Azimpour et. al., 2011; Carlo et. al, 2010; McGinley et. al., 2014; Mestre et al., 2015; Ngai & Xie, 2018; Rodrigues et. al, 2017). Overall, its evidence are congruent to show PTM reliability for the use in prosociality assessment, despite further refinents might be performed.

In Portugal, Simões and Calheiros (2016) validated the Prosocial Tendencies Measure (PTM-R) for Portuguese early adolescents, results corroborated the original model structure, internal consistency and convergent and divergent validity evidenced that prosocial behavior are more often related to girls' cognitive, affective and behavioral regulation and that students with previous retentions showed poorer relations between prosocial behaviors and self-regulation dimensions. Further validation of the PTM is desirable, not also because it could facilitate comparative research in different countries, but also because psychometric adequate measures allow for more rigorous tests and can bring some insight of the generalizability of multidimensional models of prosocial behaviors across cultures (Mestre et. al, 2015).

Considering the previous evidence, we hypothesized that the psychometric properties and the factorial structure of the original six-model would be more like those reported. Also, we

hypothesized that the PTM would show evidence of construct validity by confirming that six dimensions was invariant across gender and school year.

METHOD

PARTICIPANTS

Participants were 1289 students from public schools from the North of Portugal. Adolescents were attending 10th (*n* = 478), 11th (*n* = 441), and 12th grades (*n* = 370). The participants were predominantly girls (55.4%) and the age ranged from 14 to 23 years old (*M* = 16.5; *SD* = 1.12).

INSTRUMENT

PROSOCIAL TENDENCIES MEASURE (PTM)

The 23-items were used to assess several types of behaviors organized in six subscales: i) altruism (e.g., *I think that one of the best things about helping others is that it makes me look good*); ii) anonymous (e.g., *I tend to help needy others most when they do not know who helped them*); dire (e.g., *I tend to help people who are in a real crisis or need*); emotional (e.g.,. *I tend to help others particularly when they are emotionally distressed*); compliant (e.g., When people ask me to help them, I don't hesitate.); and public (e.g., *I can help others best when people are watching me*). Participants were asked to rate the extent each statement describes themselves accordingly to a 5 Likert scale from 1 (*Does not describe me at all*) to 5 (*Describes me greatly*).

The increased use of the PTM provided evidence of the six-factor structure and internal consistencies of each scale (Carlo & Randall, 2002): altruism (5 items, *Cronbach alpha* = .62, anonymous (5 items, *Cronbach alpha* = .88), dire (3 items, *Cronbach alpha* = .54), emotional (4 items, *Cronbach alpha* = .77), compliant (2 items, *Cronbach alpha* = .87) and public (4 items, *Cronbach alpha* = .80).

PROCEDURES

TRANSLATION OF THE INSTRUMENT

Firstly, the PTM instrument were translated from English into Portuguese, and later the Portuguese version was translated back into English by two English teachers (back-translation). Then, the research team confronted the two versions and checked whether there were any major differences between them correcting any items that showed a semantic discrepancy from the original version. Moreover, a preliminary study using the think-aloud method involving six adolescents regarding clarity and comprehension for the target sample were developed. Given the transcultural nature of the contents of PTM, there was no need for any other major cultural adaptation.

DATA COLLECTION

Procedures for the study were approved by the Carlos' university institutional review board. Complete ethical assessments and approvals were sought in advance. A brief informative document explaining the study aims and procedures were sent to students' parents. Signed informed consent from the parents was required to participate. The signed consent forms were returned in a sealed envelope to the schools and then collected by the researchers. The invitation was made to all students from all classes in the selected schools. The rejection rate was null. The assessment took place at a class with the presence of the teacher who provided the explanation to the students about the study aims/procedure and participation rights. To assure anonymity and confidentiality, the questionnaire was nameless. Once all protocol procedures and participation rights were explained, students provided their assent to partake in the study and then completed the Prosocial Tendencies Measure (PTM), and a brief socio-demographic questionnaire.

OVERVIEW OF DATA ANALYSES

As the original structure of PTM has been consistently corroborated in different countries, we started to perform descriptive statistics and a confirmatory factor analysis (CFA) to the six-factor model, followed by the analysis to the five-factor and unifactorial models, using the software AMOS (SPSS Inc, Chicago, IL, version 24.0). By using this statistical software, and according to the previous validation studies of this instrument, all CFA models were estimated via *maximum likelihood* (ML) in detriment of the Weighted Least Square Mean and Variance adjusted (WLSMV). In this regard, the literature indicates, that the differences between both estimators are not significant (Suh, 2015). For the evaluation of covariance structure models, we used the x^2 goodness of fit supplemented by the non-normative fit index (NNFI), Comparative Fit Index (CFI), the Standardized Root Mean Square Residual (SRMR) and the Root Mean Square Error of Approximation (RMSEA). We accepted values of CFI equals or greater than .90, and lower or equal to .08 for the SRMR and the RSMEA equals or lower than .05 (Hu & Bentler, 1999). In order to compare alternative models, two relative fit indices – Akaike information criterion (AIC) and expected cross-validation index (ECVI) – were also considered. There are no reference values, so the best model is the one that shows lower values (Marôco, 2010). The evaluation of the local

adjustment of the models was carried out based on the factor loadings (> 0.25) of each manifest variable and error-variances (Marôco, 2010).

To assess the measurement invariance of the PTM, we performed multi-group confirmatory analysis, following Byrne's guidelines (2010). In more detail, first we tested the fit of the 6-factors model for gender. Then, we started with the invariance routine. As a first step, we fitted a configural invariance model in which factor loadings, item intercepts, and error variances were unconstrained across groups. As a second step, we tested a metric invariance by comparing the fit of a model in which factor loadings were constrained to be equal, with the previous, unconstrained model. Then, scalar invariance was investigated by imposing equivalence constraints on the intercepts and comparing the resulting model with the previous metric invariance model. Differences between models were tested using a chi-square difference test ($\Delta\chi^2$), well suited for comparing nested models, and the comparative fit index (ΔCFI) lower or equal .01 (Byrne, 2010; Cheung & Rensvold, 2002).

RESULTS

DESCRIPTIVE STATISTICS AND CONSTRUCT VALIDITY

Table 1 presents the interrelations, means and standard deviations of the 6 subscales. In general, adolescents highlighted the compliant prosocial behaviors as the most prevalent, followed by emotional, dire, anonymous, altruism, and public, respectively.

The construct validity can be evaluated through the correlations among the dimensions of prosocial behaviors, and it was expected, given the relative conceptual proximity, a strong magnitude of the correlations. In general, the correlations among the six subscales were positive and moderate, as observed in Table 1. The correlations between Dire and Emotional (r=.67, p<.01), Public and Altruism (r=.54, p<.01), and Dire and Compliant (r=.51, p<.01) are strong, which corroborates the internal consistency of the instrument.

Table 1. *Correlations, Means and Stand*ard Deviations of PTM subscales.

	2.	3.	4.	5.	6.	M	SD
Public	.10**	.54**	.13**	-.07*	.12**	1.6	.66
Dire		.11**	.67**	.51**	.28**	3.3	.88
Altruism			.16**	-.06*	.19**	1.9	.69
Emotional				.46**	.29**	3.4	.87
Compliant					.14**	3.9	.91
Anonymous						2.3	.91

Note: ** p< 0,01; * p< 0,05.

Alpha coefficients of reliability ranged .64 and .81. Altruism (a=.64) and Dire (a=.69) demonstrated the lowest alpha values, while public (a=.71), emotional (a=.76), and compliant and anonymous (a=.81) dimensions revealed acceptable reliability.

CONFIRMATORY FACTOR ANALYSIS

To further validate the original PTM structure, we performed CFA to the six-factor solution. By analyzing the different indicators (outliers and modification indexes) we re-specified the model following the suggestions of the modification indexes. We established correlations between the measurement errors of PTM1 and PTM3, PTM 10, PTM16 and PTM20, PTM 17 and PTM21. Results revealed an acceptable fit of the model to our data ($X^2(211) = 1019.33$, $p < .001$; $X^2/gl = 4.83$; NNFI = .90; CFI =.92; RMSEA = .05; SRMR = .06). Although the chi-square was significant, this result can be easily attributable to the large sample size.

Table 2 shows the standardized factor loadings and standardized errors of 23-item PTM model. Overall, the indicators are good. Most of item loadings are higher than .50, which reveals a good internal validity of the items. The exception was observed in PTM23 and PTM10, which showed a lower saturation.

Table 2. *Standardized item* loadings (and Standard Error) for the 23-item model of PTM

Factor Item	Public	Emotional	Altruism	Dire	Compliant	Anonymous
PTM1	.44 (--*)					
PTM3	.54 (.08)					
PTM5	.84 (.11)					
PTM13	.58 (.07)					
PTM2		.62 (--*)				
PTM12		.72 (.07)				
PTM17		.62 (.07)				
PTM21		.66 (.07)				
PTM4			.75 (.18)			
PTM10			.37 (.11)			
PTM16			.47 (.12)			
PTM20			.51 (.13)			
PTM23			.30 (--*)			
PTM6				.69 (.05)		
PTM9				.62 (.05)		
PTM14				.65 (--*)		
PTM7					.87 (--*)	
PTM18					.79 (.04)	
PTM8						.65 (--*)
PTM11						.77 (.05)
PTM15						.75 (.05)
PTM19						.74 (.05)
PTM22						.46 (.04)

* Item loading fixed to one, thus no standard error was estimated.

Considering the correlations presented previously, we aggregated Dire and Emotional items into one latent factor and compared the 6-factor model. The 5-factor model denoted an adequate fit to our data ($X^2(219) = 1158.85$, $p < .001$; $X^2/gl = 5.29$; NNFI = .89, CFI =.90; RMSEA = .06, SRMR = .06). However, considering the AIC and ECVI indices, the 6-factor model showed lower values (AIC = 1149.33; ECVI = .88) than the 5-factor model (AIC = 1272.85; ECVI = .97), indicating a better fit to the data. We also tested an unifactorial model that revealed an unacceptable goodness of fit ($X^2(219) = 3026.66$, $p < .001$; $X^2/gl = 13.82$; NNFI = .66, CFI =.71; RMSEA = .99, SRMR = .12).

INVARIANCE ANALYSIS

In order to analyze whether the items of the six subscales are equivalent across the groups, we conducted measurement invariance considering gender and school year. Before the invariance measurement analysis, as proposed by Byrne (2010), we tested the PTM model in each of the subsamples (gender and school year) separately. As in all groups the models achieved sufferable fit indices (Table 3), we proceeded to the routine of testing the different types of invariance.

As observed in Table 3, the goodness of fit of all models are acceptable and based on those indicators the configurational invariance was supported both in gender and school year. This model is the reference to the comparison with the subsequent models and confirm the metric and scalar invariance.

Table 3.*Multigroup invariance analyses across gender and academic year groups*

Model	X^2	*df*	NNFI	CFI	SRMR	RMSEA	ΔX^2	Δdf	*p*	ΔCFI
Gender										
Female	718.02	210	.88	.90	.06	.06	---	---	---	---
Male	570.23	210	.90	.91	.06	.06	---	---	---	---
1. Configural Invariance	1288.26	420	.89	.91	.06	.04 (.04, .04)	---	---	---	---
2. Metric Invariance	1319.90	437	.89	.90	.06	.04 (.04, .04)	31.65	17	.02	.001
2.1 Partial Metric Invariance	1306.52	436	.90	.90	.06	.04 (.04, .04)	18.26	16	.31	.001
3. Scalar Invariance	1345.58	452	.89	.90	.06	.04 (.04, .04)	57.32	32	.00	.001
School Year										
10th grade	561.30	211	.89	.91	.07	---	---	---	---	---
11th grade	539.38	211	.87	.89	.07	---	---	---	---	---
12th grade	403.32	211	.91	.93	.06	---	---	---	---	---
1. Configural Invariance	1503.98	683	.89	.91	.07	.03 (.03, .04)	---	---	---	---
2. Metric Invariance	1530.42	667	.90	.91	.07	.03 (.03, .03)	26.44	34	.82	.001
3. Scalar Invariance	1581.74	709	.90	.91	.07	03 (.03, .03)	51.32	42	.15	.001

Metric invariance is fully confirmed for school year and partially to gender. After unconstrain the PTM 13 (public subscale), girls' and boys' perceptions about items were invariant. The indexes of scalar invariance indicated that students of 10th, 11th and 12th grades are invariant in the perceptions of the latent construct in which the items are comprised. In gender, even after unconstraining the intercepts of several items, the groups were non-invariant.

DISCUSSION

The present study intended to analyze the psychometric properties of PTM instrument and provide further evidence to the six original dimensions in a sample of Portuguese adolescents. We also aimed to investigate if this model with six dimensions was equivalently interpreted by gender and students from secondary school.

The PTM was translated into Portuguese and to pursuing these aims, we performed exploratory and confirmatory analyses. Also, measurement invariance was conducted comparing boys and girls as well as students from different high school years. In line with previous studies (e.g. Mestre et. al. 2015; Rodrigues et. al. 2017; Simões & Calheiros, 2016), the findings of the present study support that six-factor model proved to be the most adequate factorial configuration of PTM to the sample of Portuguese adolescents, when compared to the five-factor and unidimensional configurations (AIC and ECVI). It is important to note that some fit indexes were just acceptable, which may be explained by several factors, namely the sampling characteristics (Marôco, 2010). Fot instance, internal consistency indexes (Cronbach alpha and interrelations) show that this instrument is reliable for prosocial assessment. Considering the correlations scores, some expected relations were found, namely between dire and emotional subscales (Rodrigues et. al., 2015). It reveals the complementarity of these dimensions of prosocial behavior, that share a common basis.

Also, the measurement invariance analysis corroborated the six-factor as invariant across students attending different high school years, result that is line with recent empirical evidence (Ngai & Xie, 2018; Simões & Calheiros, 2016). Across gender, only configural and metric (partially) invariance were proved. The results suggest that perceptions about the latent construct vary across boys and girls. This result is congruent to previous findings (Carlo & Randall, 2002; Carlo et al., 2003; Simões & Calheiros, 2016; Ngai & Xie, 2018; Xiao et al., 2019), that denote different perceptions between boys and girls regarding the different dimensions of prosocial behaviors.

Considering the present challenges and the potential of prosocial behaviors for adolescents socioemotional functioning and, at last, for society positive development, fostering prosocial behavior is crucial. For several factors, adolescence is an optimal period to enhance the social competences (Baumsteiger, 2019), and the evidence found with this study provide the opportunity in future interventions with adolescents to use this validated instrument.

STRENGTHS, LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

The present study has provided useful contributions concerning prosocial behaviors measurement. The results evidenced strong psychometric properties of PTM suggesting that the PTM is useful as a multidimensional measure of prosocial behaviors within Portuguese youth. These results facilitate comparative research in different countries, desirable and needed as literature points out. Furthermore, PTM offers interesting features for psychologists or researchers looking for an instrument able to evaluate prosocial behaviors in adolescents, specifying its six dimensions.

Despite the strong psychometric properties of our findings, some caution is needed. The sample is not fully representative of adolescents across Portugal and therefore further validation efforts might be necessary to replicate the results and evaluate the PTM within a representative sample. Future studies might want to investigate the relation between the prosocial tendencies assessed by the PTM and other dimensions of youth's lives, such as psychological well-being.

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DECLARAÇÃO DA CONTRIBUIÇÃO DOS AUTORES

Certificamos que todos os autores participaram suficientemente do trabalho para tornar pública sua responsabilidade pelo conteúdo. A contribuição de cada autor pode ser atribuída como se segue:

M.R.B. e L.V. contribuíram para a conceptualização, a definição do plano de investigação; M.C. foi responsável pelas análises estatísticas pela redação final do método, resultados e discussão. S.N. foi responsável pela recolha de dados, análises descritivas e redação inicial do enquadramento e método (rascunho); M.R.B. e L.V. e L.M.R. foram responsáveis pela redação final do enquadramento teórico e discussão do artigo. G.C. foi responsável pela redação final (revisão e edição).

DECLARAÇÃO DE CONFLITOS DE INTERESSE

Os autores declaram que não há conflitos de interesse no manuscrito subm

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