THE RELATIONSHIP BETWEEN PROSOCIAL BEHAVIORS AND SELF- REGULA-TION: EVIDENCES FROM THE VALIDATION OF THE PTM-R FOR PORTUGUESE EARLY ADOLESCENTS

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Abstract

The main goal of this study is to understand the relationship between different types of prosocial behaviors and different forms of self-regulation, as part of the adaptation and validation of the Portuguese version of the Prosocial Tendencies Measure-Revised (PTM-R). A total of 403 early adolescents ($M = 11.81$; $SD = .92$; 52.9% girls) completed self-reported measures. The evaluation of psychometric properties of the PTM-R involved a confirmatory factorial analysis, followed by the examination of factorial internal consistency and factorial invariance analyses across gender groups and school retention groups (retention *vs.* no-retention). The results support that a 6-factor model similar to the original measure is the most adequate factorial solution for the PTM-R Portuguese version. Further convergent and divergent validity tests revealed that different forms of prosocial behavior are more often related to girls' cognitive, affective and behavioral regulation and that previously retained students denoted poorer relations between prosocial behaviors and self-regulation dimensions, as opposed to more successful students. The discussion focuses on implications of these findings for future research on prosociality.

Keywords: prosocial behavior, self-regulation, early adolescence, validation and reliability

Prosociality has endured as a unique feature of human social morality. However, the development of children and adolescents' prosocial behaviors has only recently attracted the attention of social scientists. This fact may reflect a modern version of Plato's dilemma in his dialogue *Lysis*. The Greek philosopher questioned whether the concern for a friend's sake is selfless or directed towards one's own interest. In reality, intense discussions still remain about which are the representative dimensions of prosocial behavior, namely if the fulfillment of egotistic goals should be labeled under prosociality or if altruistic and egotistic forms of help, sharing and care are independent (Carlo, Knight, McGinley, Zamboanga, & Jarvis, 2010).

Theoretical divergences have led to mounting evidence regarding the characteristics and benefits of prosocial development. Advancements in the field have been followed by claims that new research efforts are needed to clarify the relationships between dispositional characteristics such as gender and prosocial behavior (Eisenberg et al., 1996) across different social (Eisenberg, Guthrie, Murphy, Shepard, Cumberland, & Carlo, 2011) and cultural backgrounds (Carlo, Mestre, Samper, & Armenta, 2011). Unfortunately, these suggestions have not been met due to the lack of research instruments in several languages that may reproduce the latest trends in the field. This study is guided by the above mentioned recommendations, aiming at evaluating three goals: to assess the psychometric properties of the Portuguese version of the Prosocial Tendencies Measure-Revised (PTM-R) (Carlo, Hausmann, Christiansen, & Randall, 2003), a questionnaire designed to assess early adolescents' pro-social behaviors; to understand if the PTM-R factorial structure is invariant across gender and school retention groups (retained *vs.* non-retained students); finally, to assess the relation among types of prosocial behaviors and types of self-regulation in general as

well as across gender and school retention groups. This is the most original feature of this study, since such relationships remain untapped.

Prosocial Behavior

Prosocial behavior may be defined as voluntary actions intended to benefit others (Eisenberg et al., 1996; Padilla-Walker & Christensen, 2011; Yoo, Feng, & Day, 2013). Prosocial actions may assume distinct forms of helping, sharing or comforting others (Carlo, McGinley, Hayes, Batenhorst, & Wilkinson, 2007; Lenzi, Vieno, A., Perkins, Pastore, Santinello, & Mazzardis, 2012). These acts can reflect selfless orientations such as altruism, helping others in need (emotional and dire prosocial behavior), or anonymous help, but they may also comprise some type of ego-involvement in the case of public or compliant behaviors enacted to benefit others, but driven by social rewards or demands (Carlo et al., 2010).

Gender is one of the most noteworthy variables associated to the variation of prosociality. Girls depict higher levels of prosocial behaviors when compared to boys (e.g., Fabes, Carlo, Kupanoff, & Laible, 1999). This difference is evident as early as 14 months of age (Zahn-Wahler, Schiro, Robinson, Emde, & Schmitz, 2001) and tends to be stable throughout life-span (Eisenberg et al., 2011). Distinctive prosocial tendencies across gender groups have been related to individual factors, including girls' higher standards of moral reasoning (Carlo et al., 2007) and greater perceived competence (Fabes et al., 1999). Conversely, boys' lower levels of self-regulation and slower pubertal maturation during adolescence (Carlo et al., 2012) tend to undermine their ability to identify prosocial behaviors in comparison to girls (Eisenberg et al., 1996).

Gender differences in prosocial development may also result from significant interactions between prosociality and social factors. Parental support and sympathy

have been detailed as important predictors of prosocial behavior for both boys and girls (Carlo et al., 2011). However, gender-specific socialization practices foster greater prosociality among girls, especially in the case of emotional, dire and compliant prosocial behaviors (Carlo et al., 2010). Girls also tend to acknowledge higher levels of social support from friends and non-related adults, improving their chances to be prosocially involved (Lenzi et al., 2012). This does not mean that parents and friends benefit differently from prosocial enactment of both boys and girls (Padilla-Walker & Christensen, 2011); however, the type of prosocial behaviors adopted by girls and boys tends to be distinct across different social interactions: while girls are more often involved in altruistic and emotional prosocial behaviors, boys show a higher incidence of public prosocial behaviors (Carlo et al., 2010).

Prosociality may also vary across different patterns of school retention, given that prosocial behavior has a positive impact on school grades among at-risk children (Kilian & Kilian, 2011) and early adolescents (Caprara et al., 2014). However, the connections between specific types of prosocial behavior and different patterns of school retention remain unknown.

Self-regulation

Self-regulation is generally described as the flexible regulation of cognition, behavior and emotion (Bridgett, Burt, Edwards, & Deater-Decker, 2015). Cognitive self-regulation involves executive functions, the ability to set goals, plan actions, and to persist. Affective self-regulation involves strategies to adjust emotional states, such as reappraisal or suppression, as well as tonic or trait levels of emotion (Bridgett et al., 2015). Behavioral self-regulation refers to the integration of working memory, attention, and inhibitory control to replace an impulsive response by a normative behavior

(Suchodoletz et al., 2013). A complex interaction of heredity, maturation, and experience determines the development of self-regulation, meaning that overlaps and integration between the types of self-regulation are obvious and have been shown by neurological studies (Bridgett et al., 2015).

Girls tend to exhibit higher levels of self-regulation in terms of social development and learning (Carlo et al., 2012; Schunk & Pajares, 2005). These differences in behavioral self-regulation are visible as early as in kindergarten (Mathews, Ponitz, & Morrison, 2009). However, gender differences in self-regulation development and learning are nuanced by the type of self-regulation, the nature of a given task (Kurman, 2004), culture (Suchodoletz et al., 2013), or the type of informant (Suchodoletz et al., 2013), leading to some mixed findings. For instance, Kurman (2004) found that male adolescents depicted higher cognitive self-regulation in Math than girls. The author suggests that gender stereotypes may regulate the levels of self-regulation, given that Math is usually seen as a masculine academic subject. On the other hand, while American girls depicted significantly higher levels of self-regulation in kindergarten (Mathews, Ponitz, & Morrison, 2009), an identical study did not replicate the same results for Icelandic and German children (Suchodoletz et al., 2013), showing the importance of cultural factors in the development of self-regulation.

Moreover, self-regulation tends to change according to different levels of academic performance. Strong evidence support that students who perform better in school make more effort, use more adequate (meta)cognitive strategies and manage more competently their emotions and behaviors in order to fulfill their academic goals, compared to those students who do poorly in school (Schunk & Pajares, 2005), including the ones who have already been retained (Chen, Hughes, & Oi-Man Kwok, 2014). More recurrent success and a greater sense of self-efficacy, stronger positive

vicariate learning experiences or social persuasion by adults and peers altogether sustain why girls and non-retained/successful students present higher levels of self-regulation (Schunk & Pajares, 2005).

Prosocial Behavior and Self-regulation: Grounds for the Present Study

Some evidence link greater self-regulation to more recurrent prosocial behaviors among children and early adolescentes (Carlo, Crockett, Wolff, & Beal, 2012; Laible, Carlo, Murphy, Augustine, & Roesch, 2014). However, non-significant associations between the two constructs have also been detailed among late adolescents (Hardy, Bea, & Olsen, 2015). Nonetheless, the existent literature does not include studies dedicated to the clarification of relations between specific forms of prosocial behaviors (e.g. altruism) and specific dimensions of self-regulation (e.g. cognitive self-regulation) (Carlo et al., 2010).

Considering the opportunities found in the literature, this study involves three goals: to translate, adapt and validate the Portuguese version of the PTM-R (Carlo et al., 2003); to understand if the PTM-R factorial structure is invariant across gender and academic performance groups (retained students *vs.* non-retained students); finally, to assess the relations between types of prosocial behaviors and different dimensions of self-regulation through convergent and divergent validity tests across overall participants as well as gender and academic performance groups. These goals comply with the need of making available a more refined self-rated measure of prosociality in the Portuguese language. In addition, this approach may increase the knowledge regarding the psychometric properties of the PTM-R in other cultural contexts.

Classic gender comparisons suggested in this work are needed, due to the fact that this particular research goal is innovative. Academic performance was also chosen as a

source of comparison due to its developmental and cultural relevance. From a developmental standpoint, previous studies using the PTM-R have not contrasted subgroups of participants regarding academic risk criteria. This is a noteworthy gap in the literature, since the most remarkable form of risk in early adolescence is academic failure. Furthermore, the risk of academic failure has been linked to a progressive decrease of academic motivation and self-regulated behavior in the transition to adolescence (Schunk & Pajares, 2005). From a contextual standpoint, comparisons based on school performance criteria are much needed in Portugal. Despite improvements made in the past decades, the country is still struggling with low rates of school performance, compared to its European Union counterparts (Bettencourt, 2014).

The present study tests two hypotheses. First, a six-factor model is expected to be the most adequate solution for the PTM-R, similarly to the original version in the English language (Carlo et al., 2010). Second, the six-factor solution of the PTM-R is likely to be invariant across gender and academic performance groups. Considering the novelty of the topic, no specific hypotheses were outlined regarding the connections between each type of prosocial behavior and each type of self-regulation overall and across gender and school retention groups. Nevertheless, it is anticipated that, in general, positive connections among the different dimensions of both constructs will be more recurrent among girls and non-retained students.

Method

Participants

A cohort of 514 seventh graders from five public schools was invited to participate in the study; 403 of them participated ($M = 11.81$; $SD = .92$; 52.9% girls) and 111 (27.5%) did not have their parents' consent. The number of participants was

equivalent in gender to the group of those who did not participate, $\chi2 = (1, 402) = .091$, $p = .76$). However, the participants had a higher chance of being younger than those that did not have parental consent to participate, $t = (1, 402) = 256.91$, $p < .001$).

One-hundred and fifteen participants (28.5%) had already been retained in school. With regard to the professional status of the participants' fathers, and according to the Portuguese Classification of Occupations (Instituto Nacional de Estatística, 2010) 39.5% were non-specialized workers, 18.1% were administrative staff, 12.2% worked in services and sales, 7.5% were unemployed, 7.3% were middle or higher-level staff, 7.2% were specialized workers, 1.2% were military and .70% were retired; 6.3% of the participants did not report their fathers' professional situation. Concomitantly, 38.7% of their mothers were non-specialized workers, 21.2% were administrative staff, 20.1% worked in services and sales, 9.1% were middle or higher-level staff, 7.4% were unemployed, 0.5% were specialized workers and 0.5% were retired; 2.5% of the participants did not report their mothers' professional situation.

Measures

The protocol included a socio-demographic section, covering the participants' characterization (age, gender, school retention record, parents' professional status) as well as measures of prosocial behavior and self-regulation.

Prosocial Tendencies Measure-Revised (PTM-R)

The Prosocial Tendencies Measure-Revised (PTM-R) (Carlo et al., 2003) was used to assess prosocial behavior. This questionnaire encompasses 21 items divided into six subscales. Each subscale depicts a form of prosocial behavior: altruism (four reverse coded items; sample item "I feel that if I help someone, they should help me in the

future"); public (three items; "I can help others best when people are watching me");

emotional (five items; "I tend to help others especially when they are really emotional"),

compliance (two items; "I never wait to help others when they ask for it"), anonymous

(four items; "I prefer to help others without anyone knowing") and dire (three items; "I

usually help others when they are very upset"). It is important to highlight that, in order

to assess a prosocial tendency, the items measure intended prosocial behavior (e.g. "I

can help others best when people are watching me") as well as enacted prosocial

behavior (e.g. "I usually help others when they are very upset"). Response options range

from 1 (does not describe me at all) to 5 (describes me greatly). Reliability scores for

the original subscales of the PTM-R range from α = .62 (compliance) to α = .84

(emotional) (Carlo et al., 2011).

Abbreviated Dysregulation Inventory (ADI)

The participants' self-regulation was assessed using the Abbreviated

Dysregulation Inventory (ADI) (Mezzich, Tarter, Giancola, & Kirisci, 2001; Motta,

Rijo, Petiz, Souza, & Pereira, in press). This instrument is organized in three subscales:

cognitive dysregulation (10 reverse coded items; sample item "I develop a plan for all

my important goals"), affective dysregulation (10 items; "When I am angry I lose

control over my actions"), and behavioral dysregulation (10 items; "I get into arguments

when people disagree with me"). Ratings range from 0 (never true) to 3 (always true).

This structure is similar for the English and Portuguese version of the ADI according to

confirmatory factorial analysis results. Reliability scores for the original subscales of

the ADI range from α = .63 (cognitive dysregulation) to α= .85 (affective dysregulation)

(Mezzich et al., 2001). Reliability scores for the Portuguese version of this instrument's

subscales vary from α = .84 (affective dysregulation) to α = .86 (cognitive

dysregulation) (Motta et al., in press). In this study, reliability scores ranged from α = .81 for cognitive dysregulation to α = .85 for affective dysregulation. Higher rates on affective and behavioral dysregulation subscales indicate lower levels of self-regulation. Conversely, higher rates on cognitive dysregulation subscale mean higher rates of cognitive self-regulation. Therefore, we reversed the original codification of the behavioral and affective subscales in order to reflect the participants' self-regulation levels as well as to facilitate the interpretation of results according to this conceptualization.

Procedures

Translation and adaptation of the PTM-R

The study was conducted after permission to adapt the PTM-R was granted by the first author of the original English version. The adaptation of the PTM-R followed a five-step approach suggested by Harkness, Villar, and Edwards (2010): translation, revision, adjudication, pretest, and documentation. The translation involved two bilingual psychologists, each one translating the PTM-R items. The revision consisted of a meeting with the first author for an item-by-item discussion in order to reach a consensual formulation for each item. The adjudication entailed a retroversion of the translated items made by two English teachers. Later, they met with the first author to compare their versions of the items with the original items of the PTM-R. For each pair of original and retroverted items, independent comparisons were made in terms of linguistic and cultural equivalences using a scale from 1 (not at all similar) to 7 (extremely similar) (Sperber, Devellis, & Boehlecke, 1994). The highest rated retroverted item was retained, as long as ratings on linguistic and cultural equivalence

were above the cut-off point in both criteria (> 6), otherwise adjustments were made. Ten of the translated items were rephrased or reworded.

Afterwards, eight early adolescents (M = 11.63; SD = .92) enrolled in an after-school program volunteered to participate in the pretest and had their parents' informed consent to do so. Five of the participants were boys. The pretest was conducted according to a script which guided the administration of a first Portuguese version of the PTM-R and an item-by-item discussion between each participant and the first author. According to the feedback provided by the participants, ten items were slightly reworded and one (item 20) was entirely rephrased, due to lack of cultural equivalence.

Documentation encompassed an ongoing annotation of the problems found in the four steps described above in order to outline which adjustments were necessary.

Data collection procedures

Before being implemented, this study was approved by the Ethics Committee of the University Institute of Lisbon. This approval was followed by a formal request to the Regional Department of Education of the Azores Islands government for data collection. The region is considered an intermediate area (between 106 and 201 inhabitants by squared kilometer) and the population is homogenous regarding their ethnicity (.06% are immigrants). In the Azores Islands, the rate of middle school graduation (72.1%) is the lowest in the country (Conselho Nacional da Educação, 2014).

After obtaining official permission for conducting this study, all schools from one of the islands of the archipelago were invited and agreed to cooperate. After parental informed consent was obtained, a collective administration of the study's protocol was conducted by class, in the classroom, by the first author. Data collection involved:

explanation of research goals, asking the participants for their consent to participate and reading the instructions of each questionnaire. The participants had 60 minutes to complete the survey. Data collection occurred in April and May of 2015. Class lists were made available by school boards to identify the students who did not participate.

Data Analyses

The analyses were made using AMOS 20.0 statistical software. The study of the psychometric properties of the Portuguese version of the PTM-R included confirmatory factor analysis (CFA), internal consistency analysis and factorial invariance tests. Psychometric analysis was completed by convergent and divergent validity tests, which also enabled an assessment of the relations between forms of prosociality and self-regulation overall and across gender and school retention groups.

CFA was conducted to establish the six-factor model in the overall sample for the Portuguese version of the PTM-R (Figure 1). This step involved the comparison of the six-factor model with one, four, and five-factor models. These comparisons were made to control possible construct overlap due to high correlations between factors (Brown, 2006). Multiple fit indices were used to evaluate patterns of fit for each of these measures. Statistical interpretation of fit indices tracked general recommendations found in the literature. Adequate fit is indicated by a comparative fit index (CFI) value of .90 or greater, a root mean square error of approximation (RMSEA) of .10 or lower and a standardized root mean square residual (SRMR) value of .10 or lower (Byrne, 2004). The Akaike information criterion (AIC) and the expected cross-validation index (ECVI) were also regarded to assess relative fit. In general, the AIC and the ECVI correct model fit for model complexity, and lower values indicate better model fit. By default, AMOS rescales AIC; so, when comparing models, the lowest AIC coefficient is 0. For the

remaining models, AIC > 7 shows strong evidence that the alternative models should be ruled out (Burnham & Anderson, 1998).

The evaluation of the psychometric properties of the PTM-R included an internal consistency analysis, which involved the calculation of Cronbach alpha estimates for each of the PTM-R subscales (DeVellis, 2012).

Subsequently, measurement equivalence analyses were performed for both gender and school performance groups. The present study focused on item, functional, and scalar equivalence (Byrne, 2004). Item equivalence was analyzed by exploring the factorial invariance of the PTM-R, which was assessed by using multigroup CFA to fit a series of hierarchically nested factor structures (Byrne, 2004). A sequence of nested CFA models was examined going from the least restrictive to the most restrictive model of invariance. This statistical approach helps to determine if each item is equivalent across groups. The first step of factorial invariance tests consists of specifying a CFA model that allows the same set of items to create a factor in each group while allowing all other parameters to vary across groups. This configural model is progressively compared to a series of models that add constraints to other of its parameters, starting by factor loadings, followed by item intercepts and error variances, assuming all of them to be invariant across the groups. Weak factorial invariance exists if the factor loadings are invariant across groups, whereas strong factorial invariance is met if the item intercepts are additionally invariant across groups. Finally, strict factorial invariance exists if the unique item error variances are invariant across groups (in addition to loadings and intercepts).

Functional and scalar equivalence was assessed by exploring the convergent and divergent validity equivalence between dimensions of prosocial behavior and different forms of self-regulation. This step involved a series of structural equation model

analyses, regressing the six latent factors of the PTM-R onto each of the variables of interest (cognitive regulation, affective regulation, and behavioral regulation). First, these tests were conducted for the overall sample. Afterwards, a comparison was made between a fully unconstrained model to a model that constrained the slopes between the PTM-R scales and the construct validity scale, as well as the construct validity scale intercept across gender and school performance groups. Equivalence in slopes and intercepts suggests that a given PTM-R scale score is related with the same score on the construct validity variable for each group. However, groups may be different at the path level, enabling the study of associations between types of prosocial behaviors and different self-regulation processes for each subgroup (e.g. girls and boys).

In addition to the fit indices (CFI, RMSEA, and SRMR), the chi-square difference test ($\Delta\chi^2$) invariance and convergent and discriminant tests also evaluated the relative model fit. Considering that χ^2 criteria are sensitive to minor fit modifications, additional parameters were considered to reach a more accurate evaluation of model fit, if necessary (Steiger, 1998). Thus, if the χ^2 was accompanied by: (a) substantial drop in the practical fit indices and/or (b) a large (i.e., > 3) ratio of chi-square difference to degrees of freedom ($\Delta\chi^2$: Δdf), modification indices should be used to determine which parameters were significantly different across the groups. Once these parameters were allowed to be freely estimated across the groups, partial invariance could be attained if model fit indices showed adequate fit. Estimates for CFA, invariance tests as well as discriminant and convergent validity tests were calculated using asymptotically distribution-free extraction method, considering that some of the PTM-R subscales (e.g. public prosocial behavior) did not present a normal distribution (Fan, Thompson, & Weng, 1999).

Results

Confirmatory Factor Analysis

In the overall sample, the 21-item six-factor model (Figure 1) showed good fit, χ^2 (174) = 1.725, p < .001, CFI = .95, RMSEA =. 030, SRMR = .08. Factor loadings for this model were all positive and significant. All unstandardized item parameter estimates (factor loadings and item intercepts) as well as the respective standard errors for the overall 21-item factor solution of the PTM-R are presented in Table 1.

[Insert Figure 1 approximately here]

Competing models of the PTM-R were then tested. A unidimensional factor model did not demonstrate adequate fit, χ^2 (189) = 7.584, p < .001, CFI = .50, RMSEA =. 130, SRMR = .28, thus suggesting that this factorial solution was not reasonable. The correlation between emotional and dire subscales was strong (r =.89) and similar to the one found for the original version (Carlo et al., 2010). Thus, a five-factor solution in which one latent factor aggregated all emotional and dire items loadings was also tested. This model denoted adequate fit according to fit indices, χ^2 (179) = 1.804, p < .001, CFI = .94, RMSEA =. 050, SRMR = .08. However, the AIC value difference was > 10 and the ECVI value was lower for the six-factor model (AIC = 414.118, ECVI = 1.030) when compared to this alternative five-factor solution (AIC = 426.838, ECVI = 1.062), suggesting that the six-factor solution had better fit.

Another five-factor solution was tested by aggregating compliant and emotional item loadings into the same latent factor, because these subscales were highly associated in the current study (r = .74) and in prior works (r = .83) (Carlo et al., 2010). This five-factor model presented adequate fit according to fit indices, χ^2 (179) = 1.928, p < .001, CFI = .94, RMSEA =. 050, SRMR = .08. Both the AIC and ECVI values were lower for

the six-factor model when compared to this five-factor solution (AIC = 449.140, ECVI = 1.117), demonstrating that the six-factor solution presented a better fit.

Then, a four-factor model was assessed. In this case, all emotional, compliance and dire subscales items were loaded into the same latent factor. This model also depicted an adequate fit according to fit indices, χ^2 (183) =1.955, $p < .001$, CFI = .93, RMSEA =. 050, SRMR = .08. However, the AIC and ECVI values were much higher than those found for the six-factor solution, (AIC = 453.689, ECV = 1.129). Hence, the analyses revealed that the six-factor solution was the most plausible model of the Portuguese version of the PTM-R for the overall sample, considering that all competing models resulted in no model convergence or poorer relative fit.

[Insert Table 1 approximately here]

Internal Consistency

Dire factor denoted a minimally acceptable internal consistency value (α = .67). Public (α = .70), compliance (α = .70), altruism (α = .72), emotional (α = .75) and anonymous (α = .78) subscales showed acceptable alpha values (DeVellis, 2012).

Factorial Invariance Analysis

Gender

The configural model across gender had adequate fit, thus establishing the six-factor model of the PTM-R in Portuguese boys and girls. The weak factorial invariance model constraining the factor loadings to be equal across gender had adequate fit, so the weak factorial invariance model was retained. Both the strong and strict factorial invariance models had adequate fit, but the $\Delta\chi^2$ tests were significant for the strong and the strict invariance models. However, the $\Delta\chi^2/ \Delta df$ was also < 3 for both these models. Therefore, full factorial invariance across gender groups was also retained.

School retention

The configural model across school retention groups had adequate fit, thus establishing the six-factor model of the PTM-R for Portuguese students, with or without a school retention record. The weak, strong, and restrict factorial invariance models presented adequate fit. None of these models presented significant $\Delta\chi^2$ results. Also, the $\Delta\chi^2/\Delta df$ was < 3 for all the examined models. Therefore, full factorial invariance across groups with different trajectories regarding school retention record was achieved.

[Insert Table 3 approximately here]

Convergent and Divergent Validity Analyses

Overall sample

Structural equation modeling analysis regressing the six latent factors of the PTM-R onto each of the self-regulation dimensions denoted adequate fit, whether the variable of interest was cognitive regulation, χ^2 (412) = 1.645, $p < .001$, CFI = .93, RMSEA =. 040, SRMR = .07, affective regulation, χ^2 (412) = 1.605, $p < .001$, CFI = .94, RMSEA =. 040, SRMR = .07, or behavioral regulation χ^2 (412) = 1.514, $p < .001$, CFI = .94, RMSEA =. 040, SRMR = .06.

Further examination of standardized regression weights estimates revealed positive significant associations between emotional prosocial behaviors ($\beta = 35$; $p < .001$) and cognitive self-regulation. Compliant prosocial behavior ($\beta = .38$; $p < .01$) showed a positive association with affective self-regulation, contrary to emotional ($\beta = -.35$; $p < .01$) and anonymous prosocial behavior ($\beta = -.16$; $p < .05$). Finally, a positive link between altruism and behavioral self-regulation was found ($\beta = .42$; $p < .01$) contrary to compliant prosocial behavior ($\beta = -.29$; $p < .05$).

Gender

The models freely estimating the cognitive, affective, and behavioral self-regulation intercepts across gender groups had adequate fit, as well as the ones constraining both the slopes and the intercepts across gender groups. Across these groups, significant $\Delta\chi^2$ were not found for the comparisons between unconstrained and constrained models for different types of self-regulation. For all of these comparisons the $\Delta\chi^2:\Delta df$ test were < 3.

The inspection of standardized regression weights estimates showed that boys' ($\beta = -.58; p < .01$) and girls' emotional prosocial behaviors ($\beta = .59; p < .001$) had negative and positive relations respectively with cognitive self-regulation. Girls also showed a negative relation between their public prosocial behavior and their cognitive self-regulation ($\beta = -.33; p < .05$). Moreover, girls denoted a positive association between compliant prosocial behavior and affective self-regulation ($\beta = .37; p < .05$), as well as positive relations between anonymous ($\beta = .60; p < .05$) and public ($\beta = .41; p < .05$) prosociality and behavioral self-regulation.

School retention

The models freely estimating the cognitive, affective, and behavioral self-regulation intercepts across school retention groups had adequate fit. The models constraining both the slopes and the intercepts across the two groups also had adequate fit. Across school retention groups, significant $\Delta\chi^2$ for the comparisons between unconstrained and constrained models for different types of self-regulation were not found; also, the $\Delta\chi^2: \Delta df$ test were < 3 for all comparisons (Table 4).

Regression weights estimates depicted a significant and similar negative association between emotional prosocial behavior and cognitive self-regulation for both the retained group (β = - .49; *p* = <.01) and the non-retained group (β = - .50; *p* = <.01). In addition, a negative relation between anonymous prosocial behavior and affective self-regulation (β = -.36; *p* < .01) was found for the retained group. In turn, the non-retained group showed positive relations between compliant (β =.62; *p* < .01) and altruistic (β = .28; *p* < .05) prosocial behaviors and affective self-regulation. Moreover, this group presented a negative association between emotional prosocial behavior and affective self-regulation (β = - .52; *p* < .05). Finally, the non-retained group presented a positive relation between compliant (β = .60; *p* < .05) and altruistic (β = .52; p < .01) prosocial behaviors and behavioral self-regulation.

[Insert Table 4 approximately here]

Discussion

Prosocial behavior has been portrayed as a distinctive feature of social morality across different civilizations. Social researchers have made noteworthy efforts to understand the conditions that may endorse the development of children and adolescents' prosociality. Prior studies have demonstrated that variations in prosocial behavior are influenced by a wide collection of individual factors, namely by gender. However, multidimensional measures of prosocial behavior that facilitate more refined studies on this matter are not available in many languages, including Portuguese. Furthermore, researchers have not yet addressed differences in prosocial tendencies in general and across gender and risk groups based on self-regulatory processes.

This work intends to make three contributions to the literature: (a) to examine the psychometric properties of the Portuguese version of PTM-R (Carlo et al., 2003), a self-

report measure designed to assess early adolescents' prosocial behaviors; (b) to investigate if the structural solution of the PTM-R is invariant across gender and school retention (retained *vs.* non-retained students) groups; and (c) to test its convergent and discriminant validity by assessing the links between different types of prosocial behaviors and different forms of self-regulation in general and across gender and school retention subgroups.

The six-factor solution of the PTM-R revealed to be the most adequate factorial structure of this instrument for Portuguese early adolescents. This model presented better fit and better results on comparative indexes (AIC and ECVI) when confronted to one, four, and five-factor structural alternatives. The six-model structure of the PTM-R is further sustained by psychometric qualities such as an adequate internal consistency for the different factors. As predicted, the PTM-R six-factor structure was invariant across gender and school retention groups. In the case of gender comparisons, the $\Delta\chi^2$ tests were significant for both the strong and the strict factorial invariance models, meaning that the factorial structures varied across boys and girls. Still, χ^2 tests may fall short to accurately describe invariance across groups, due to the fact that χ^2 criteria are sensitive to slight modifications of fit (Steiger, 1998). Therefore, $\Delta\chi^2/\Delta df$ was also regarded in the interpretation of the results ($\Delta\chi^2/\Delta df < 3$) indicating invariance across groups. According to these criteria, invariance was found for multigroup CFA strong and strict factorial invariance models.

Altogether, CFA, internal consistency, and invariance analyses results sustain that the proposed factorial structure of the PTM-R is valid for Portuguese early adolescents, addressing the first and the second aim of this study. These results also expand on previous findings suggesting that the PTM-R six-factor structure is valid across different ethnic groups (Carlo et al., 2010) and cultures (Carlo et al., 2011). Moreover,

the current evidence emphasize that multidimensional measures of prosocial behavior are more appropriate to capture the complexity of prosociality. Unidimensional measures of prosociality have been in use (e.g. Yoo et al., 2013) and their application may be appropriate. Still, they may fail to capture specific features of prosocial behavior enactment depending on its type (Carlo et al., 2010), the recipient of a prosocial act (Padilla-Walker & Christensen, 2011), or the context in which prosocial enactment occurs (Eisenberg et al., 2011).

Convergent and discriminant tests involved an examination of the connections between different types of prosocial behavior and different forms of self-regulation. Although no specific hypotheses were formulated, most of the positive associations between the dimensions of both constructs were found for girls and students who had never been retained, as anticipated. Only one form of selfless prosociality (emotional prosocial behavior) was connected to cognitive self-regulation. Mixed findings described the remaining relations between prosociality dimensions and affective and behavioral self-regulation for the overall participants. For instance, a selfless form of prosocial behavior, altruism, denoted a positive link with behavioral self-regulation, while anonymous and emotional forms of prosociality were negatively associated with affective self-regulation. Interestingly, compliant prosocial behavior had a positive association with affective self-regulation, but a negative link with behavioral self-regulation.

These results propose that the relations between different dimensions of prosocial behavior and self-regulation in early adolescence are complex. Nevertheless, in the context of this study, the findings still suggest that executive regulation and planning can play a crucial role in emotionally demanding situations. In addition, the results also point out that affective restrain, more than on any other form of self-regulation, may be

essential for these particular participants to cope with the reluctance to help others according to social demands or expectations.

The comparisons between gender groups revealed a greater involvement of different self-regulatory processes in girls' prosocial behaviors. This is an expected outcome, as girls denote greater and more precocious prosociality and self-regulation when compared to boys (Carlo et al., 2012; Zahn-Wexler et al., 2001). Girls also tend to more easily recognize the use of prosocial behaviors, due to an earlier maturation of executive functions (e.g. attention) (Eisenberg et al., 1996). However, the results do not present a distinctive pattern of differences across gender groups, with one relevant exception: the links between emotional prosocial behaviors and cognitive self-regulation. In the case of boys, a negative association among these two dimensions was found, whereas this relation is positive in the case of girls. In part, this evidence confirms previous findings sustaining that preadolescent girls are less driven by social rewards or costs resulting from selfless and emotive prosocial enactment (e.g. peer refusal of such behaviors) than boys (Carlo et al., 2010). This result might also reveal gender role expectations, being that caring and comforting expectations are usually associated to girls (Lenzi et al., 2012). To some extent, this trend is also confirmed by the fact that girls' affective self-regulation is positively related with less altruistic forms of prosocial behavior (e.g. compliant prosocial behaviors). It is likely that affective self-regulation may negatively moderate other emotional traits, especially sympathy, which has been presented as an important positive mediator of prosocial behavior in adolescence (Carlo et al., 2007). Nevertheless, this interpretation requires further investigation.

Finally, findings regarding the links between different forms of prosocial behavior and behavioral self-regulation across gender groups are contradictory. Positive relations

between this type of self-regulation and opposite forms of prosocial behavior (anonymous and public) were identified. It is possible that behavioral self-regulation, as a more tangible self-regulatory process, may more easily have both a selfless and an instrumental expression. Yet, this result clearly requires a greater clarification.

The links between different forms of prosocial behavior and behavioral self-regulation across school retention groups seem closer to depict a pattern that differentiates adolescents with and without a record of academic retention. For instance, negative relations between emotional prosocial behaviors and cognitive self-regulation as well as between anonymous prosocial behavior and affective self-regulation were found for participants with a record of school retention. These negative associations can be infused by lower self-regulatory abilities (e.g. Schunk & Pajares, 2005) as well as by a myriad of social risks (inconsistent parenting, differential treatment in school by peers and teachers, social withdrawal, or integration in homogeneous deviant groups). Altogether, poorer self-regulation and greater accumulation of risks may lead to greater difficulty in acknowledging emotions and fewer opportunities to support and help others in social interactions.

Conversely, students who have not been retained in school depict positive connections between compliant and altruistic prosocial behaviors and affective and behavioral self-regulation. Successful students, including those that have not been retained previously, denote greater self-regulation levels and have a greater probability of being involved in more nurturing and reassuring social networks (Chen et al., 2014; Schunk & Pajares, 2005). These factors prompt a greater internalization of social norms, including the imperative to help others according to contextual demands such as parental expectations and school rules. These results may be congruent with a negative association of emotional prosociality with affective self-regulation identified for this

group. Lower risk exposure may lead early adolescents to greater personal demand for self-control and, thus, to avoid disturbing/emotional situations, including those that would implicate them to console others.

As a final remark, it is important to recognize that the PTM-R is a complex measure which combines items that assess prosocial motives and prosocial enactment, which altogether reflect a prosocial tendency. Would the connections between self-regulation and prosocial behavior overall and across gender and school retention groups be different if prosociality was measured only in terms of intended or enacted behaviors? The replication of the present study with other groups of early adolescents should not overlook this possibility in order to clarify the matter of this research.

Implications and Limitations

The first implication of this study is to further demonstrate the multidimensionality of prosocial behavior in a different cultural context. This work adds new evidence that the six dimensions of the PTM-R are relevant across cultures and different ethnic groups (Carlo et al., 2011).

The most innovative implication of this study is to reveal some trends regarding the connections between distinct types of prosocial behaviors and different self-regulation dimensions across gender and school retention groups. Future studies may better explain these intricate associations by taking into account the recipients of adolescents' prosocial behaviors (such as parents, teachers, or peers) as well as the contexts (family, school, or the community) in which they occur (Padilla-Walker & Cristensen, 2011). In addition, if new research approaches are supported by longitudinal research designs, including studies using observational and laboratory methods

(Eisenberg et al., 1999), its results will help to better establish the consistency of connections between prosocial behavior and self-regulatory processes across life-span.

This study confirms that more attention is needed to understand the conditions under which vulnerable adolescents may regulate their prosocial behaviors. Further comparisons between groups based on various sets of individual and environmental risks are urgent, especially if the fact that vulnerable adolescents may usually feel less competent or lack opportunities to help, share, and console others is taken into account.

This work is obviously incomplete without discussing its weaknesses. First, some of the PTM-R items presented low loadings on some of the instrument's subscales, despite the fact that the six-factor solution denoted better fit indexes compared to other solutions. Better loadings may be achieved by further improving the items of the Portuguese version of the PTM-R, to insure greater cultural equivalence. Additional analyses, such as temporal reliability tests, are also desirable.

Another limitation is that the present study relies on a unique source of information. This method is vulnerable to same-source bias or to the possibility that self-reported data may lead to spurious association between different variables. Thus, new studies involving adolescents, parents, and teachers are highly recommendable to replicate these findings.

Finally, the self-regulation questionnaire used in this study was the only available measure in Portuguese that met the research goals. Despite the fact that both the original and the Portuguese versions of the ADI have revealed good internal consistency and fit, according to confirmatory factor analyses (Motta et al., in press), no invariance tests across different groups (e.g. gender) were conducted. Thus, the present findings, namely the ones related to associations between prosocial dimensions and self-regulatory types across different groups may have been influenced, in part, by measurement error.

Conclusion

This study involved the analysis of the psychometric properties of the Portuguese version of the PTM-R. The analyses strengthen the idea that prosocial behavior is a multidimensional construct across different cultures. More importantly, this work highlighted the connections between distinct dimensions of prosociality assessed by the PTM-R and different types of self-regulation. Cognitive, affective, and behavioral regulation processes were more closely associated to different forms of prosocial behavior in the case of girls. Comparisons between school retention groups showed that retained students denoted poorer relations between prosocial behaviors and self-regulation dimensions, as opposed to more successful students.

Acknowledgments

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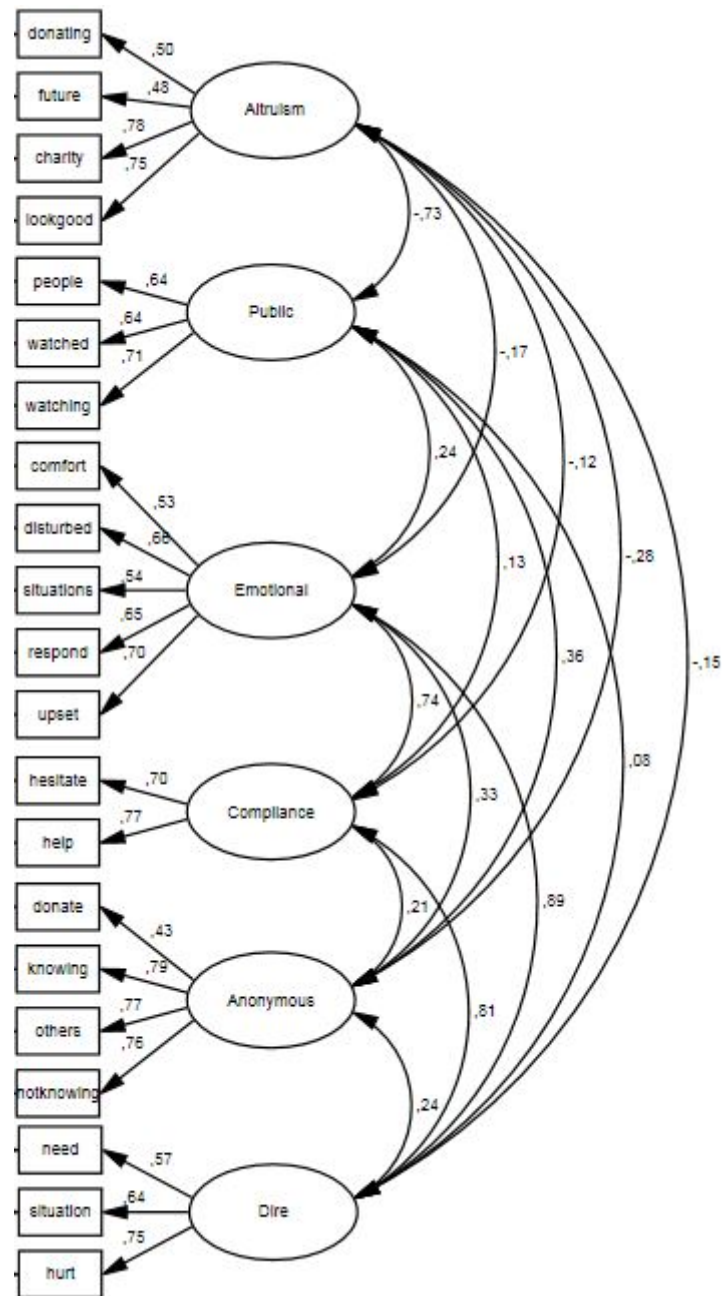
Figure 1. Standardized factor loadings and latent factor intercorrelations of the final six-factor (21-item) structure of the PTM-R.

Note. All parameters reported are standardized.

Table 1

Unstandardized Item Parameter Estimates (and Standard Errors) for the Overall 21-Factor Model of the PTM-R

Factor/Item	Factor Loadings (*SE*)	Item Intercepts (*SE*)	Variances (*SE*)
Altruism			
4	1.12 (.09)	3.11 (.08)	1.07 (.11)
5	.56 (.07)	4.12 (0.7)	1.10 (.08)
10	.62 (.07)	4.11 (.07)	1.27 (.10)
16	1.00 (---)[a]	3.82 (.07)	.71 (.08)
Public			
1	.77 (.08)	1.76 (.05)	1.07 (.10)
3	.97 (.10)	2.40 (.07)	.74 (.06)
13	1.00 (---)[a]	2.06 (.06)	1.05 (.06)
Emotional			
2	.80 (.08)	3.86 (.06)	.97 (.08)
12	1.06 (.09)	3.33 (.07)	1.23 (.09)
17	.89 (.09)	2.84 (.07)	.95 (.08)
21	1.03 (.09)	3.54 (.06)	.68 (.06)
25	1.00 (---)[a]	3.61 (.06)	.62 (.06)
Compliant			
7	.83 (.07)	3.84 (.06)	.60 (.08)
18	1.00 (---)[a]	3.64 (.06)	1.06 (.07)
Anonymous			
8	.55 (.07)	1.63 (.06)	1.06 (.07)
11	1.13 (.08)	2.21 (.06)	.62 (.06)
15	1.08 (.07)	2.14 (.06)	.64 (.06)
19	1.00 (---)[a]	1.88 (.06)	.58 (.06)
Dire			
6	1.06 (.11)	3.51 (.06)	.89 (.07)
9	1.06 (.11)	3.90 (.05)	.50 (.05)
14	1.00 (---)[a]	3.28 (.06)	1.12 (.09)

[a]Item loading fixed to one in order to set the metric of the latent variable; thus, no standard error was estimated.

Table 2

Correlations, Means, Standard Deviations, Skewness and Kurtosis Estimates for the Six Factors of the PTM-R (n = 403)

	1	2	3	4	5	6	*M*	*SD*	Skewness	Kurtosis
1. Altruism	---						3.79	1.35	-.52	-.67
2. Public	-.53**	---					2.07	1.21	.94	.32
3. Emotional	-.12**	.19**	---				3.44	1.32	-.27	-.46
4. Compliant	-.07	.09	.53**	---			3.74	1.17	-.47	-.61
5. Anonymous	-.26**	.29**	.26**	.15**	---		1.97	1.22	.97	.39
6. Dire	-.12*	.08	.66**	.55**	.19**	---	3.56	1.11	-.30	-.46

Table 3

Summary of the Factorial Invariance Tests Across Gender Groups and School Retention Groups

	χ^2	df	$\Delta\chi^2$	Δdf	$\Delta\chi^2/$ Δdf	CFI	RMSEA	RMSEA 90% CI	SRMR
Gender Groups									
(1) Configural Invariance model (Model 1)	509.626	348	---	---	1.464	.935	.034	[.029;.037]	.062
(2) Model 1+ all factor loadings invariants	576.706	391	67.080	43	1.475	.925	.034	[.029;.037]	.066
(3) Model 2 + all item intercepts invariant	579.405	392	69.779	44	1.478	.924	.035	[.029;.038]	.066
(4) Model 3 + all latent factor means invariant	608.961	407	99.355***	59	1.496	.918	.035	[.029;.038]	.093
(5) Model 4 + all latent factor correlations invariant	641.559	426	131.933***	78	1.506	.913	.036	[.030;.040]	.093
School Retention Groups									
(1) Configural Invariance model (Model 1)	517.747	348	---	---	1.488	.933	.035	[.030;.039]	.076
(2) Model 1+ all factor loadings invariants	544.998	383	27.251	35	1.423	.936	.032	[.028;.037]	.082
(3) Model 2 + all item intercepts invariant	546.721	384	28.974	36	1.424	.935	.033	[.028;.037]	.082
(4) Model 3 + all latent factor means invariant	582.779	405	65.032	57	1.439	.929	.033	[.028;.037]	.087
(5) Model 4 + all latent factor correlations invariant	612.999	426	95.252	78	1.439	.926	.033	[.028;.037]	.086

*** $p < .001$

Table 4

Summary of the Construct Validity Equivalence Tests Across Gender Groups and School Retention Groups

	χ^2	df	$\Delta\chi^2$	Δdf	$\Delta\chi^2/\Delta df$	CFI	RMSEA	RMSEA 90% CI	SRMR
Gender Group									
Cognitive self-regulation									
(1) Model freely estimating the intercept and slopes	1167.923	824	---	---	---	.907	.032	[.027;.036]	.063
(2) Model 1+ all intercepts and slopes constrained	1176.500	839	8.577	15	.572	.909	.032	[.027;.036]	.063
Affective self-regulation									
(1) Model freely estimating the intercept and slopes	1179.677	828	---	---	---	.907	.033	[.028;.037]	.066
(2) Model 1+ all intercepts and slopes constrained	1187,714	843	8.037	15	.536	.909	.032	[.028;.038]	.067
Behavioral self-regulation									
(1) Model freely estimating the intercept and slopes	1142.459	826	----	----	---	.912	.031	[.027;.036]	.067
(2) Model 1+ all intercepts and slopes constrained	1150.104	841	7.887	15	.928	.914	.030	[.026;.037]	.069

Table 4

Summary of the Construct Validity Equivalence Tests Across Gender Groups and School Retention Groups (cont.)

	χ^2	df	$\Delta\chi^2$	Δdf	$\Delta\chi^2/ \Delta df$	CFI	RMSEA	RMSEA 90% CI	SRMR
School retention groups									
Cognitive self-regulation									
(1) Model freely estimating the intercept and slopes	1177.117	824	---	---	---	.905	.033	[.026;.035]	.075
(2) Model 1+ all intercepts and slopes constrained	1185.214	839	8.097	15	.920	.907	.032	[.026;.035]	.075
Affective self-regulation									
(1) Model freely estimating the intercept and slopes	1151.678	824	---	---	---	.915	.031	[.027;.036]	.082
(2) Model 1+ all intercepts and slopes constrained	1159.592	839	7.914	15	.528	.916	.031	[.027;.036]	.082
Behavioral self-regulation									
(1) Model freely estimating the intercept and slopes	1110.344	822	----	----	---	.921	.030	[.025;.034]	.083
(2) Model 1+ all intercepts and slopes constrained	1118.260	837	7.916	15	.527	.923	.029	[.025;.034]	.083