The Portuguese version of the Basic Empathy Scale (BES): dimensionality and measurement invariance in a community adolescent sample

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Abstract

Empathy is the heightened ability to cognitively perceive and/or affectively share the emotions of others, which has been consistently associated with desirable social interactions. This paper aimed to test the bi-factorial structure of a Portuguese version of the Basic Empathy Scale and examine its variation by gender and age using a large community sample (n=1029) of adolescents. The two-factor model, originally developed and supported by other cross-cultural validations, presented good fit indicators which was similar across genders and adolescent age groups. Girls were more empathic than boys and younger adolescents were more empathic than the older ones. Further support for the validity of the new scale comes from its relations to measures of social skills and aggression which were similar to theoretical predictions. In conclusion, the Portuguese version of the BES is a consistent and valid instrument for the assessment of empathy in samples of adolescents aged 12 to 18 years old in Portugal, which can now be used in cross-cultural studies of this important psychological construct.

Keywords: cognitive empathy, affective empathy, adolescence, Basic Empathy Scale

Introduction

Empathy is currently viewed as a multidimensional construct, encompassing both a cognitive and an affective dimension, each exerting various influences on

empathic behavior (Ang & Goh, 2010). Cognitive empathy has been conceptualized as the ability to adopt another's perspective and infer their thoughts and feelings (Preston & De Waal, 2002). This facilitates the understanding and prediction of another's behavior and can facilitate dialogue and social understanding (Smith, 2006). In turn, affective empathy corresponds to the ability to share or experience another's emotions (Ang & Goh, 2010). This can motivate the subject to act altruistically towards others, either to increase other's positive emotions (e.g., happiness) or to reduce other's negative emotions (e.g. fear; Davis, 1996).

Greater levels of empathy have been associated with an increased likelihood of behaving pro-socially (Lam, Solmeyer, & McHale, 2012), and with a greater predisposition to forgive others (Mellor & Fung, 2012). Conversely, lower levels of empathy have been related to increased aggressive and antisocial behavior (Jolliffe & Farrington, 2006), and bullying (Rivers, Ducan & Besag, 2007).

A number of methods of assessing empathy exist, ranging from psychophysiological responsiveness (e.g., Neumann & Westbury, 2011) to peer reports (e.g. Kaukiainen et al., 1999), but self-report questionnaires are by far the most common method (e.g., Gerdes, Segal & Lietz, 2010). The main benefit of self-reported questionnaires is their ease of use and their main limiation related to accuracy of measurement. A number of self-report measures of empathy exist (e.g, Hogan, 1969; Mehrabian & Epstein, 1972), but only the Interpersonal Reactivity Index (IRI; Davis, 1980) measures both cognitive and affective empathy, however, this has been shown to elicit socially desirable responding (Jolliffe & Farrington, 2006).

In order to overcome the limitations of the available instruments, Jolliffe and Farrington (2006) developed the Basic Empathy Scale (BES), which assesses both cognitive and affective empathy, and was found to be unassociated with social

desirability. In the Italian, French, Mandarin and Spanish validations of the BES, the original bi-factorial model achieved a good fit, suggesting that this instrument adequately measures empathy in different cultures (Albiero, Matricardi, Speltri, & Toso, 2009; D'Ambrosio, Olivier, Didon, & Besche, 2009; Geng, Xia, & Qin, 2012; Sánchez-Pérez, Fuentes, Jolliffe, & González-Salinas, 2014). In Portugal, the BES has been studied but only in a non-representative forensic juvenile sample of males (Pechorro, Ray, Salas-Wright, Maroco, & Abrunhosa, 2015).

Following a two dimension conceptual model of empathy tested in previous works on BES and considering that empathy is an important social skill for accomplishing developmental tasks such as attaching to peers and being able to establish intimate relationships, we intended to test its bifactorial structure in a community sample of Portuguese adolescents. Existing research on BES used mainly community samples and future crosscultural studies will be facilitated if this measure proves to be valid across a broader number of cultures. Measurement invariance across gender and across developmental age-groups was also investigated to ensure reliable between-group comparisons. If these comparisons yield results similar to previous findings on empathy, the BES will likely be evaluating its intended constructs.

Method

Participants

Participants were 1023 adolescents (Table 1) aged 12 to 18 years old (M = 14.55, SD = 1.89), including boys and girls, who presented similar mean ages ($t_{(1021)}$ = 0.86, p = .39), and were similarly distributed by school years ($\chi^2_{(5)}$ = 3.43, p = .63) and age groups (*i.e.*, mid adolescents aged 12 to 15 years old and late adolescents aged 16 to 18 years old; $\chi^2_{(1)}$ = 0.31, p = .58). A subsample of 449 adolescents aged 12 to 18 years old (M = 15.90, SD = 1.79) reported on their social skills and aggressive behavior (in

addition to their empathy). In this sub-sample, boys and girls again had similar mean ages ($t_{(447)} = 0.81$, $p = .42$) and were evenly distributed by school years ($\chi^2_{(5)} = 2.30$, $p = .81$) and age groups ($\chi^2_{(1)} = 0.87$, $p = .35$).

[Insert Table 1]

Instruments

The original version of the Basic Empathy scale has 20 items to assess affective empathy (11 items) and cognitive empathy (9 items), answered on a five-point scale ranging from "strongly disagree" (1) to "strongly agree" (5). Three scores can be obtained: cognitive, affective and global empathy. The bi-dimensional model was confirmed for the BES original version, and found to be invariant across gender (Jolliffe & Farrington, 2006).

The Portuguese version of the Peer Conflict Scale (PCS; Vagos, Rijo, Santos & Marsee, 2014) is a 40-item scale using a 1 (has very little to do with me) to 4 (has everything to do with me) point rating scale, assessing four aggressive behaviors' categories: Overt Proactive (α = .93), Overt Reactive (α = .93), Relational Proactive (α = .93) and Relational Reactive (α = .90). It has shown to possess excellent internal consistency levels in previous samples as well as in these study samples.

The Portuguese version of the Social Skills Questionnaire (SSQ; Mota, Lemos & Matos, 2005) is a 39-item scale assessing the frequency (0 = never to 2 = often) and importance (0 = not important to 2 = indispensable) of four dimensions of social skills. These achieved acceptable internal consistency values in this sample: cooperation (frequency α = .66; importance α = .73), assertiveness (frequency α = .63; importance α = .70), empathy (frequency α = .79; importance α = .82) and self-control (frequency α = .73; importance α = .73).

Procedures

The Portuguese version of the BES was translated following Behling and Law (2000) recommendations (cf. table 2) and subsequently applied in 10 selected schools based on their geographic placement (i.e., centre region of Portugal) and availability. Classes were then randomly chosen by the schools, after which parental consent was obtained for each student. No information was provided to the researchers on families who refused participation, so as to preserve their identity. Participants were instructed to answer all items and were assured of the anonymity of their responses. The self-report measures were presented in counterbalanced order.

[Insert Table 2]

Data analyses were conducted using MPlus v6.0 (Muthén & Muthén, 2010). First, confirmatory factor analysis (CFA) was used to test the two-factor measurement model of the BES. This model was then tested for measurement invariance, across gender and age groups. First, configural invariance was considered, followed by metric invariance, and lastly scalar invariance. Latent means were subsequently used for group comparison (Dimitrov, 2006). A unit loading constraint on the 1st item of each factor was used for scaling purposes and a reference group methodology was used for group comparison. Once the data were found to be not multivariate normal (Mardias' coefficient = 8098.65, p<.001), a robust *Weighted Least Squares* estimator was used. Reference values for overall adjustment were RMSEA≤.07 combined with CFI≥.92 (Hair Jr., Black, Babin, & Anderson, 2005). Six participants (0.58%of the complete sample) were excluded from the sample due to missing responses and were not considered in any data analyses; no patterns for missing data were evident. The ordinal alpha was taken as indicative of acceptable internal consistency when higher than .70 (Gadermann, Guhn, Zumbo, & Columbia, 2012), and was computed using R (R Development Core Team, 2015).

Results

Several steps (cf. supplementary material) were undertaken for establishing a factorial solution that simultaneously 1) achieved statistical acceptability, 2) made theoretical sense, and 3) corresponded with previous cross-cultural studies by addressing the same constructs evaluated by previous adaptations of the BES. A 16-item two-factor solution measurement model served these criteria (Table 3 and Table 4); both factors achieved very good internal consistency values ($\alpha = .80$ for affective empathy and $\alpha = .85$ for cognitive empathy).

[Insert Table 3]

[Insert Table 4]

This measurement model fitted well to the male sample, after allowing the residuals from item 17 to correlate with the residuals from items 2 and 11, and very well to the female sample (Table 3 and Table 4). Full metric invariance ($\Delta\chi^2$=12.36, *df*=14, *p*=0.58) and partial scalar invariance ($\Delta\chi^2$= 21.53, *df*=14, *p*=0.088) were achieved, after allowing the threshold of the first response option for items 11 and 13 to vary across gender. Considering boys as the reference group, we found that girls scored higher than boys on affective empathy (latent mean for girls = .91, $p < .001$) and cognitive empathy (latent mean for girls = .52, $p < .001$). The same measurement model fitted well for the mid and late adolescence samples (Table 3 and Table 4). Partial metric invariance was achieved ($\Delta\chi^2$=16.91, *df*=13, p=0.20), with the loading for item 6 being variant; full scalar invariance was subsequently achieved ($\Delta\chi^2$=19.09, *df*=16, p=0.32). Taking mid-adolescents as the reference group, mid-adolescents scored significantly higher than late adolescents on cognitiveempathy (latent mean for late adolescents = -253, p = .004). Supplementary material presents descriptive measures for this measurement models.

The validity of the BES in relation to other measures was based on a structural equation model; the impact of common method variance was investigated using Harman's single-factor test (cf. supplementary material). Cognitive and affective empathy were significantly and positively correlated with measures of social skills and significantly and negatively correlated with measures of aggression (Table 5). In addition, a significant positive correlation value was found between the measures of affective and cognitive empathy ($r = .628$, $p < .001$)

[Insert Table 5]

Discussion

The original bi-factorial measurement model was replicated using a large community sample of adolescents, addressing homogeneous and consistent constructs, similar to the original and the other language versions of this instrument. Still, four items had to be removed from the Portuguese version of the BES in order to achieve an acceptable two-factor measurement model. These items seemed not to be representative of the intended constructs (i.e., items 4 and 15), or sufficient to discriminate between them (i.e., items 5 and 19). Although the neurodevelopment of empathy includes both affective and cognitive components, these interact in order to regulate empathic manifestations (Decety, 2010). In adolescence, these components are not yet fully developed, probably being more dependent on each other, which might explain the strong correlation between the two factors of the BES.

There was evidence for the validity of the newly developed measure of empathy. Specifically, higher levels of empathy were associated with higher levels of social competence. It is known that empathy is associated with cooperative resolution of conflicts (Garaigordobil & Maganto, 2011), and that it can function as a moderator of the negative effects of assertiveness (Kern, 1982). Alternatively, empathy was

negatively associated with measures of aggression, which is consistent with previous findings (Shechtman, 2002).

In this study, BES structure was invariant across gender (i.e., boys and girls) and age-groups (mid and late adolescents), allowing for valid between-group comparisons. Gender differences in empathy, with girls scoring higher than boys, is a consistent research finding (e.g. D'Ambrosio, Olivier, Didon, & Besche, 2009; Garaigordobil, 2009; Geng, Xia, & Qin, 2012; Jolliffe & Farrington, 2006). While females consistently score higher than males on self-report measures of empathy, recent research based on neuroimaging assessments have shown that this may not accurately reflect reality. Females may be self-reporting empathy in a way that conforms to existing gender stereotypes (Rueckert, 2011). Regarding empathy and age, mid adolescents were more empathic than late adolescents. Recent findings using emotion recognition tasks suggest the opposite, especially for cognitive empathy (Schwenck et al, 2014). These tasks may encompasse other demanding competences, namely perspective taking, more accessible to older adolescents, which may have hindered younger participants' performance. In this self-report study, younger adolescents might have been influenced by their stronger peer orientation.

The Portuguese version of the Basic Empathy Scale was found to be a parsimonious and valid measure of cognitive and affective empathy with adolescents ranging from 12 to 18 years old, strenghtening its use in Portugal beyond detained juveniles (Pechorro et al., 2015). The convergence of the factor structure with those of other international versions of this instrument could enable more transcultural studies of empathy. This could assist in furthering our understanding of the universal factors that sustain the development of empathy and the particular factors that culturally promote it.

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Table 1: Gender, schooling and age group characteristics of the complete sample and subsample

	Complete Sample		Subsample	
	n	%	n	%
Gender				
Male	489	47.8	218	48.6
Female	534	52.2	231	51.4
School year				
7th grade	321	31.4	58	12.9
8th grade	233	22.8	60	13.4
9th grade	233	22.8	140	31.2
10th grade	99	9.7	68	15.1
11th grade	84	8.2	78	17.4
12th grade	53	5.2	45	10.0
Developmental groups				
Mid adolescents	699	68.3	158	35.2
Late adolescents	324	31.7	291	64.8

Contrasting with national statistics (Direção-Geral de Estatísticas da Educação e Ciência, 2015), a similar proportion of girls and boys are represented in the current sample (national statistics = 48.23% of 7th through 9th grade students and 49.3% of 10th through 12th grade students are male). Also, a similar distribution of students attending the 7th through 9th grades versus the 10th through 12th grades is depicted in the current sample, with national statistics reporting more students attending the former than the last. Finally, the normal age range for students attending the 7th through 12th grades is 12 to 18 years old, which is again in line with the age range of the current sample.

Table 2: Example of Items of the original and Portuguese versions of the BES

It 2	A	After being with a friend who is sad about something, I usually feel sad (O) I usually feel sad every time I'm with a friend who is sad about something (R) *Sempre que estou com um amigo que está triste com alguma coisa, a seguir costumo sentir-me triste*
It 8	A	Other people's feelings don't bother me at all (O) Other people's feelings don´t bother me at all (R) *Não me incomodo nada com os sentimentos das outras pessoas*
It 12	C	I can often understand how people are feeling even before they tell me (O) I can often understand how people are feeling even before they tell me (R) *Habitualmente consigo perceber como as pessoas se estão a sentir, mesmo antes de elas me dizerem*
It 16	C	I can usually realize quickly when a friend is angry(O) I usually realize when a friend is angry (R) *Habitualmente percebo logo quando um amigo está zangado*

Note: It = Item; A = Affective; C = Cognitive; O=Original item; R= retroversion of the item

Table 3: Fit Indicators taken from CFA and invariance analyses

	X^2	df	RMSEA	CI for RMSEA	CFI	WRMR
Complete sample						
16-item two-factor model	552.59	103	0.065	0.060; 0.071	0.941	1.564
Gender invariance						
Male participants	341.61	101	0.070	0.062; 0.078	0.922	1.278
Female participants	273.84	103	0.056	0.048; 0.064	0.948	1.113
M0: Baseline model	744.79	236	0.065	0.060; 0.070	0.920	1.899
M1: Loading invariance	712.28	250	0.060	0.055; 0.064	0.927	1.926
M2: Loading and threshold invariance	729.65	266	0.058	0.053; 0.063	0.927	1.989
M2P: Loading and threshold partial invariance	711.94	264	0.058	0.053; 0.063	0.930	1.954
Age-groups invariance						
Mid adolescents	394.15	103	0.064	0.057; 0.070	0.943	1.330
Late adolescents	245.97	103	0.065	0.055; 0.076	0.942	1.053
M0: Baseline model	693.72	234	0.062	0.056; 0.067	0.936	1.770
M1: Loading invariance	683.55	250	0.058	0.053; 0.063	0.939	1.844
M1P: Loading partial invariance	669.83	249	0.057	0.052; 0.063	0.941	1.813
M2: Loading partial invariance and threshold full invariance	661.07	265	0.054	0.049; 0.059	0.945	1.839

Note: All $\chi 2$ statistics were significant at $p < .001$. RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval, CFI = Comparative Fit Index; WRMR = Weighted Root Mean Square Residual

Table 4: Loading values for the complete sample, by gender and by age-groups

		Complete Sample	Gender		Age groups	
			Male	Female	Mid-adolescents	Late adolescents
Affective Empathy						
1	My friend's emotions don't affect me much.	.46	.39	.48	.48	.43
2	After being with a friend who is sad about something, I usually feel sad.	.52	.41	.52	.55	.46
7	I don't become sad when I see other people crying.	.64	.64	.58	.64	.64
8	Other people's feelings don't bother me at all.	.74	.73	.74	.71	.79
11	I often become sad when watching sad things on TV or in films.	.47	.34	.38	.49	.45
13	Seeing a person who has been angered has no effect on my feelings.	.53	.55	.47	.55	.46
17	I often get swept up in my friend's feelings.	.48	.34	.47	.51	.45
18	My friend's unhappiness doesn't make me feel anything.	.78	.75	.74	.77	.77
Cognitive Empathy						
3	I can understand my friend's happiness when she/he does well at something.	.61	.60	.59	.59	.62
6	I find it hard to know when my friends are frightened.	.43	.42	.42	.33	.63
9	When someone is feeling 'down' I can usually understand how they feel.	.65	.61	.65	.64	.66
10	I can usually work out when my friends are scared.	.69	.69	.71	.69	.69
12	I can often understand how people are feeling even before they tell me.	.67	.66	.66	.70	.60
14	I can usually work out when people are cheerful.	.72.	.68	.74	.71	.74
16	I can usually realise quickly when a friend is angry.	74	.77	.71	.72.	.79
20	I have trouble figuring out when my friends are happy.	68	.65	.66	66	.71

Note: All loading values were significant at $p < .001$.

Table 5: Correlation values between measures from the Basic Empathy Scale, the Social Skills Questionnaire and the Peer Conflict Scale

	Affective empathy	Cognitive empathy
Social Skills Questionnaire		
Frequency		
Cooperation	.294***	.299***
Assertiveness	.127*	.342***
Empathy	.624***	.553***
Self-control	.062 ns	.097 ns
Importance		
Cooperation	.349***	.339***
Assertiveness	.233***	.263***
Empathy	.580***	.458***
Self-control	.294***	.263***
Peer Conflict Scale		
Over proactive aggression	-.333***	-.302***
Relational proactive aggression	-.336***	-.358***
Overt reactive aggression	-.201***	-.139**
Relational reactive aggression	-.247***	-.320***

*** p < .001, ** p < .05, * p < .01 ns, non-significant