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Validity Studies of the Online Empathy Questionnaire

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Abstract

The present study's objective was to examine the validity of the Online Empathy Questionnaire (QoE – initials in Portuguese), whose purpose is to evaluate empathy via three factors: emotional, cognitive and compassionate empathy. The study enjoyed the participation of 4801 individuals, 56.8% of whom were females, with a mean age of 27.73 years ($SD = 7.89$). The participants answered the QoE first; and the remaining 11 instruments (e.g., quality of life, personality and intelligence), on a rotating basis. The QoE scores exhibited strong positive correlations with measures of agreeableness and strong negative correlations with the Dark Triad and social isolation; moderate correlations with measures of emotional dysregulation (positively for emotional empathy and negatively for the others), quality of life and life satisfaction (positively); and practically null correlations with measures of intelligence. Reliability rates were moderate to good, with test-retest stability. Women exhibited means that were moderately higher than those of men. The results we obtained corroborated theoretical expectations. We believe the results exhibit construct, criterion and discriminant validity evidence for the QoE.

Keywords: Empathy, personality, intelligence, test validity.

Estudos de Validade do Questionário *Online* de Empatia

Resumo

Esta pesquisa teve como objetivo estudar a validade do Questionário *Online* de Empatia (QoE), que se propõe a avaliar empatia por meio de três fatores: empatia afetiva, cognitiva e compassiva. Participaram 4801 pessoas, sendo 56,8% do sexo feminino, com idade média 27,73 ($DP = 7,89$). De maneira espi-

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ralada, os participantes responderam ao QoE e 11 instrumentos (como qualidade de vida, personalidade e inteligência). Os escores do QoE apresentaram correlações fortes com medidas de agradabilidade (positivamente), tríade sombria e isolamento social (negativamente); correlações brandas com medidas de desregulação emocional (positivamente para empatia afetiva, negativamente para as outras), qualidade de vida e satisfação de vida (positivamente); e correlações próximas de nulo com medidas de inteligência. Os índices de precisão foram moderados a bons, com estabilidade de reteste. Mulheres apresentaram médias moderadamente mais altas que homens. Os resultados encontrados corroboraram as expectativas teóricas. Considera-se que os resultados demonstraram evidências de validade de construto, critério e discriminante para o QoE.

Palavras-chave: Empatia, personalidade, inteligência, validade do teste.

Estudios de Validez del Cuestionario *Online* de Empatía

Resumen

Esta investigación tuvo como objetivo estudiar la validez del Cuestionario *Online* de Empatía (QoE), que se propone evaluar empatía por medio de tres factores: empatía afectiva, cognitiva y compasiva. Participaron 4801 personas, siendo 56,8% del sexo femenino, con edad media 27,73 ($DE = 7.89$). De manera espiral, los participantes respondieron al QoE y 11 instrumentos (como calidad de vida, personalidad e inteligencia). Los escores del QoE presentaron correlaciones fuertes con medidas de agradabilidad (positivamente), tríada sombría y aislamiento social (negativamente); correlaciones blandas con medidas de desregulación emocional (positivamente para empatía afectiva, negativamente para las otras), calidad de vida y satisfacción de vida (positivamente); y correlaciones cercanas de nulo con medidas de inteligencia. Los índices de precisión fueron moderados a buenos, con estabilidad de retest. Las mujeres presentaron medias moderadamente más altas que los hombres. Los resultados encontrados corroboraron las expectativas teóricas. Se considera que los resultados demostraron evidencias de validez de constructo, criterio y discriminante para el QoE.

Palabras clave: Empatía, personalidad, inteligencia, validación de test.

Empathy is defined as the ability to comprehend other people's emotional states and to experience the same emotions they do, manifesting this ability in a way in which such people feel as though they are understood. Empathy is thus an important aspect of social interactions (Decety & Cowell, 2014; Eres, Decety, Louis, & Molenberghs, 2015; Falcone et al., 2008). Traditionally (Bloom, 2017; Decety & Cowell, 2014; Grünh, Rebucal, Diehl, Lumley, & Labouvie-Vief, 2008; Vachon & Lynam, 2016), the construct is subdivided into two processes: cognitive and emotional. Cognitive empathy means rationally comprehending other individuals' feelings, motives and intentions, without necessarily experiencing the same sentiments. Meanwhile, emotional empathy, also known as emotional contagion, refers to experiencing the same emotions that other individuals are experi-

encing, such as feeling sad when another person is sad. More recently, and thus less frequently, a third component of empathy has been identified, known as prosociability or compassion, which denotes the desire to help prevent unpleasant events from happening to other people (Bloom, 2017).

Studies have demonstrated that empathy is associated with various psychological aspects, such as personality traits (i.e., emotional and behavioral characteristics that are common in various contexts and are relatively stable; McCrae & Costa, 1997). In this respect, it is usually associated with agreeableness (also translated in Brazil as socialization), with correlation magnitudes (r) ranging between .24 and .48 (Iacovella, Díaz-Lázaro, & Richards, 2015; Magalhães, Costa, & Costa, 2012; Song & Shi, 2017), indicating that it is related to greater

concern over the quality of social interactions and prosociability. There are also studies examining the relationship between empathy and loneliness, the latter being considered a stable, lasting aspect of social isolation and suffering due to isolation (Barroso, Andrade, Midgett, & Carvalho, 2016). The results exhibit inverse correlations between the constructs, with values ranging from $r = -.41$ to $-.42$ (Beadle, Keady, Brown, Tranel, & Paradiso, 2012; Marilaf Caro, San-Martín, Delgado-Bolton, & Vivanco, 2017).

Also regarding aspects of sociability, dangerous driving is considered a manifestation of aggressive social interaction, involving feelings of anger and frustration aimed at other people and potentially resulting in traffic accidents (Willemsen, Dula, Declercq, & Verhaeghe, 2008). We did not come across studies that directly associate dangerous driving with empathy, but rather with traits that are similar to empathy, such as agreeableness, altruism and sincerity, with negative correlations ($r = -.25$ to $-.57$) between such constructs (Bartholomeu, 2008; Correia, 2014; Lucidi, Mallia, Lazuras, & Violani, 2014). Accordingly, one may presume that there would also be a negative correlation between dangerous driving and empathy. Last but not least, the Dark Triad is a construct that describes antisocial personality traits, which refer to the antagonistic and manipulative behaviors of individuals who consider themselves superior. Studies (Jonason & Krause, 2013; Vachon & Lynam, 2016) have shown that the Dark Triad is negatively correlated with empathy ($r = -.14$ a $-.44$).

While aspects of sociability appear to be more closely associated with empathy, other psychological characteristics exhibit less significant correlations, such as quality of life (i.e., individual perception of well-being and life satisfaction). In a Brazilian study, upon associating quality of life with empathy in medical students, Paro et al. (2014) discovered significant yet weak correlations between the two constructs ($r = .1$ to $.2$; they reported the first decimal place alone). In a survey of 140 caregivers of senior citizens in the United States, Lee, Brennan and Daly (2001) found that caregivers with a high

degree of cognitive empathy reported greater life satisfaction ($r = .17$). On the other hand, emotional empathy was a predictor of less life satisfaction ($\beta = -.23$), giving rise to the hypothesis that caregivers find it difficult to detach themselves from the problems existing in such a context. Along the same lines, other studies also discovered a positive correlation between cognitive empathy and emotion regulation ($r = .25$ to $.28$), whereas emotional empathy exhibited a negative correlation with emotion regulation ($r = -.28$), implying that emotional contagion is weakly correlated with lesser efficacy for emotional control (Eisenberg et al., 1994; Miguel, Giromini, Colombarolli, Zuanazzi, & Zennaro, 2017). Alexithymia is another facet of experiencing emotions, and it refers to the difficulty to experience and process emotional states. Several studies have also identified weaker correlations ($r = -.12$ to $-.37$) with empathy (Colombarolli, Zuanazzi, Miguel, & Giromini, in press; Grynberg, Luminet, Corneille, Grèzes, & Berthoz, 2010).

In the literature on the subject, there is also evidence of discriminant validity for the empathy construct, such as general intelligence (i.e., the ability to employ abstract reasoning for the purpose of adaptively solving problems that arise in the environment; Primi & Almeida, 2000). In studies analyzing the relationship between general intelligence and empathy, the observed correlations tend to be practically null (Alloway et al., 2016; Grühn et al., 2008), indicating a minimal relationship with this cognitive ability.

Furthermore, with respect to sociodemographic characteristics, women tend to exhibit higher levels of empathy than men do (Sampaio, Guimarães, Camino, Formiga, & Menezes, 2011). In relation to age, the studies show that empathy develops during childhood and adolescence, reaching stability as of young adulthood. Hence, by the age of approximately 18 years, the correlations between empathy and age tend to be insignificant, with values ranging from $r = -.17$ to $.01$ (Grühn et al., 2008; Pinho, Fernandes, & Falcone, 2011).

Despite the construct's importance to comprehending the quality of social interaction,

few instruments adapted for Brazil are currently available for assessing empathy: The Empathy Inventory (Falcone et al., 2008), the translated version of the Interpersonal Reactivity Index (Sampaio et al., 2011) and the Online Empathy Questionnaire (QoE; Miguel, 2017) are the only ones that presented psychometric studies. Nonetheless, up to the present moment none of these three tests has been approved for professional use by Brazil's Federal Psychology Council. Their use is thus limited to research contexts alone. Of the three, only the QoE was developed for the digital format, featuring online application. Computerized psychological tests offer those who administer them various advantages, such as speedy calculations, lack of human error in calculations, automatic verification of blank items or items with more than one option checked, and multimedia resources, among various others (Joly & Noronha, 2006). Nevertheless, there is only one study of the QoE's factor structure, whereby three factors were identified, named (Responsiveness, Respect and Availability), and associated with emotional, cognitive and compassionate empathy, respectively. The present study's aim was to assess the QoE's validity, examining its relationship with other constructs and seeking to increase the list of instruments available for assessing empathy, especially computerized versions. Bearing in mind the literature we examined, we developed the following hypotheses: h1 (similar constructs), the QoE would be more strongly correlated with measures of prosociability (positively with agreeableness and negatively with the Dark Triad, aggressiveness, dangerous driving and social isolation); h2 (related constructs), weakly correlated with measures of life satisfaction (satisfaction, quality of life, and the experiencing of positive and negative affects) and with measures of experiencing emotions (emotion regulation and alexithymia); h3 (discriminant constructs), practically null correlations with measures of intelligence (abstract and verbal reasoning) and with age; and h4 (criterion), women would exhibit a mean score higher than that of men. Furthermore, the reliability of the

overall scale and of the three factors was also examined.

Method

Participants

The present study enjoyed the participation of 4801 individuals between the ages of 18 and 50 years ($M = 27.73$; $SD = 7.89$), most (2725, 56.8%) of whom were women. With respect to schooling, 162 (3.4%) had completed elementary and middle school; 1638 (34.1%), high school; 2362 (49.2%), undergraduate programs; and 638 (13.3%), graduate programs. Regarding regions of Brazil, 343 (7.1%) were from the North; 1191 (24.8%), the Northeast; 472 (9.8%), the Midwest; 1908 (39.7%), the Southeast; and 887 (18.5%), the South.

Instruments

Online Empathy Questionnaire (QoE). The QoE (initials in Portuguese) was developed for application in an online, computerized environment, featuring 23 statements to be rated by the examinee according to a Likert scale (1 = "Never"; 5 = "Always"). The QoE exhibited a three-factor structure (Miguel, 2017): Responsiveness, which is made up of 9 items related to the emotional component of empathy (e.g., "I cry during movies/TV series"); Respect, consisting of 8 items associated with the cognitive component of empathy, including respect for differences (e.g., "I engage in heated arguments with other people because we have different opinions," which is scored inversely); and Availability, which is composed of 6 items pertaining to the compassion component (e.g., "I help others").

Personality Factor Battery (BFP). The Personality Factor Battery (BFP; initials in Portuguese for "Bateria Fatorial de Personalidade") is a self-report instrument for personality assessment based on the five-factor model (Nunes, Hutz, & Nunes, 2010). The scale consists of 126 items that are rated according to a 7-point Likert scale. For the present study, we employed the Socialization factor alone, which refers to en-

agement in prosocial and altruistic behaviors, involving kindness and trust in people. In the present sample, the Socialization factor's reliability was .85.

Dirty Dozen (D-12). The D-12 assesses the Dark Triad (i.e., negative personality traits such as narcissism, psychopathy and Machiavellianism). It consists of 12 phrases that are rated according to a 5-point Likert scale. The scale was translated and adapted for Brazil by Hauck, Carvalho, and Jonason (2015). In the present sample, its reliability was .84.

Dula Dangerous Driving Index (DDDI). The DDDI assesses dangerous driving tendencies in traffic, such as feeling irritated and driving aggressively (Willemsen et al., 2008). It is made up of 28 statements that are rated according to a 5-point Likert scale. Since no prior studies of this scale were found in Brazil, the DDDI was translated according to the translation/back-translation method suggested by the literature (Borsa, Damásio, & Bandeira, 2012). In the present sample, its reliability was .93.

Dimensional Clinical Personality Inventory – version 2 (IDCP-2). The IDCP-2 (initials in Portuguese) assesses pathological personality traits via 12 scales encompassing 210 items that are rated according to a 4-point Likert scale (Carvalho & Primi, in press). For the purposes of the present study, we employed the scales of Aggressiveness (hostile and authoritative behaviors and thoughts) and Isolation (irritability toward people and a tendency toward not interacting socially). In the present sample, the reliability was .89 for Aggressiveness and .90 for Isolation.

UCLA Loneliness Scale – Brazilian Version (UCLA-BR). The UCLA-BR is a 20-item, self-report scale that measures an individual's experience of negative facets of loneliness, such as feelings of sadness and emptiness. The scale's Brazilian version was researched and adapted by Barroso et al. (2016). In the present sample, its reliability was .93.

Positive and Negative Affect Schedule (PANAS). The PANAS assesses an individual's recent frequency of experiencing positive and negative emotions via 10 items that are rated

on a 5-point Likert scale. It was translated and adapted for Brazil by Zanon, Bastianello, Pacico, and Hutz (2013). In the present sample, the reliability of the positive affect scale was .78 and of the negative affect scale was .84.

Satisfaction With Life Scale (ESV). The ESV (initials in Portuguese for the Brazilian version of Pavot and Diener's SWLS) assesses an individual's overall level of satisfaction and contentment with life via 5 items that are rated according to a 7-point Likert scale. It was translated and adapted for Brazil by Zanon, Bardagi, Layouts, and Hutz (2014). In the present sample, its reliability was .86.

Quality-of-Life (WHOQOL). The WHOQOL instrument was developed by the World Health Organization for the purpose of assessing quality of life in different contexts. The brief version of the instrument (WHOQOL-BREF) consists of 26 statements that are rated according to a 5-point Likert scale. It was adapted for Brazil by Fleck et al. (2000). For the present study, we employed two of the instrument's four domains (scales) related to quality of life: psychological health and social relationships, whose reliability was .79 and .72, respectively.

Difficulties in Emotion Regulation Scale (DERS). The DERS is a self-report instrument that assesses problems related to emotion regulation, such as non-acceptance of emotional responses, limited access to emotion regulation strategies, impulse control difficulties, and lack of emotional awareness. The present study employed the 16-item version, which was researched and adapted to the Brazilian context by Miguel et al. (2017). In the present sample, the reliability of the DERS total score was .92.

Toronto Alexithymia Scale (TAS-20). The TAS-20 measures alexithymia (i.e., the inability to comprehend one's own emotions and to employ symbolic thought). It consists of 20 items that are rated according to a 5-point Likert scale. Colombarolli et al. (in press) adapted the TAS-20 and studied the validity of the Brazilian version. In the present sample, its reliability was .83.

Reasoning Tests Battery (BPR-5). The BPR-5 (initials in Portuguese) consists of five

tests for assessing general cognitive functioning and specific reasoning abilities (Primi & Almeida, 2000). For the present study, we employed the abstract reasoning test (AR) and the verbal reasoning test (VR), both of which are measures of fluid intelligence, that is, the ability to employ abstract reasoning using, respectively, images of which one has little prior knowledge (AR) or words (VR). In the present sample, the reliability of the AR was .81 and of the VR was .66.

Data Collection Procedures

Invitations to participate in the survey were sent out via social networking websites, providing our link for those interested. In accordance with recommended international standards for computerized tests (International Test Commission, 2005), an informed consent form alone was exhibited initially, and those interested in participating manifested their assent by creating a user name and password to access our system. The tests were then presented. Since there were

a large number of instruments, the QoE was always administered first, while the remaining tests were presented on a rotating basis. Actually, none of the participants took all of the tests: 43.8% took three or more tests (including the QoE); and 18.0%, four or more (including the QoE). As a result of employing this testing method, we hope to have avoided the effects of fatigue and to have reduced Type-I and Type-II statistical errors; nonetheless, the number of participants that took the other tests varied. Table 1 presents the distribution of participants according to the second test taken. We sought to maintain a similar distribution in terms of age and sex. There was greater discrepancy only in the case of the DDDI, whose participants were 68.1% male. In the case of the BFP, the tests were administered to students taking different courses at the State University of Londrina. They were invited via social networking websites, and they answered the QoE online and the printed version of the BFP in person.

Table 1
Distribution of Participants according to the Test Answered

Instrument	Female	Male	Total
BFP	104 (51.7%)	97 (48.3%)	201
D-12	310 (54.0%)	264 (46.0%)	574
DDDI	51 (31.9%)	109 (68.1%)	160
IDCP-2	285 (59.4%)	195 (40.6%)	480
UCLA-BR	271 (52.7%)	243 (47.3%)	514
ESV & PANAS	374 (60.5%)	244 (39.5%)	618
WHOQOL	233 (49.2%)	241 (50.8%)	474
DERS	288 (52.2%)	288 (47.8%)	602
TAS-20	335 (61.1%)	213 (38.9%)	548
RA	259 (54.8%)	214 (45.2%)	473
RV	320 (52.2%)	293 (57.8%)	613
QoE Retest	25 (52.1%)	23 (47.9%)	48

Data Analysis Procedures

The tests were scored according to the instructions of their respective manuals or

publications. The QoE scores were transformed into z-scores based on the distribution of the participants. Mean differences between the

sexes were checked using Cohen's d in order to calculate the effect size. Values around .20 were considered small; around .50, medium; and around .80, large (Cohen, 1992). The scores for the three factors and the overall score were associated with the other tests by way of the Pearson correlation, aiming at checking the degree of correlation between the constructs. Correlation values around .10 were considered weak; around .30, moderate; and around .50, strong (Cohen, 1992; Hemphill, 2003). Two methods for determining test reliability were employed: Cronbach's alpha and test-retest. As recommended by the literature (Peterson, 1994), alpha values less than .60 were considered undesirable; between .60 and .70, acceptable; and over .70, desirable. For the retest, 48 participants answered the QoE a second time after an average interval of 70 days. Distribution by sex (shown in Table 1), age and schooling tended to be similar to that of the general sample. Cohen's d was also employed to check the size of the difference between the two tests.

Ethical Procedures

The present study was approved by the State University of Londrina Research Ethics Committee (CAAE no. 64469717.6.0000.5231; ruling no. 1.934.599). It complied with all ethical procedures, in accordance with resolution no. 510/2016 of Brazil's National Health Council.

Results

The descriptive statistics of the instruments employed in the present study are exhibited in Table 2. The scores for the three factors and the overall score of the QoE displayed a mean of 0.00 and a standard deviation of 1.00 because they were transformed into z-scores. With respect to the tests that enjoy Brazilian standardization (i.e., AR, VR, BFP, DERS, IDCP-2 and TAS-20), the present study's sample tended to exhibit means close to those anticipated, with the only exception being the BFP's Socialization factor, for which the participants exhibited moderately lower means ($d = .54$). Nonetheless, in

Table 2
Descriptive Statistics of the Tests that were Correlated with QoE

Score	Mean	Standard deviation	Minimum	Maximum
BFP Socialization ($n = 201$)	4.89	0.82	2.32	6.46
D-12 ($n = 574$)	25.75	8.94	12	60
DDDI ($n = 160$)	51.41	17.04	28	118
IDCP-2 Aggressiveness ($n = 480$)	1.93	0.60	1.00	3.94
IDCP-2 Isolation ($n = 480$)	2.10	0.59	1.00	3.94
UCLA-BR ($n = 514$)	25.94	13.76	0	60
ESV ($n = 618$)	18.12	7.22	5	35
WHOQOL Psychological ($n = 474$)	19.93	4.39	8	30
WHOQOL Social ($n = 474$)	9.54	2.68	3	15
PANAS Positive ($n = 618$)	31.00	6.61	13	50
PANAS Negative ($n = 618$)	25.85	7.59	10	50
DERS ($n = 602$)	46.09	15.25	16	80
TAS-20 ($n = 548$)	53.56	13.16	23	86
RA ($n = 473$)	18.56	4.17	4	25
RV ($n = 613$)	17.92	3.30	4	25

all of the tests the values of the responses tended to range between the minimum and maximum possible scores.

Calculated via Cronbach's alpha, the test reliability values were the following: .84 for Factor 1; .73 for Factor 2; .69 for Factor 3; and .82 for the overall score. Furthermore, temporal stability was checked by way of retesting a 48-person sample. The means for the first test were as follows: -.13 ($SD = 1.08$) for Factor 1; .23 ($SD = 1.03$) for Factor 2; -.10 ($SD = 0.99$) for Factor 3; and -.01 ($SD = 1.01$) for the global factor. The retest means were the following: -.12 (SD

= 1.06) for Factor 1; -.03 ($SD = 1.06$) for Factor 2; -.20 ($SD = 1.00$) for Factor 3; and -.15 ($DP = 1.06$) for the global factor. The test-retest mean differences were as follows: $d = -.01$ for Factor 1; $d = .25$ for Factor 2; $d = .10$ for Factor 3; and $d = .14$ for the global factor.

Aiming at assessing hypotheses h1, h2 and h3, we checked the Pearson correlations between the three QoE scores and the other tests. The results are exhibited in Table 3. On average, the correlation values are higher for the tests of sociability, which are related to h1, while those for the tests of h2 are lower. With respect to h3, the values are practically zero.

Table 3
Pearson Correlations between QoE and Other Variables

	QoE 1	QoE 2	QoE 3	QoE Total
h1 (similar constructs)				
BFP Socialization ($n = 201$)	0.63***	0.47***	0.42***	0.71***
D-12 ($n = 574$)	-0.24***	-0.45***	-0.18***	-0.41***
DDDI ($n = 160$)	-0.23**	-0.50***	-0.28***	-0.47***
IDCP-2 Aggressiveness ($n = 480$)	-0.38***	-0.58***	-0.33***	-0.58***
IDCP-2 Isolation ($n = 480$)	-0.37***	-0.24***	-0.41***	-0.45***
UCLA-BR ($n = 514$)	-0.08	-0.17***	-0.31***	-0.22***
h2 (related constructs)				
ESV ($n = 618$)	0.17***	0.13**	0.22***	0.24***
WHOQOL Psychological ($n = 474$)	0.01	0.14**	0.30***	0.16***
WHOQOL Social ($n = 474$)	0.10*	0.18***	0.34***	0.24***
PANAS Positive ($n = 618$)	0.12**	-0.00	0.40***	0.20***
PANAS Negative ($n = 618$)	0.07	-0.21***	-0.19***	-0.12**
DERS ($n = 602$)	0.23***	-0.19***	-0.25***	-0.03
TAS-20 ($n = 548$)	-0.13**	-0.24***	-0.34***	-0.30***
h3 (discriminant constructs)				
RA ($n = 473$)	-0.16**	0.01	-0.07	-0.11*
RV ($n = 613$)	0.01	0.00	-0.01	0.00
Age ($n = 4801$)	0.15***	0.04**	0.03	0.12***

* $p < .05$; ** $p < .01$; *** $p < .001$.

In order to assess h4, we checked the sizes of the differences between the QoE mean scores of men and women. We obtained the following re-

sults: $d = .72$ for Factor 1; $d = .27$ for Factor 2; $d = .13$ for Factor 3; and $d = .60$ for the overall score.

Discussion

The present study displayed the results of psychometric analyses of the Online Empathy Questionnaire (QoE). Based on the prior literature, we developed hypotheses, which, on the whole, were confirmed. An initial, general observation to be derived from the analyses relates to the multifaceted nature of empathy. Various studies focusing on instruments for assessing empathy present a structure of more than one factor (Alloway et al., 2016; Bloom, 2017; Falcone et al., 2008; Sampaio et al., 2011), which is likewise the case of the QoE. Upon examining the results as to the QoE's correlations with the other instruments, one perceives that certain aspects of empathy can be more closely associated with other characteristics of life. For example, experiencing feelings of loneliness (UCLA-BR) exhibited practically no correlation with Responsiveness (emotional contagion component of empathy), whereas it did display a moderately negative correlation with Availability (compassion component of empathy). Such results imply that, instead of merely interpreting empathy in terms of the overall score, a more in-depth interpretation of empathy could provide more information as to the nature of people's experiences.

With respect to hypothesis h1, according to which empathy would be related to measures of sociability, we identified positive correlations with socialization/agreeableness (BFP) and negative correlations with the Dark Triad (D-12), dangerous driving (DDDI), aggressiveness and isolation (IDCP-2), and feelings of loneliness (UCLA-BR). As hypothesized, both the overall score and the factors of the QoE exhibited strong correlations with carefulness in interactions with other people (i.e., concern over being pleasant and paying greater attention to how we treat others), an aspect that describes the empathy construct itself (Decety & Cowell, 2014; Eres et al., 2015; Falcone et al., 2008). Similarly, the QoE scores were negatively correlated with traits that are considered antisocial. More specifically, the Respect factor of the QoE was more strongly correlated with such experiences, indicating

that less ability to cognitively comprehend what other people are thinking and feeling is strongly associated with evil desires, desires involving hostility toward and manipulation of other individuals, thus confirming prior studies (Jonason & Krause, 2013; Vachon & Lynam, 2016). Hence, the present study's results corroborate the notion that empathy is associated with attention to other people's needs, resulting in a more adaptive, positive form of social interaction. It is thus an important construct to be assessed when one seeks to understand the nature of an individual's social interaction. Moreover, we perceived that the existence of a third factor of empathy (compassionate empathy) contributed to explaining more aspects of sociability. Although this factor's correlations with socialization and the Dark Triad were weaker than those of the other two factors, its correlations with isolation and loneliness were stronger. Accordingly, the inclusion of compassion in the empathy construct resulted in incremental validity (i.e., a greater possibility of interpreting aspects of socialization) beyond the emotional and cognitive empathy factors.

What is especially interesting is the high value of the (negative) correlation between dangerous driving in traffic (a trait associated with disrespect for social norms) and the Respect factor, indicating that lack of attention to others' needs is also associated with imprudent driving behaviors. Earlier studies of empathy-related constructs, such as agreeableness, altruism and sincerity, also revealed negative correlations with aggressive and hazardous driving behaviors (Bartholomeu, 2008; Correia, 2014; Lucidi et al., 2014). Such a result could be beneficial to traffic psychology, for the current driving test does not require an assessment of empathy (*Conselho Federal de Psicologia*, 2009).

Also regarding correlations with aspects of sociability, and as aforementioned, the Availability factor of the QoE was found to be more strongly associated (negatively) with feelings of loneliness and social isolation. Such a correlational finding does not permit one to make causal inferences as to the relationship (i.e., whether low empathetic compassion leads to isolation or vice versa). Nonetheless, the results clearly

show that the compassion component of empathy provides a higher level of information than that provided by the other two components that have traditionally been assessed (cognitive and emotional), thus justifying its inclusion in the assessment of the construct.

We also elaborated hypothesis h2, according to which the QoE would be correlated more weakly with related constructs, such as maturity of the emotional experience (DERS and TAS-20) and quality of life (PANAS, ESV and WHOQOL). Most of our hypotheses were confirmed, although some values were higher or lower depending on the factor. For example, being available to other people proved to be strongly associated with experiencing positive feelings, whereas Respect did not exhibit a correlation with positive feelings. Accordingly, in terms of the overall QoE score, a weaker correlation with the other constructs was confirmed, as was previously observed in other studies (Grynberg et al., 2010; Lee et al., 2001; Paro et al., 2014). Such results make sense from a theoretical standpoint because the constructs are part of a larger group related to emotional experiences, although the psychological process that governs them is distinct. For example, while empathy relates to understanding and experiencing other people's feelings, emotion regulation relates to the ability to employ one's own resources to manage one's experience of positive and negative affects and to control emotional activation. The same differentiation can be observed for life quality/satisfaction and alexithymia. Such constructs' correlation with empathy is thus less evident, although there is a weak correlation between them, indicating that those aspects have at least one characteristic in common. That characteristic could be the level of one's awareness of the emotional experience, that is, being in contact with one's feelings and knowing how to recognize them, which is important to emotion regulation efficacy; and the ability to regulate one's emotions can result in greater life satisfaction and positive affects. Difficulties in relation to such awareness could lead to empathetic experiences that are less frequent, as is demonstrated by the moderate

correlation between the total scores for alexithymia and empathy ($r = -.30$). This is an explanatory hypothesis that needs to be examined in future studies, analyzing the correlations with other aspects of emotional awareness, such as emotional intelligence.

Furthermore, the emotional component of empathy (Responsiveness) proved to be positively correlated with low emotion regulation, suggesting that allowing oneself to be contaminated by other people's emotions is weakly associated with less ability to control one's own emotions. In contrast, the cognitive and compassionate components of empathy proved to be associated with greater emotion regulation. Consequently, the total score for empathy had practically no correlation with emotion regulation. Nonetheless, this statistic should be interpreted at the factor level because the various aspects of empathy do in fact correlate with emotional control, yet in different ways. Moreover, the correlation between emotional empathy and various aspects of emotional dysregulation was previously observed in earlier studies (Eisenberg et al., 1994; Miguel et al., 2017). Although a certain amount of emotional contagion is necessary for the empathetic experience, those studies indicate that, at higher levels, emotional responsiveness could actually be a consequence of difficulties in controlling emotional activation, an aspect that can lead to negative social interactions. In this respect, when assessing the quality of a person's social interactions, one should consider the level of Responsiveness and examine aspects such as emotion regulation as well.

Hypothesis h3 postulated the non-correlation of empathy with age and discriminant constructs. Although there were several significant ones (probably due to the large number $[N]$ of participants), the correlations with age were very low, almost null. This fact is probably related to the research participants' age group (18-50 years). In fact, prior studies indicate that empathy develops during childhood and adolescence, reaching stability by the young adult age (Grühn et al., 2008; Pinho et al., 2011). Accordingly, around 18 years of age, one's level of empathy tends to become stable over the rest

of one's life, which would explain the practically null correlation. Likewise, the correlations with intelligence were also close to zero, confirming the hypothesis. In this sense, the construct that is referred to as intelligence, which is the ability to employ abstract reasoning to solve problems, and empathy appear to be practically independent, indicating very distinct psychological processes.

With respect to hypothesis h4, significant differences between the sexes were observed, especially in relation to the Emotional Responsiveness factor and the overall score, with women exhibiting scores higher than those of men. Such data corroborate earlier studies that indicate that roles that are related to maturity and emotional expressiveness are still attributed to women (Sampaio et al., 2011). In contrast, the differences in relation to the Respect and Availability factors were less significant, suggesting greater uniformity of such characteristics between the sexes.

Finally, we assessed the QoE's reliability. The Cronbach's alpha values were good for the Responsiveness and Availability factors and the overall score, and acceptable for the Respect factor. On the one hand, this result could indicate the need for greater caution when using the scores of the factors. On the other hand, it is well known that the calculation of alpha is influenced by the number of items, making it difficult to establish interpretable cutoff points (Sijtsma, 2009). Accordingly, an alternative information source was test-retest stability, which exhibited very little variance between the tests, confirming the stability of the construct assessed by the QoE.

By and large, validity evidence for the QoE was obtained, demonstrating that the construct under assessment is strongly correlated with various aspects of prosociability (positively with agreeableness; and negatively with the Dark Triad, dangerous driving, aggressiveness and social isolation); weakly correlated with related constructs (positively with quality of life, life satisfaction and emotion regulation; and negatively with alexithymia and negative affects); and practically not correlated with discriminant measures (intelligence and age). Also, it is worth emphasizing that the factors of empathy can be

more related or less related to other psychological aspects. We thus recommend the assessment that takes all of the scores into consideration, aiming at a greater wealth of information.

Nevertheless, several of the study's limitations should be pointed out. Although the sample was relatively large ($N = 4801$), most of the participants only took the QoE and one other test. Consequently, several measures had a limited number of participants (e.g., only 160 took the DDDI). Generalization of results can be more limited with small samples, making it necessary to conduct studies of other samples in order to check the stabilities of the data obtained in the present study. Furthermore, the instruments were mostly administered by computerized means, a fact that could have excluded individuals with little access to IT. Future studies could administer a printed version of the QoE, both to include individuals without access to the web and to examine the difference between the printed and digital formats. Finally, the use of Item Response Theory (IRT) could contribute to a better understanding of the distribution of the QoE's items because, as is common in inventories, certain items tend to be endorsed more frequently, while others, more rarely, implying greater or lesser manifestation of the construct.

Authors' Contributions

Substantial contribution in the concept and design of the study: Fabiano Koich Miguel, Eduardo de Souza Hashimoto, Evilin Roumaine Dutra Santos Gonçalves, Gracielly Terziotti de Oliveira, Thais Distéfano Wiltenburg.

Contribution to data collection: Fabiano Koich Miguel.

Contribution to data analysis and interpretation: Fabiano Koich Miguel, Eduardo de Souza Hashimoto, Evilin Roumaine Dutra Santos Gonçalves, Gracielly Terziotti de Oliveira, Thais Distéfano Wiltenburg.

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Contribution to critical revision, adding intellectual content: Fabiano Koich Miguel, Eduardo de Souza Hashimoto, Evilin Roumaine Dutra Santos Gonçalves, Gracielly Terziotti de Oliveira, Thais Distéfano Wiltenburg.

Conflicts of interest

The authors declare that they have no conflict of interest related to the publication of this manuscript.

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