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The psychometric properties of the Russian version of the Empathy Quotient

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The aim of the work was to develop and prove a Russian version of the Empathy Quotient, a new tool to measure empathy. A sample of 221 volunteers from the general population filled this questionnaire, the Questionnaire Measure of Emotional Empathy and the Quotient of Empathic Abilities. The coefficients of test-retest reliability, internal consistency and validity were high. In a factor analysis three factors were found that correspond to cognitive, emotional and social skills subscales. A short version with seven questions in each subscale was elaborated and it had acceptable psychometric properties as well.

Keywords: empathy, questionnaire, psychometrics, empathy quotient, adaptation

Introduction

Empathy has many definitions. It can be defined as the ability "to perceive the internal frame of reference of another with accuracy and with the emotional components and meanings which pertain thereto as if one were the person, but without ever losing the 'as if' condition" (Rogers, 1975, p. 3) or "our ability to identify what someone else is thinking and feeling, and to respond to their thoughts and feelings with an appropriate emotion" (Baron-Cohen, 2011, p. 11). There are three elements of empathy: 1) a cognitive capacity to take the perspective of the other person; 2) an affective response to another person that entails sharing that person's emotional state; and 3) certain regulatory mechanisms that keep track of the origins of self- and other-feelings (Kim & Lee, 2010). Empathy is a necessary capacity in daily and professional life. It is of great importance for teachers, psychologists and medical staff. It is a cornerstone of some psychiatric diseases. It has been shown that patients with autism and Asperger's syndrome (Baron-Cohen & Wheelwright, 2004) and schizophrenics (Lee, Zaki, Harvey, Ochsner, & Green, 2011) demonstrate a low level of empathy development.

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Nowadays psychologists use several questionnaires of empathy. The Interpersonal Reactivity Index (Davis, 1983) has only seven questions on empathy concern and seven on perspective-taking that can be considered as a cognitive element of empathy. The Questionnaire Measure of Emotional Empathy (QMEE, Mehrabian & Epstein, 1972) evaluates only the emotional aspect of empathy. One of the newest instruments is the Empathy Quotient (EQ, Baron-Cohen & Wheelwright, 2004). Its creators tried to take into account all aspects of empathy which were not presented in other questionnaires. It consists of 60 questions, of which 40 are related to empathy (1, 4, 6, 8, 10, 11, 12, 14, 15, 18, 19, 21, 22, 25, 26, 27, 28, 29, 32, 34, 35, 36, 37, 38, 39, 41, 42, 43, 44, 46, 48, 49, 50, 52, 54, 55, 57, 58, 59, and 60), and 20 relate to distraction and do not count (2, 3, 5, 7, 9, 13, 16, 17, 20, 23, 24, 30, 31, 33, 40, 45, 47, 51, 53, and 56). The possible answers to every question are as follows: "strongly agree", "slightly agree", "slightly disagree", and "strongly disagree". For every question, either 0, 1, or 2 points can be given. In some questions 2 points are given for "strongly agree", and 1 point for "slightly agree"; in some questions, 2 points are given for "strongly disagree" and 1 point for "slightly disagree". Therefore, a minimum of 0 and a maximum of 80 points can be obtained. Its reliability and validity was proved on British (English language, Baron-Cohen & Wheelwright, 2004), Japanese (Wakabayashi, Baron-Cohen, Uchiyama, Yoshida, Kuroda, et al., 2007), Canadian (French language, Berthoz, Wessa, Kedia, Wicker, & Grezes, 2008), Turkish (Bora & Baysan, 2009), South Korean (Kim & Lee, 2010), Italian (Preti, Vellante, Baron-Cohen, Zucca, Petretto, 2011), Serbian (Dimitrijević, Hanak, Vukosavljević-Gvozden, & Opačić, 2012), and Brazilian (Portuguese language, Gouveia, Milfont, Gouveia, Rique, & Galvão, 2012) samples. In addition, several factor studies showed that questions of EQ can be divided into at least three groups: cognitive empathy, emotional reactivity and social skills (Lawrence, Shaw, Baker, Baron-Cohen, & David, 2004; Muncer & Ling, 2006). The aim of this study was to prove its reliability and validity on a Russian sample, and to conduct factor analysis to explore possible elements of empathy.

Methods

Participants

A total of 221 volunteers (121 females and 100 males) took part in the study. They were recruited in public places in several cities of Russia. All were native Russian speakers. Their mean age was 24.9 years (SD = 7.7, range was 18-59). There was no difference in age between men and women (p = .8). 8% had completed only secondary education, 26% vocational education, 33% university education, and 33% were students of vocational schools or universities. As regards the occupation of the participants, 14% worked in industry as engineers or workers, 12% worked in the arts, 9% worked in medicine or education, 33% were university students of various specialties, 15% were office employees, 10% were unemployed or on parental leave, 7% were soldiers or athletes.

Procedure

The participants fulfilled three self-assessment questionnaires: the Russian translation* of the Empathy Quotient (which was the result of a consensus between two independent translators), the Russian version (Stoliarenko, 1999) of the Questionnaire Measure of Emotional Empathy (Mehrabian and Epstein, 1972) and the Quotient of Empathic Abilities (QEA, Boiko, 1996), a test made for Russian samples which comprises of 36 questions. The last two tests were used to prove the validity of the EQ. Twenty participants fulfilled the EQ for a second time 2 weeks later, as a test of its retest reliability.

Data analysis

Unpaired *t*-tests were applied to compare the means of men and women. For these tests, the level of significance was set at .05. Internal consistency was measured by Cronbach's α coefficient. The Kaiser-Meyer-Olkin test of sampling adequacy (a value of .5 is an acceptable minimum, Cureton & D'Agostino, 1983) and the Bartlett's test of sphericity were applied to demonstrate whether the data were appropriate in explanatory factor analysis. The Varimax method of rotation was used. The cut-off for factor loadings was set at .4. In the comparative factor analysis the values of the RMSEA below .08 (Browne & Cudek, 1993), χ^2/df below 2, and *GFI* above .8 (Bentler & Wu, 1993) were considered as indicators of a good fit. All statistical calculations were realised in SPSS 19 (IBM, USA), except for comparative factor analysis, which was performed in Statistica 8 (Statsoft, USA).

Results

Descriptive statistics

The descriptive statistics are shown in Table 1. In all three questionnaires, the mean values for men and women were significantly different.

Table 1. Descriptive statistics of the obtained data

	Means (SD)			*t-value*	*p*
	Total	**Male**	**Female**		
EQ	42.03 (11.08)	40.22 (10.71)	43.52 (11.20)	2.2	.027
QMEE	23.00 (5.10)	21.32 (4.91)	24.82 (4.74)	4.4	.001
QEA	22.20 (5.21)	20.43 (5.20)	22.77 (5.23)	2.2	.030

Shapiro–Wilk's test showed that the EQ data were distributed normally ($W = .99$, $p = .4$, skewness = 0.18, kurtosis = –0.11, see Figure 1). The men and women data distributions were also normal ($W = .98$, $p = .1$, skewness = 0.43, kurtosis = 0.71 for men; $W = .99$, $p = .5$, skewness = –0.02, kurtosis = –0.42 for women)

* The Russian version of the EQ is available here: http://psylab.info/images/4/47/YC.pdf

The internal consistency of EQ measured by Cronbach's α was .85. The test-retest reliability was excellent ($r = .94$, $p = .002$). There were moderate correlations between EQ and QMEE ($r = .34$, $p = .001$), and between EQ and QEA ($r = .48$, $p = .001$)

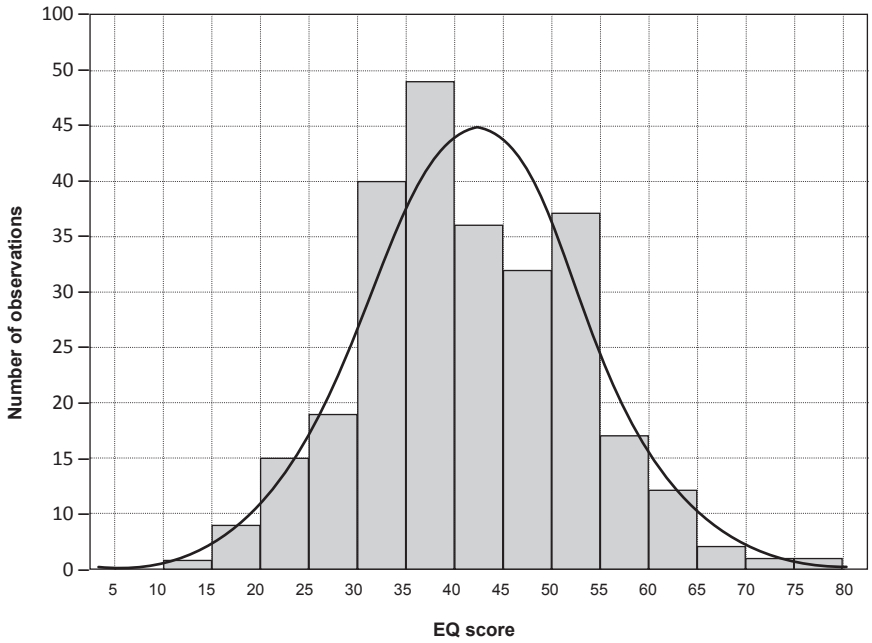

Figure 1. The distribution of the EQ data.

Factor analysis

The measure of sampling adequacy (*KMO* = .8) and Bartlett's test of sphericity (approximated $\chi^2 = 2530$, $df = 780$, $p = .001$) showed that the data are adequate for a factor analysis procedure.

Factor analysis found a three-factor solution which included 29 questions and accounted for 32.33% of explained variance. The factors loadings are presented in Table 2.

Table 2. Results of Explanatory Factor Analysis of the Empathy Quotient.

Questions of the EQ	Factor 1	Factor 2	Factor 3
54	.736		
55	.735		
25	.722		
58	.710		
19	.682		
26	.645		
43	.587		
36	.577		
41	.566		
52	.551		

Questions of the EQ	Factor 1	Factor 2	Factor 3
1	.540		
22	.498		
21	.471		
44	.409		
32		.579	
42		.496	
6		.480	
27		.476	
49		.465	
39		.445	
38		.440	
14			.582
4			.558
48			.521
8			.481
12			.470
29			.467
46			.464
10			.435
Eigenvalue	6.84	3.71	2.55
Explained variance, %	16.10	9.27	7.38

Confirmatory analysis

Several factor models were proved by confirmatory analysis (Table 3). First, the model with all questions and one-factor model were studied. Then, 29 factors obtained in the explanatory factor analysis were introduced as manifest variables and three found factors were presumed as latent variables. It showed a mediocre fit for this model. The model of Lawrence et al. (28 factors) was also applied to the data, but did not fit better (Table 3). Three short versions of the EQ were then proved. The first one (15 questions) contained 5 questions with the highest loadings from

Table 3. Comparison of confirmatory factor analysis of different factor solutions of the empathy quotient

Model	χ^2	χ^2/df	*RMSEA*	*GFI*	*CFI*
All questions	1531.3	2.07	.092	.68	.59
One factor (14 questions)	171.4	2.23	.076	.90	.90
Three factors (29 questions)	681.6	1.65	.064	.82	.80
Short version (15 questions)	175.3	2.40	.077	.90	.83
Short version (21 questions)	353.3	1.89	.064	.86	.83
Lawrence et al. (28 questions)	706.5	2.04	.073	.80	.76
Muncer & Ling (15 questions)	162.2	1.86	.065	.91	.84

each factor, the second one (21 questions) contained 7 questions with the highest loadings from each factor (although in Factor 3, Question 29 was replaced by Question 10 on theoretical grounds; see Discussion), and the third one was of Muncer and Ling. The two last models turned out to provide the best fit. Additionally, in all models Cronbach's *α*s for each factor were calculated (Table 4).

Table 4. The internal consistency (cronbach's α) of all solutions applied to the obtained data

Model	Total	Factor 1	Factor 2	Factor 3
One factor (14 questions)	.88			
Three factors (29 questions)	.85	.88	.67	.66
Short version (15 questions)	.75	.71	.62	.61
Short version (21 questions)	.78	.85	.67	.63
Lawrence et al. (28 questions)	.85	.86	.72	.54
Muncer & Ling, (15 questions)	.72	.70	.58	.55

Descriptive statistics of short versions

As the 29-question and 21-question models had the best fit and internal consistency values, the descriptive statistics were calculated only for those models.

29-question model

The Shapiro–Wilk test showed that the EQ data were distributed normally ($W = .99$, $p = .4$, skewness = 0.11, kurtosis = –0.28). The men and women data distributions were normal as well ($W = .98$, $p = .3$, skewness = 0.29, kurtosis = 0.34 for men; $W = .99$, $p = .4$, skewness = –0.05, kurtosis = –0.52 for women)

There were correlations between Factor 1 and Factor 2 ($r = .2$, $p = .003$, discriminant validity = 0.26), between Factor 1 and Factor 3 ($r = .36$, $p = .001$, discriminant validity = 0.47), and between Factor 2 and Factor 3 ($r = .37$, $p = .001$, discriminant validity = 0.56).

Women scored higher than men ($M_w = 33.01$, $M_m = 30.28$, $t = 2.24$, $p = .026$). There were differences between men and women only in Factor 2 ($M_w = 7.41$, $M_m = 6.12$, $p = .001$).

21-question model

The Shapiro–Wilk test showed that EQ data were distributed normally ($W = .99$, $p = .2$, skewness = 0.11, kurtosis = –0.38). The men and women data distributions were also normal ($W = .99$, $p = .4$, skewness = 0.26, kurtosis = 0.22 for men; $W = .98$, $p = .1$, skewness = –0.02, kurtosis = –0.66 for women)

There were correlations between Factor 1 and Factor 3 ($r = .34$, $p = .001$, discriminant validity = 0.46), and between Factor 2 and Factor 3 ($r = .37$, $p = .001$, discriminant validity = 0.57).

Women scored higher than men ($M_w = 23.55$, $M_m = 21.44$, $t = 2.32$, $p = .001$). Factor 2 scores were higher in women ($M_w = 7.41$, $M_m = 6.12$, $t = 3.46$, $p = .001$).

Discussion

The aim of the work was to prove the Empathy Quotient in a Russian sample. In general, it turned out to be acceptable. The internal consistency and test-retest validity of the Russian version was good. The validity of the Russian version was acceptable as well, because it showed moderate correlations with two other empathy tests: the Questionnaire Measure of Emotional Empathy and the Quotient of Empathic Abilities.

Factor analysis revealed 3 factors comprising 29 questions. Factor 1 comprised 14 questions, Factor 2 comprised 7, and Factor 3 comprised 8. This solution explained 32.33% of the total variance, which is less than in the works of Lawrence et al. (41.4%) and Dimitrijević et al. (32.62%).

This factor model differs from that found in the study of Lawrence et al. However, the names of factors proposed by Lawrence et al. (Factor 1 = "cognitive empathy", Factor 2 = "emotional reactivity", and Factor 3 = "social skills") are suitable for factors found in the Russian sample. Almost all the questions corresponded well to its categories. The only doubtful question is 29: "I can't always see why someone should have felt offended by a remark", which fits into the social skills subscale in this study and into emotional reactivity subscale in the study of Lawrence et al., and theoretically can be fitted into cognitive empathy subscale. That is why it was replaced by Question 10 in the short version with seven questions in each factor. It should be noted that some questions from the emotional subscale in the study of Lawrence et al. do not fit into this subscale: Questions 21, 22, 29 seem to be related not to the emotional subscale, but rather to the cognitive subscale.

Confirmatory factor analysis and internal consistency calculation applied to different models did not reveal the best one. The one-factor model had the best *GFI*, *CFI* and Cronbach's α, but its χ^2/df was more than 2. Moreover, from the theoretical point of view the questionnaire has more than one dimension. Within the three-factor models the Muncer and Ling one had the best confirmatory analysis values, but the worst Cronbach's αs. Two three-factor models obtained in this study (29 questions and 21 questions) had good internal consistency and acceptable confirmatory factor values. Furthermore, their Cronbach's αs were greater than in the British study of Muncer and Ling (.74, .63, and .57), in the Brazilian study (.72, .45, and .50), in the Korean study (.85, .65, .55), and in the Serbian study (.82, .67, and .32).

As correlations and discriminant validity between obtained factors were low, it can be concluded that the factors reflect different elements of one phenomenon.

Differences between scores of men and women were found in the original set of questions and in the short version, and the same result was obtained by all the investigators. Considering each subscale separately showed a difference only in emotional subscale. The same pattern was observed only in the Canadian study. In the Italian study there were differences only in cognitive subscale, in the study of Lawrence et al. in cognitive and emotional subscales, in the Korean study in emotional and social-skills subscales. Therefore, the gender differences may reflect cultural peculiarities.

In conclusion, the Russian version of the Empathy Quotient showed acceptable psychometric properties and can be used in scientific studies. It is recommended to use the original version or the 21-question version elaborated here (Questions 19,

25, 26, 43, 54, 55, 58 measure the cognitive component, Questions 6, 27, 32, 38, 39, 42, 49 emotional component, and Questions 4, 8, 10, 12, 14, 46, 48 the social skills component).

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