Original Research

Cross-Cultural Validation of the Empathy Quotient in a French-Speaking Sample

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Objective: The Empathy Quotient (EQ) is a self-report that was developed to measure the cognitive and affective aspects of empathy. We further evaluated its validity in 2 studies.

Method: The psychometric qualities of the French version of the EQ, and its correspondence with 2 other measures of empathy (Interpersonal Reactivity Index and the Empathy Scale of the Impulsiveness-Venturesomeness-Empathy Questionnaire), and with dimensions of the emotional state (depression and anxiety), were evaluated in a sample of 410 students (201 men and 209 women). Second, the clinical validity of the EQ was investigated in participants expected to have dysfunctional empathy. For this purpose, EQ scores of 16 people with autistic spectrum disorder (ASD) were collected.

Results: The EQ showed satisfying internal, convergent, test–retest and discriminant validity. The confirmatory factorial analyses suggested a 3-factor structure offered a good fit to the data. The women's superiority in empathy was replicated. As expected, the ASD EQ scores were very low.

Conclusion: This study provides further evidence that the EQ is reliable in this population and should be recommended to estimate empathy problems, notably in individuals with troubled interpersonal interaction patterns.

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Clinical Implications

- Empathy helps to accurately represent others' psychological states and therefore enables self-control and adequate behaviour in social contexts.
- Altered interpersonal interactions and empathy impairments have been reported in numerous psychopathological disorders.
- The EQ can help clinicians and researchers to highlight some aspects of the problems in social functioning in many mental disorders.

Limitations

- The present data collected in a student population may not be representative of the population in general.
- This study did not include a matched control group on IQ for the ASD group.
- As systemizing tendencies were not assessed, Baron-Cohen's extreme male brain theory is incompletely validated.

Key Words: *empathizing, sex differences, autism spectrum disorders, reliability*

The evaluation of the underpinnings of prosocial behaviours and appropriate social interactions has become increasingly desirable in health and psychopathology research, and in affective neuroscience.[1–4] In this domain, empathy is considered a core component of adaptive interpersonal interactions,[5] and empathy impairments have been reported in various psychiatric conditions, including antisocial personality disorders and psychopathy,[6,7] ASDs,[8,9] schizophrenia,[10,11] BPDs, and eating disorders.[12,13]

However, though the crucial role of empathy in moral development and social bonds is undoubted, there is a lack of consistency in the definition and use of the term empathy.[5] Schematically, there is a distinction between those who conceptualized empathy as more cognitive, and those who conceptualized it as more affective.[1] Nevertheless, there is a recent consensus for considering that both approaches are essential to characterizing the empathy concept, and for recognizing its multidimensional nature.

This past disagreement may account for the fact that several measures of empathy were developed, but only a few were designed with the aim of validating the construct and (or) assessing only single aspects of this multidimensional construct.[14–16] Thus many of these measures cannot be recommended for use in either clinical or research settings.

Abbreviations used in this article

ASD	autistic spectrum disorder
BDI-13	Beck Depression Inventory—13 items
BPD	borderline personality disorder
CFI	Comparative Fit Index
EE	Eysenck Empathy Scale
EQ	Empathy Quotient
EQ-CE	Empathy Quotient—cognitive empathy
EQ-ER	Empathy Quotient—emotional reactivity
EQ-SS	Empathy Quotient—social skills
GFI	Goodness of Fit Index
IRI	Interpersonal Reactivity Index
IRI-EC	Interpersonal Reactivity Index—empathic concern
IRI-FS	Interpersonal Reactivity Index—fantasy subscale
IRI-PD	Interpersonal Reactivity Index—personal distress
IRI-PT	Interpersonal Reactivity Index—perspective taking
NNFI	Non-Normal Fit Index
RMSEA	root mean square error of approximation
SDS	Social Desirability Scale
STAI	State-Trait Anxiety Inventory

To address this deficiency, Baron-Cohen and Wheelwright[14] developed the EQ, a brief, accessible, and easy to score self-report questionnaire. It was explicitly designed to be applied in a clinical context and to be sensitive to a lack of empathy as a feature of psychopathology. The original and the Japanese versions of the EQ were validated in samples of university students and of the general population, in adults with high-functioning autism or Asperger syndrome, and with depersonalization disorder.[14,15,17–19]

The purpose of our study was to further evaluate the validity of the EQ. We translated the EQ into French and, herein, report on the EQ's psychometric properties, as well as on the correspondence between 3 empathy questionnaires and measures of the emotional state. In addition, the validity of the EQ was investigated in individuals expected to lack empathy, that is, in adults with ASD.

Methods

Participants

Because different capacities for empathy have been observed among people studying various subject matters (for example, sciences, compared with humanities and social sciences),[20] the questionnaires were given to volunteers studying or working in various areas to ensure representativeness (women/men): philosophy (17/22), psychology (98/19), biology and biotechnologies (34/33), mathematics (6/18), informatics (19/23), general engineering (17/30), maritime engineering (10/41), and tourism and management (8/15).

Fifty-one percent of the participants were women (n = 209) and 49% were men (n = 201), with an average age of 21.0 years (SD 3.24). Except for 2 responders with a low level of education (that is, less than a high school diploma), the other participants had an intermediate-to-high level of education (35.2% with a high school diploma; 22.5% with up to 2 years of college; 41.8% with more than 2 years of college).

To examine EQ scores in individuals expected to lack empathy, we collected EQ scores of 16 adults (13 men; mean age 28.9, SD 1.4) who had received a formal diagnosis of ASD using DSM-IV criteria. To complete the questionnaire, it was necessary to read and write, therefore all participants had to be high-functioning. Their mean IQ was in the normal range (mean 107.8, SD 24.5), but 3 ASD participants had an IQ below the average standard for a normal IQ (85), and 4 others had an IQ above 115. They completed the questionnaire during an experimental testing session including other cognitive tests.

The Pitié-Salpétrière Hospital (Paris, France) ethics committee approved the study, and all subjects participated voluntarily after giving written informed consent.

Self-Reports

The STAI Form-Y[21] (French version[22]): Individuals are asked to respond to 40 statements on a 4-point Likert scale. The state portion of the scale (20 items) asks subjects to report the extent of their anxiety at present; the trait scale (20 items) asks respondents to indicate the intensity of their anxiety in general.

The BDI-13[23] (French version[24]): This inventory measures the level of depression. Individuals are asked to respond to statements about how they have felt over the past week.

The Impulsivity Venturesomeness Empathy–7 Questionnaire[25] (French version[26]): This is a 54-item true or false questionnaire with 3 scales measuring impulsiveness, venturesomeness, and empathy (19 items). The latter subscale was originally included to provide meaningful buffer items, and is independent from the other 2. This empathy scale was derived from Mehrabian and Epstein's[27] Empathic Tendency Questionnaire, which sought to measure aspects of emotional empathy. Here we used only the empathy subscale and refer to it as the EE.

The IRI[28] (French version[12]): A 28-item questionnaire with 4 subscales measuring: IRI-EC; IRI-PT; IRI-FS; and IRI-PD. Each of these 4 dimensions (composed of 7 items) are scored on a 5-point Likert scale. The IRI has good internal and convergent validity, and test–retest reliability.[29–31]

The EQ[14] (French version): Available from the Autism Research Centre's website, this is a 60-item questionnaire, with 40 questions tapping empathy and 20 filler items. Responses are given on a 4-point Likert scale. Scores can range from 0 to 80. A cut-off score of fewer than 30 was the most useful to differentiate adults with ASD from controls.[14] A 3-factor solution has been observed[15]: EQ-CE; EQ-ER; and EQ-SS. The original version of the EQ seems to show acceptable internal consistency, concurrent and convergent validity, and good test–retest reliability.[15] In agreement with the authors, the EQ was translated into French. It was back-translated by a French senior lecturer in English literature, and modifications were made. The final version was approved by the 2 original translators and a native English speaker, fluent in French.

The SDS[32] (French version[33]): A 33-item true or false questionnaire assessing the extent to which individuals are likely to respond in a culturally appropriate and acceptable manner.

Statistical Analyses

We used the Kolmogorov-Smirnov test for GFI to assess the normality of the distribution of the EQ scores. We used independent-samples *t* tests to estimate the sex effect for the self-reports' scores. To evaluate relations among the self-reports' scores, we used Pearson's *r* correlation coefficients. To test the discriminant validity of the EQ (that is, whether individuals categorized as low-empathics have lower scores on the other measures of empathy), we conducted an ANOVA with empathy as the between-group factor and the EE, and 4 IRI scores as the criterion variables. The SPSS software (SPSS Inc, Chicago, IL) version 11.5 was used to calculate these statistics.

To test whether our EQ data fit a 3-factors structure,[15] we conducted confirmatory factor analysis in LISREL 8.8 software (Scientific Software International Inc, Lincolnwood, IL).[34] Among the fit indices, the chi-square tests are evaluated in 2 ways. First, a nonsignificant chi-square suggests that the model does not deviate from the data. Second, if the chi-square statistic is significant, but less than 2 times the df, the model is thought to be a good representation of the data.[35] However, in general, chi-square values are very sensitive to sample size and tend to overestimate the badness of a model fit. Therefore, fit statistics minimizing the influence of sample size and model complexity; that is, the RMSEA,[36] the CFI,[37,38] and the NNFI[38] were determined additional to the more traditional chi-square and GFI values. Among these 3 fit indices, the CFI seems the best and most valid index because it has a very small sampling variability, and a rather negligible downward bias relative to other indices.[37] As a conventional rule of thumb, GFI values greater than 0.85, CFI and NNFI values of 0.90 to 0.95, respectively, and a RMSEA of 0.08 and lower[39] are considered satisfactory, with CFI and NNFI values higher than 0.95 indicating an excellent model fit.

Among 410 participants, 3 left the state STAI partially uncompleted, 3 left the BDI-13 partially or totally uncompleted, one left the EE uncompleted, and one left the IRI partially uncompleted. Consequently, statistical analyses included 410 participants on the EQ, SDS and trait STAI scores, 409 participants on the EE and IRI scores, and 407 participants on the state STAI and BDI-13 scores.

Results

The participants' scores on the self-reports' are presented in Table 1.

Mean state and trait STAI and BDI-13 scores were comparable to those of other French normative data.[22] Mean EE scores were comparable with those of other French-speaking young adults.[40] Mean IRI scores were equivalent to those reported in studies of undergraduate young adults.[28,41]

Mean EQ scores were similar (albeit inferior) to those reported by Baron-Cohen et al.[14,15] The Kolmogorov-Smirnov GFI test for a normal distribution indicated that the distribution of the EQ scores was normal ($Z = 0.857$, $P > 0.05$; skewness = –0.010; kurtosis = 0.189) (Figure 1). This was also the case when analyzing the scores of men ($Z = 0.762$,

Table 1 Participants' scores on the self-reports

	Sex						
	Men (*n* = 201)			Women (*n* = 209)			Group (*n* = 410)
Self-reports	Minimum	Maximum	Mean (SD)	Minimum	Maximum	Mean (SD)	Mean (SD)
State STAI	20.0	69.0	32.9 (9.2)	20.0	68.0	34.9 (9.8)	33.9 (9.6)
Trait STAI	20.0	66.0	36.2 (9.7)	20.0	71.0	39.9 (10.2)	38.1 (10.1)
BDI-13	0.0	27.0	3.0 (3.7)	0.0	19.0	3.1 (3.4)	3.0 (3.5)
EQ	13.0	70.0	37.7 (10.0)	20.0	64.0	41.4 (7.7)	39.6 (9.1)
EE	2.0	19.0	12.9 (3.2)	7.0	19.0	15.1 (2.6)	14.0 (3.1)
IRI-PT	7.0	28.0	17.4 (3.9)	6.0	24.0	16.7 (3.6)	17.0 (3.8)
IRI-FS	2.0	28.0	18.0 (5.7)	2.0	28.0	20.3 (4.6)	19.2 (5.3)
IRI-EC	4.0	28.0	18.5 (5.1)	8.0	28.0	20.8 (3.5)	19.7 (4.5)
IRI-PD	0.0	23.0	10.9 (4.6)	3.0	28.0	13.8 (4.4)	12.4 (4.7)
SDS	2.0	29.0	17.6 (5.1)	6.0	29.0	16.9 (4.7)	17.2 (4.9)

$P > 0.05$; skewness = 0.215; kurtosis = 0.205), and women ($Z = 0.622$, $P > 0.05$; skewness = 0.004; kurtosis = 0.001) separately. The internal consistency of the EQ measured by the Cronbach's alpha coefficient was 0.81.

A significant sex effect was found for all self-report scores, except for the BDI-13 and the SDS scores (Table 2).

To test the extent to which the responses on the empathy questionnaires were biased by socially desirable responding, scores on each item of the EQ, the EQ total score, the EE score, and the 4 IRI subscores, were entered into a Pearson's product–moment correlation analysis along with the SDS score. A positive correlation above 0.3 was taken as an indicator of a socially desirable responding.[15]

None of the EQ items correlated positively above 0.3. Two items had a negative, rather than a positive, relation.

Whereas the SDS and EE scores were not significantly correlated, the SDS score correlated positively with the EQ total score, the IRI-EC and IRI-PT scores, and it correlated negatively with the IRI-FS and IRI-PD scores (Table 3).

The confirmatory analysis for the factorial structure reported by Lawrence et al[15] showed that most, but not all, GFI statistics were indicative of a satisfactory fit. Indeed, the chi-square value was significant ($\chi^2_{347} = 805.7$, $P < 0.001$) and over the desired 2:1 chi-square to df ratio. Nevertheless, the other fit indices achieved their conventional adequacy standards: RMSEA = 0.057, 90%CI for RMSEA = (0.052; 0.062), *P* value for test of close fit (RMSEA < 0.05) = 0.014, CFI = 0.93, NNFI = 0.92, GFI = 0.88.

The analysis of the relation between the EQ total and subscales' scores showed that the EQ total score was positively correlated with the EQ-CE ($r = 0.71$, $P < 0.001$), EQ-ER ($r = 0.80$, $P < 0.001$), and EQ-SS scores ($r = 0.46$, $P < 0.001$). In addition, EQ-CE and EQ-ER correlated positively ($r = 0.32$, $P < 0.001$), as did EQ-CE and EQ-SS ($r = 0.21$, $P < 0.001$), and EQ-ER and EQ-SS ($r = 0.24$, $P < 0.001$). Examination of these relations among the men only showed that EQ-CE and EQ-ER correlated positively ($r = 0.36$, $P < 0.001$), as did EQ-CE and EQ-SS ($r = 0.24$, $P = 0.001$), and EQ-ER and EQ-SS ($r = 0.25$, $P < 0.001$). Among the women, the EQ-CE and EQ-ER correlated positively ($r = 0.33$, $P < 0.001$), as did EQ-CE and EQ-SS ($r = 0.18$, $P = 0.008$), and EQ-ER and EQ-SS ($r = 0.21$, $P = 0.003$). A significant effect of sex was found for the EQ-ER ($t_{408} = 7.42$, $P < 0.001$) only. As we found an effect of sex for the 2 STAI scores, we examined if the results remained unchanged when these scores were taken into account. Using ANCOVAs, the analyses showed that after controlling for the 2 STAI scores, the difference on EQ-ER remained significant while there was a significant effect of sex for EQ-SS as well ($F_{1,403} = 7.72$, $P = 0.006$).

The correlations between the EQ total and subfactors scores, and the other measures of empathy are presented in Table 3. The EQ score correlated positively with the EE score, and with all of the IRI scores except the IRI-PD score. The EQ-CE score correlated positively with the EE score, the IRI-PT and IRI-EC, but not with the IRI-FS and IRI-PD scores. The EQ-ER score correlated positively with the EE score, and with all of the IRI scores. The EQ-SS score was not correlated with the EE and the IRI-FS scores. It correlated

Figure 1 Histogram and superimposed normal curve of the distribution of EQ scores of the entire sample

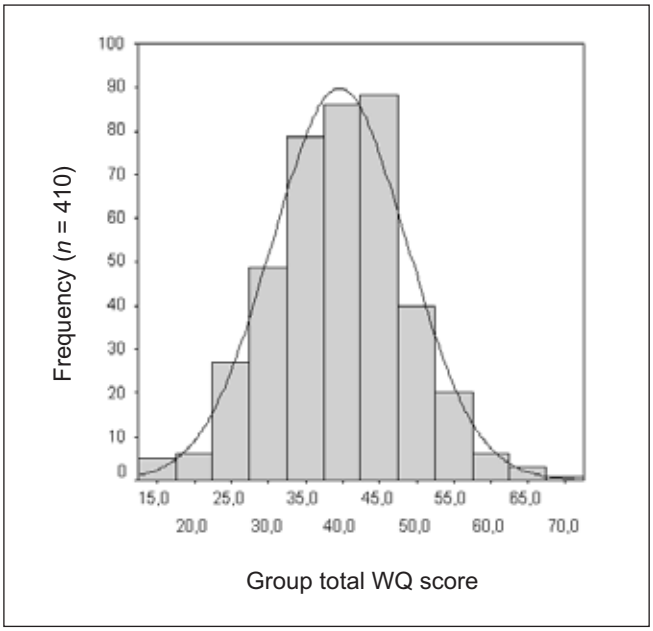

Table 2 Effect of sex (men, compared with women; *t* tests for 2 independent samples) on the self-reports' scores

Self reports	*t*	df	*P*
State STAI	2.11	405	0.04
Trait STAI	3.76	408	<0.001
BDI-13	0.40	405	ns
EE	7.41	407	<0.001
IRI-PT	1.99	407	0.05
IRI-FS	3.99	407	<0.001
IRI-EC	5.35	407	<0.001
IRI-PD	6.49	407	<0.001
EQ	4.24	408	<0.001
SDS	1.41	408	ns

ns = not significant at $P < 0.05$

positively with the IRI-PT and IRI-EC scores, but negatively with the IRI-PD score. The EE score correlated positively with all of the IRI scores, except the IRI-PD score.

We then analyzed the same correlations in men and women separately. We found the same patterns of correlations, except for EQ-CE, which was not significantly correlated with the EE score in the group of men. In the group of women, the EQ-ER was not significantly correlated with the IRI-PD score, and the EQ-SS was not significantly correlated with the IRI-PT score.

The relation between the measures of empathy, the BDI-13 (depression), and the STAI scores (state and trait anxiety) are presented in Table 4. The EQ score correlated negatively with the BDI-13 and the trait STAI scores. The EQ-CE score correlated negatively with the trait STAI score only. The EQ-ER score was not significantly correlated with the BDI-13 or the STAI scores. Conversely, the EQ-SS score correlated negatively with the BDI-13 and the state and trait STAI scores.

In the group of men, the same analyses showed that the EQ score was negatively correlated with the BDI-13 score, as well as with both the state and trait STAI scores (respectively: $r = –0.16$, $P = 0.025$; $r = –0.15$, $P = 0.039$; $r = –0.20$, $P = 0.005$). Regarding the EQ subfactors' scores, the analyses revealed the same pattern of correlations observed in the entire sample.

In the group of women, the analyses showed that the EQ score was not correlated with the BDI-13 or the 2 STAI scores. In addition, the EQ-SS score was the only EQ subfactor that was significantly (and negatively) correlated with the BDI-13 or the state and trait STAI scores (respectively: $r = –0.40$, $r = –0.34$, $r = –0.36$; all Ps < 0.001).

We used Baron-Cohen et al's[14] cut-off score to split our sample into 2 groups: low-empathic and empathic. The observed percentage of subjects with an EQ score of ≤30 (low-empathic) was equal to 15.9% ($n = 65$), of which 75.4% were men ($n = 49$). There was a significant association between the group (low-empathic, compared with empathic) and sex (men, compared with women): $\chi^2 = 21.48$, df = 1, $P < 0.001$. In addition, ANOVAs showed a main effect of group on the EE score ($F_{1,408} = 391.35$, $P < 0.001$) on the IRI-PT ($F_{1,407} = 20.9$, $P < 0.001$), IRI-EC ($F_{1,407} = 71.6$, $P < 0.001$), and IRI-FS scores ($F_{1,407} = 9.3$, $P = 0.002$), but not on the IRI-PD score ($F_{1,407} = 1.02$, $P > 0.05$). Mean differences between the low-empathic and the empathic groups were: EE mean –2.67, SD 0.40; IRI-PT mean –2.28, SD 0.50; IRI-EC mean –4.77, SD 0.56; and IRI-FS mean –2.17, SD 0.71. Using ANCOVA, we found that these between-group differences remained significant after controlling for the 2 STAI scores.

For the 36 participants who completed the EQ on 2 occasions, the test–retest reliability as measured by Pearson's *r* correlation coefficient between EQ scores at time 1 and time 2 (6 to 24 weeks after time 1) was $r = 0.93$ ($P < 0.001$).

Among the individuals expected to lack empathy, all but one of the ASD participants had an EQ score of ≤30, which corresponds to the cut-off score found to be the most useful to

Table 3 Intercorrelations (Pearson's *r*) between the empathy measures

	SDS	EQ	EE	IRI-PT	IRI-FS	IRI-EC
EQ	0.24					
	P < 0.001					
EE	–0.49	0.40				
	ns	*P* < 0.001				
IRI-PT	0.28	0.32	0.05			
	P < 0.001	*P* < 0.001	ns			
IRI-FS	–0.11	0.28	0.41	0.09		
	P = 0.02	*P* < 0.001	*P* < 0.001	ns		
IRI-EC	0.17	0.49	0.58	0.21	0.33	
	P < 0.001	*P* < 0.001	*P* < 0.001	*P* < 0.001	*P* < 0.001	
IRI-PD	–0.22	0.06	0.36	–0.11	0.21	0.20
	P < 0.001	ns	*P* < 0.001	*P* = 0.03	*P* < 0.001	*P* < 0.001

ns = not significant at *P* < 0.05

differentiate ASD adults from controls.The ASD's mean EQ total and subfactors scores were: EQ mean 17.6, SD 7.9; EQ-CE mean 2.3, SD 3.1; EQ-ER mean 4.4, SD 2.8; and EQ-SS mean 2.9, SD 2.0. Interestingly, the ASD subjects with the lowest IQs were not those with the lowest EQ scores, and conversely, those with the highest IQs did not receive the highest EQ scores. Moreover, we observed an important intragroup variance in EQ-CE scores. Inspection of the individual data revealed that EQ-CE scores ranged from 0 to 9, and that one-half of the ASD participants had an EQ-CE score equal to 0. The IQs of these subjects ranged from 78 to 155. The only ASD participant who obtained a score of 0 on 2 EQ subfactors (that is, on EQ-CE and EQ-ER, and who had an EQ-SS score of 1), had an IQ above the average standard for a normal IQ.

Discussion

Our study provides reliability, validity, and factor structure data of the French version of the EQ.

Mean EQ scores were similar (albeit inferior) to those obtained by Baron-Cohen et al[14,15] in samples of older adults, and to those reported by Wheelwright et al[19] in a large group of university students (723 men, 1038 women). The men's scores were exactly the same, and the women's scores were slightly inferior to those observed by Muncer and Ling[17] in a study of 156 young men and 192 young women. Our results add to those of Wakabayashi et al[18] and further support the cross-cultural stability of the EQ.

The EQ showed high internal consistency and test–retest reliability. Additionally, we found no association with social desirability, which supports the scale's construct validity. The confirmatory factorial analyses suggest that a 3-factor structure offers a satisfactory fit to the data.

The correlations observed between the EQ scores and the scores of the other measures of empathy (IRI and EE) further demonstrate the EQ's concurrent validity. We replicated the lack of association with the IRI-PD score, but unlike Lawrence et al's[15] findings, the IRI-FS score was associated with the EQ score.

Though moderate, the positive associations observed among the IRI-FS, the EQ, and the measures of emotional empathy (that is, EQ-ER and EE scores) work against the suggestion that the fantasy items may not be relevant to empathy.[14,15] Moreover, contrary to Lawrence et al's[15] study, but in line with the definition of cognitive empathy (that is, the ability to attribute all types of mental states), we found a positive association between the EQ-CE scale and the IRI-PT and IRI-EC scales. Interestingly, whereas the EQ total and EQ-CE scores were not correlated with the IRI-PD score (that is, the experience of negative feelings in response to the distress of others), we showed that this latter scale was positively associated with the EQ-ER, the IRI-EC, and the EE scores.

Inspection of the intercorrelations with the EQ subfactors' scores revealed that it is in fact the EQ-ER scale (that is, the tendency to have an emotional reaction in response to others' mental states) that was the most strongly associated with the other measures of empathy, and notably with the other

Table 4 Relations (Pearson's *r*) between the empathy measures and the emotional state measures

	BDI-13	State STAI	Trait STAI
EQ	–0.13	–0.08	–0.11
	P = 0.01	ns	*P* = 0.03
EQ-EC	–0.01	–0.02	–0.10
	ns	ns	*P* = 0.04
EQ-ER	–0.06	0.02	0.05
	ns	ns	ns
EQ-SS	–0.36	–0.34	–0.37
	P < 0.001	*P* < 0.001	*P* < 0.001
EE	0.05	0.14	0.19
	ns	*P = 0.004*	*P* < 0.001
IRI-PT	–0.08	–0.09	–0.12
	ns	ns	*P* = 0.02
IRI-FS	0.08	0.10	0.13
	ns	ns	*P* = 0.01
IRI-EC	–0.04	–0.02	0.01
	ns	ns	ns
IRI-PD	0.29	0.39	0.51
	P < 0.001	*P* < 0.001	*P* < 0.001

ns = not significant at *P* < 0.05

measures of emotional empathy (that is, IRI-EC and EE scores). In addition, the EQ-ER scale was not associated with self-oriented measures of emotional state (BDI-13 and state and trait STAI). These results may provide further arguments for considering that the EQ's second factor captures the ability to feel emotions in response to the affective state of another person, and thus for labeling this factor emotional or affective empathy.[15]

Among the EQ's factors, the EQ-SS scale is the subfactor that is least related to the EQ total score and to the other measures of empathy. However, its association with the IRI-PT scale (albeit weak) further supports Lawrence et al's[15] suggestion that social skills rely on a certain amount of cognitive empathy. Moreover, our results suggest that social skills have to do with emotional empathy too (that is, feeling emotional concern for others). Besides, the social skills score was found negatively associated with the IRI-PT score, and with the depression and state and trait anxiety scores, which suggests that this factor might be inversely related to emotional arousability.

The present data confirmed previous studies reporting a female superiority on questionnaires of empathy.[14,15,17–19,42,43] In line with the research on the EQ, the largest difference was observed for the EQ-ER scale.[15,17] Nonetheless, whereas we found no sex difference in EQ-CE, the analyses revealed a female superiority in social skills, but only after adjusting for the sex difference in emotional state. In addition to Muncer and Ling's[17] suggestion that men may overestimate their social skills in a self-report measure,[p 1117] our study highlights that sex differences in an emotional state may affect measures of empathic ability, at least when using self-reports.

In fact, Baron-Cohen et al[14] suggested that, "if you are angry or depressed, your own current emotional state might cloud your ability to see the other person's perspective."[p 170] Here, emotional empathy score, as measured by the EE scale, was positively correlated with the self-report scores of state and trait anxiety. The IRI-PD score was positively correlated with all of the self-report scores of emotional state. Conversely, the EQ total and subfactors scores were either not or negatively associated with the subject's self-report scores of depression and state and trait anxiety. However, as demonstrated in the women's superiority in social skills, taking sex differences in emotional state into account is worthwhile when comparing empathy scores for men and women. Further, the ASD were shown to be more depressed, more anxious, and more alexithymic than controls,[44,45] emphasizing

the need for adjusting for these affective dimensions when measuring empathy in future clinical research.

Regarding the EQ's discriminant validity, the healthy individuals characterized as low-empathics received lower scores on all of the empathy measures, except the IRI-PD scale. In addition, 3 times as many men as women scored ≤30, a cut-off score that has been found the most useful to differentiate adults with ASD from controls.[14] Further, concerning the validation of the EQ in subjects hypothesized to have dysfunctions in empathic ability, as expected, the ASD participants obtained very low EQ scores, and except for one ASD participant, all were ascribed to the low-empathic group. The results of the ASD sample (though small) are similar to those reported in previous studies.[14,18,19] Thus our study further demonstrates that empathizing is a dimension in which normal individuals differ[19] and our results are consistent with Baron-Cohen's[46] extreme male brain theory of autism.

Conclusion

Our study further demonstrates that the EQ offers satisfying psychometric properties, and that it should be recommended to estimate empathy problems in individuals with troubled interpersonal interaction patterns. In future clinical research, the EQ may help to investigate the affective deviances and the social interaction problems present in numerous mental disorders, including those related to aggressive behaviours (such as schizophrenia, BPD, and substance use disorder) and those with predominant anxiety and depressive symptoms (such as eating disorders and obsessive–compulsive disorders).

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Résumé : Validation transculturelle du quotient d'empathie dans un échantillon francophone

Objectif : Le quotient d'empathie (QE) est une autodéclaration qui a été élaborée pour mesurer les aspects cognitifs et affectifs de l'empathie. Nous en avons aussi évalué la validité dans 2 études.

Méthode : Les qualités psychométriques de la version française du QE, et sa correspondance à 2 autres mesures de l'empathie (l'indice de réactivité interpersonnelle et l'échelle d'empathie du questionnaire sur l'impulsivité, l'esprit d'aventure, l'empathie), ainsi qu'à des dimensions de l'état émotionnel (dépression et anxiété), ont été évaluées dans un échantillon de 410 étudiants (201 hommes et 209 femmes). Deuxièmement, la validité clinique du QE a été vérifiée chez les participants qu'on prévoyait avoir une empathie dysfonctionnelle. À cette fin, les scores de QE de 16 personnes souffrant du trouble du spectre de l'autisme (TSA) ont été recueillis.

Résultats : Le QE a démontré une validité interne, convergente, test-retest et discriminante satisfaisante. Les analyses factorielles confirmatoires suggéraient qu'une structure à 3 facteurs convenait bien aux données. La supériorité des femmes en empathie a été reproduite. Comme prévu, les scores de QE dans le TSA étaient très faibles.

Conclusion : Cette étude amène d'autres données probantes que le QE est un instrument fiable qui devrait être recommandé pour estimer les problèmes d'empathie, notamment chez les personnes présentant des modèles problématiques d'interaction person.