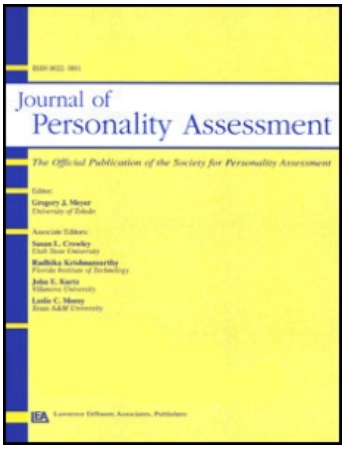

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Psychometric Properties of the Emotion Awareness Questionnaire for Children in a French-Speaking Population

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In this study, we investigated the psychometric properties of the French version of the Emotion Awareness Questionnaire (EAQ30; Rieffe et al., 2008). The EAQ30 was administered to 707 French-speaking children aged 8 to 16 years old. The original 6-factor structure was replicated in our data. The internal consistency coefficients of the EAQ30 subscales were satisfactory. We found small significant differences for gender and age. Regarding convergent validity, we found positive correlations between EAQ30 scores and emotional intelligence and negative correlations between EAQ30 scores and alexithymia. There was preliminary evidence of discriminant validity, with EAQ30 scores being weakly related to school performance, and concurrent validity, with EAQ30 scores being negatively related to somatic complaints, depression, and anxiety. Finally, except for 1 dimension, EAQ30 scores were not susceptible to social desirability. Although some weaknesses of the scale remain to be addressed, these findings support the use of the EAQ30 for research and clinical purposes.

Experiencing emotions is an innate human characteristic. However, individuals differ in the way they are able to identify, express, understand, regulate, and use their emotions and the emotions of others. These different dimensions of emotional competence (EC) develop during childhood, with contributions from various intrinsic and extrinsic factors, and marked individual differences can be observed among children (e.g., Calkins & Hill, 2007; Luminet & Lenoir, 2006). Intrinsic factors include age, gender, temperament, and physiological processes, whereas extrinsic factors refer to social and family context (Scharfe, 2000). The main aim of this study was to validate a questionnaire that is able to capture these individual differences in French-speaking children's EC.

Until recently, there were very few instruments that assessed the EC of children. However, the assessment of children's EC is important for both research and clinical purposes. From a research perspective, a measure that adequately captures individual differences in EC could lead to a better understanding of the role of these competences in children's adaptation to their environment. Indeed, EC seems to be essential from both intrapersonal (e.g., to ensure individuals' emotional stability and to prevent mental and physical disorders; Mavroveli, Petrides, Rieffe, & Bakker, 2007; Rieffe et al., 2007) and interpersonal standpoints (e.g., to increase the quality of social relationships and to prevent antisocial behaviors; Petrides, Sangareau, Furnham, & Frederickson, 2006). From a clinical perspective, screening children for emotional deficits could help practitioners identify children who are vulnerable to psychological and physical disorders—children who could subsequently be treated using early individualized interventions.

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The opportunity to prevent mental or somatic disorders seems to be attainable because a great deal of research has revealed positive associations between EC and physical and psychological health (e.g., John & Gross, 2004; Mikolajczak, Luminet, & Menil, 2006; Schutte, Malouff, Thorsteinsson, Bhullar, & Rooke, 2007). For example, in a meta-analysis of 44 effect sizes ($N = 7{,}898$), Schutte et al. (2007) showed a relationship of $r = .29$ with mental health, $r = .31$ with psychosomatic health, and $r = .22$ with physical health. The links between EC and health have primarily been studied through different emotion-related constructs (such as alexithymia and emotional intelligence [EI]). Alexithymia represents the extent to which individuals have difficulties in identifying and describing feelings and evidence in externally oriented thinking (Nemiah, Freyberger, & Sifneos, 1976). This concept does not include other important dimensions of EC such as attending to other's emotions. By contrast, EI targets the way with which individuals identify, express, understand, regulate, and use their emotions and the emotions of others (Mikolajczak, Quoidbach, Kotsou, & Nélis, 2009). Measures of this construct (e.g., The Trait Emotional Intelligence Questionnaire; Petrides, 2009) include dimensions that are not part of the core emotional competences and that could even be considered as an outcome of EC (e.g., well-being; self-control skills, etc.).

Results have shown that alexithymia is a risk factor for mental and physical health in adults (e.g., rheumatoid arthritis, cardiac disease, diabetes, morbid obesity, chronic pain, eating disorders, panic disorder; Lumley, Neely, & Burger, 2007; Taylor, Bagby, & Parker, 1997). The literature also shows growing evidence for an association between EI and resistance to stress (e.g., higher EI scores are associated with lower cortisol secretion during acute stress) as well as better mental and physical health (e.g., Mikolajczak, Roy, Luminet, Fillée, & de Timary, 2007; Salovey, Stroud, Woolery, & Epel, 2002). Recent research has also found that emotion-related constructs are important

predictors of the adaptability of individuals to their environment (e.g., Eisenberg, Hofer, & Vaughan, 2007; Thompson & Meyer, 2007), including work and academic performance (e.g., Van Rooy & Viswesvaran, 2004, for a meta-analysis).

Despite the importance of EC across the life span, the consequences of such competences have rarely been studied in children. Only a few recent studies have investigated the impact of EC on school performance, peer relationships, and physical and mental health. Results showed that children with higher EI scores were considered by their peers and their teachers as being more cooperative, less disruptive, less aggressive, less dependent, and as having more leadership qualities than peers with lower EI scores (Petrides et al., 2006). Petrides, Frederickson, and Furnham (2004) also found that adolescents with lower EI scores had more unauthorized absences and exclusions from school than their peers with higher EI scores. Other studies have revealed that adolescents with higher EI scores have lower risks for psychological and physical difficulties such as depression and somatic complaints than adolescents with lower EI scores (Mavroveli et al., 2007). These results converge with Rieffe and colleagues (2007a) finding that the abilities to differentiate and express emotions (assessed by the Emotion Awareness Questionnaire; Rieffe et al., 2007) were negatively correlated with depressive symptoms and somatic complaints.

Notwithstanding these findings, there is no valid and reliable instrument to assess the children's EC in French. Therefore, the aim of this present study was to translate and test the psychometric properties of a recently developed questionnaire, the Emotion Awareness Questionnaire (EAQ30; Rieffe, Oosterveld, Miers, Meerum Terwogt, & Ly, 2008). This questionnaire, partly inspired by the literature on alexithymia and adult EI, evaluates the way children feel and think about their own and others' feelings. The EAQ30 is a self-report questionnaire comprising 30 items rated on a 3-point scale (1 = *not true,* 2 = *sometimes true,* 3 = *true*). It includes six subscales: (a) Differentiating Emotions reflects the ability to identify one's emotions and to differentiate and understand the causes of one's emotions; (b) Verbal Sharing of Emotions captures the ability to communicate one's feelings to others; (c) Bodily Awareness is the cluster of physical sensations of emotions; (d) Not Hiding Emotions reflects the overt expression of emotions: note that this dimension is different from impulsive tendencies to show one's emotions; (e) Analyses of Emotions captures the willingness to face one's emotions; and finally, (f) Attending to Others' Emotions reflects the willingness to face the emotions of others. Twenty items are negatively formulated and thus reversed-scored. In all scales, a higher score is indicative of greater ability, with the exception of Bodily Awareness in which a higher score implicates lower attention to bodily symptoms. This questionnaire is suitable for children and adolescents ranging from 8 to 16 years old. The translation of this questionnaire was performed according to the International Test Commission guidelines for test adaptation (Hambleton, 2001). Items were first translated into French and then back-translated into English. The translation and back-translation process was conducted entirely by bilingual individuals and was supervised by the two first authors (M. Lahaye and O. Luminet) of this article. After the back translation, four problematic items were reviewed and discussed. Differences implied the choice between two synonyms.

Overview

In this study, we examined the psychometric properties of the French translation of the EAQ30. First, we focused on the distributional properties and the reliability (Cronbach's alphas) of the EAQ30 subscales. Afterward, we investigated the relationships between the EAQ30 and demographic variables. Next, we looked at the factor structure of the questionnaire. We also examined the convergent validity of the questionnaire regarding alexithymia and EI and the discriminant validity regarding school performance. Then, we observed the susceptibility of the EAQ30 to socially desirable responding. Last, we assessed the concurrent validity regarding somatic complaints, anxiety, and depressive symptoms.

Method

Participants and Procedure

A sample of 707 children and adolescents ranging from 8 to 16 years old ($M_{age} = 12.5$ years, $SD = 1.98$) participated in this study. There were 365 girls and 340 boys; and two children who failed to report their gender. Participants were children from 34 classes within two primary schools and two secondary schools in Brussels (Belgium). To investigate the concurrent validity, the discriminant validity, and the susceptibility to social desirability of the EAQ30, we conducted a second study on a sample of 90 children ($M_{age} = 11.8$ years, $SD = 0.53$). These participants (47.8% girls) were recruited from five classes within five different schools in Brussels. To ensure that all of the children could read, we took two precautions. First, we recruited only children who were in the third grade. In Belgium, children can only pass the second grade if they are able to "understand explicit information of a text and perceive the global meaning of a text" (Ministère de la Communauté Française de Belgique, 1997). Moreover, children completed questionnaires at school, and we asked their teachers to identify children who had reading difficulties. These children were excluded from this sample.

We followed the ethical principles for research with human subjects of the American Psychological Association (2005). We presented the study to the school directors, and we obtained their permission to conduct the survey. The children and their parents received written information about the study, which emphasized the confidentiality of the child's answers and their freedom to decline participation. Children were given oral and written instructions about the procedure, and they completed the questionnaires in class in around 40 min. We thanked parents and children for their participation and gave them the opportunity to ask questions. Finally, we gave global results to school directors.

Measures

EC. We assessed EC using the EAQ30 (Rieffe et al., 2008) described earlier. The original Dutch version demonstrated minimally acceptable reliability (Cronbach's alphas between .65 and .76; Rieffe et al., 2008).

Alexithymia. We assessed alexithymia with the Alexithymia Questionnaire for Children (Rieffe, Oosterveld &

Meerum Terwogt, 2006, adapted in French for this study[1]), a self-report questionnaire comprising 20 items rated on a 3-point scale (0 = *not true;* 1 = *a bit true;* 2 = *true*). In line with the adult version of the Toronto Alexithymia Scale-20 (Bagby, Parker, & Taylor, 1994), the Alexithymia Questionnaire for Children consists of three dimensions: difficulty in identifying feelings, difficulty in describing feelings, and externally oriented thinking. The original Dutch version (Rieffe et al., 2006) showed acceptable reliability, .73 and .75, respectively, for the two dimensions of difficulty in identifying feelings and difficulty in describing feelings. However, the Cronbach's alpha of the third dimension was quite low ($\alpha = .29$). These results are consistent with the adult literature (Kooiman, Spinhoven, & Trijsburg, 2002), and the same pattern of results was found in this sample (αs = .70, .67, and .43, respectively).

EI. We evaluated trait EI by the Trait Emotional Intelligence Questionnaire–Adolescent Short Form (TEIque–ASF; Petrides et al., 2006; adapted in French for this study.[2] This questionnaire contains 30 items ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The internal consistency reliability of the original TEIque–ASF was .84 (Petrides et al., 2006). It was .81 in this sample.

School performance. We assessed school performance asking parents for the average mark of their child at school. This question was rated on a 6-point scale (1 = *less than 50%;* 2 = *between 50% and 60%;* 3 = *between 60% and 70%;* 4 = *between 70% and 80%;* 5 = *between 80% and 90%;* 6 = *more than 90%*).

Somatic complaints. To identify the health complaints of children, we used the Somatic Complaint List (SCL; Jellesma, Rieffe, & Meerum Terwogt, 2007; adapted in French for this study.[3] The SCL is a self-report questionnaire of 11 items rated from 1 (*almost never*) to 5 (*quite often*). The original Dutch version showed good internal consistency ($\alpha = .83$; Jellesma et al., 2007), which we confirmed in this study ($\alpha = .83$).

Depression. We assessed depressive symptoms through the Children's Depression Inventory (CDI; Kovacs & Beck, 1977; French adaptation: Moor & Mack, 1982), an adaptation of the Beck Depression Inventory for adults (Beck, 1967). This questionnaire, adapted for children and adolescents between 7 and 17 years, contains 27 items rated on a 3-point scale rated from 0 (*absence of depressive symptom*) to 2 (*severe depressive symptom*). The higher the total score, the more severe are the respondent's depressive symptoms. The original English version of the CDI showed acceptable internal reliability ($\alpha = .70$). The test–retest reliability over a period of 1 month was .43 (Kovacs, 1985). In this sample, the internal consistency was good ($\alpha = .86$).

Anxiety. The State-Trait Anxiety Inventory for Children (STAIC; Spielberger, Edwards, Lushene, Montuori, & Platzek, 1973; French adaptation: Turgeon & Chartrand, 2003) is a self-report questionnaire assessing anxiety in children. The STAIC includes two scales of 20 items rated on a 3-point scale rated from 1 (*almost never*) to 3 (*often*). In the context of this study, we used only the State scale, which investigates current anxious thoughts and behaviors, as opposed to the Trait scale, which measures a stable predisposition to anxiety. The original English version demonstrated good internal reliability ($\alpha = .87$ for girls and $\alpha = .82$ for boys; Spielberger et al., 1973), which was confirmed in the French adaptation ($\alpha = .88$; Turgeon & Chartrand, 2003) and in this study ($\alpha = .86$). The test–retest reliability of the French adaptation (Turgeon & Chartrand, 2003) over a period of 6 months was .43.

Social desirability. We assessed *social desirability,* defined as a tendency to present oneself in an overly positive manner, through the 14-item subset of the Children's Social Desirability Scale (CSD 14-item subset; Baxter et al., 2004; adapted in French for this study.[4] Based on the original CSD scale (Crandall, Crandall, & Katkovsky, 1965), Baxter et al. (2004) created a short form of the CSD scale, selecting 14 items from the original 46-item scale. As Baxter et al., put it

> Items were selected for the shortened scale if they had high loadings on the first extracted factor and nonextreme endorsement rates (which is required for an item to contribute to differentiating among respondents); in addition, the set was selected to mirror the full scale in the proportion of items keyed "yes" for social desirability. (p. 87).

This short version is preferable for measuring social desirability in children, for whom the 46-item version might be too exhausting. The internal reliability of the CSD scale was good ($\alpha = .88$; Baxter et al., 2004) and was acceptable in this sample ($\alpha = .71$). The test–retest reliability was .79 for the CSD scale and .83 for the 14-item subset of CSD over a period of 28 days. The 14-item CSD subset is a dichotomous (true–false) scale. Higher scores indicate a higher tendency to respond in a socially desirable manner.

[1]The translation of the questionnaire was performed according to the International Test Commission guidelines for test adaptation (Hambleton, 2001). Items were first translated into French and then back translated into English. The translation/back-translation process was conducted entirely by bilingual people and supervised by the two first authors of this article (M. Lahaye and O. Luminet). After the back translation, problematic items were reviewed, discussed, and modified.

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TABLE 1.—Means, standard deviations, skewness, kurtosis and Cronbach's α of the EAQ30.[a]

Measure	No. of Items	Total Sample		Girls		Boys		Skewness[b]	Kurtosis[c]	α
		M	*SD*	*M*	*SD*	*M*	*SD*			
EAQ30 Total	30	2.16	.25	2.15	.23	2.18	.26*[d]	–.064	–.169	.74
Differentiating Emotions	7	2.28	.42	2.20	.40	2.36	.43**	–.181	–.692	.68
Verbal Sharing of Emotions	3	1.97	.61	1.92	.60	2.02	.62*	.012	–.892	.73
Not Hiding Emotions	5	1.98	.49	2.00	.49	1.97	.49	–.026	–.568	.71
Bodily Awareness	5	1.83	.52	1.72	.47	1.96	.55**	.293	–.702	.68
Attending to Others' Emotions	5	2.54	.42	2.65	.35	2.44	.46**	–1.012	.524	.69
Analyses of Emotions	5	2.26	.47	2.28	.44	2.23	.50	–.586	–.122	.65

Note. EAQ30 = Emotion Awareness Questionnaire 30.

[a] $N = 707$; 365 girls, 340 boys, two unreported. [b] Standard error of skewness estimations is 0.92. [c] Standard error of kurtosis estimations is 0.18. [d] Asterisks correspond to *p*values for gender differences *t* tests.

* $p < .05$. ** $p < .001$.

RESULTS

Descriptive Statistics

The means, standard deviations, skewness, kurtosis, and internal consistencies of the EAQ30 global score and its subscales are presented in Table 1. The EAQ30 total score demonstrated acceptable internal consistency reliability ($\alpha = .74$). Two subscales of the EAQ30 also displayed satisfactory internal consistency reliability ($\alpha = .73$ for Verbal Sharing of Emotions and $\alpha = .71$ for Not Hiding Emotions). The four other subscales have minimally acceptable Cronbach's alphas, varying between .65 and .70 (DeVellis, 1991). To test whether the reliability would differ among age groups, we computed Cronbach's alphas by age group. Results revealed that there were important differences between children and adolescents. In the younger age group, the internal consistencies varied between .61 and .68, which indicates poor internal consistency of the EAQ30 for young children. In the older age group, conversely, internal consistencies were generally good. With the exception of the subscale Analyses of Emotions ($\alpha = .63$), Cronbach's alphas varied between .73 and .82. The skewness and kurtosis of the EAQ30 total score indicated a normal distribution. For the EAQ30 subscales, it appeared that some of the skewness and kurtosis values differed by two standard errors, values above which the distribution differed from normality to a significant degree (Brown, 1997).

We conducted an independent samples *t* test to test for gender differences. The results for the EAQ30 scales revealed that boys had significantly higher scores than girls on the EAQ30 total score, $t(703) = 2.038$, $p < .05$, $d = .15$; Differentiating Emotions, $t(703) = 5.157$, $p < .001$, $d = .39$; Verbal Sharing of Emotions, $t(703) = 2.052$, $p < .05$, $d = .15$; and Bodily Awareness, $t(703) = 6.193$, $p < .001$, $d = .47$; and lower scores on Attending to Others' Emotions, $t(703) = -6.816$, $p < .001$, $d = -.51$. All gender effects held when age was controlled. Finally, age correlated positively with EAQ30 total score, $r = .15$, $p < .001$; Differentiating Emotions, $r = .11$, $p < .01$; and Attending to Others' Emotions, $r = .23$, $p < .001$; suggesting a small but significant effect of maturation on some of the dimensions.

Confirmatory Factor Analysis

We performed a confirmatory factor analysis to test the theoretical six-factor structure (Rieffe et al., 2008) using the structural equation modeling procedure through AMOS 16.0 (Arbuckle, 2007). To determine which model fit best with our data, we used a combination of different indexes, including a root mean square error of approximation (RMSEA) of .05 or less (Roussel, Durrieu, Campoy, & El Akremi, 2002), the goodness-of-fit index (GFI), the comparative fit index (CFI) over .90 (Medsker, Williams, & Holahan, 1994), and a nonsignificant chi-square test (χ^2/df). An acceptable proportion is 2:1 or 3:1 (Kline, 1998). We also considered the Akaike's information criterion (AIC; Akaike, 1987). Smaller values are preferred, as they indicate simpler models with good fit, whereas large values can indicate poorly fitting models.

The first six-factor model we tested presented two very high modification indexes, denoting a poor fit of the model (Roussel et al., 2002). To improve the model, we added two constraints. We allowed covariances between the error estimates of four items. These constraints could be theoretically explained by the closely related formulation of these two sets of items. The two first items were "when I am upset, I try not to show it"; and "when I am angry or upset, I try to hide this." The two other items were "when I am scared or nervous, I feel something in my tummy"; and "I don't feel anything in my body when I am scared or nervous." Therefore, we compared the first six-factor model with a second six-factor model wherein we allowed the errors for each of the preceding items to covary freely with its pair (for a total of two estimated covariances between the four error terms). Results are presented in Table 2. As can be observed, the chi-square difference test indicated that the two constraints significantly improved model fit, $\Delta\chi^2 = 175.43$, $p < .001$, with a RMSEA of 0.03 and a CFI and a GFI above the recommended 0.90 criterion (Medsker et al., 1994). We thus decided to keep the two constraints for all further analyses.

TABLE 2.—Fit indexes for six-factor model with and without constraints.

Model	*df*	χ^2	χ^2/df	CFI	GFI	RMSEA	AIC	$\Delta\chi^2$
Six-factor without constraint	390	865.28*	2.22	0.88	0.92	0.042	1015.28	/
Six-factor with two constraints	388	689.85*	1.78	0.92	0.94	0.033	843.85	175.43*

Note. CFI = comparative fit index; GFI = goodness of fit index; RMSEA = root mean square error of approximation; AIC = Akaike's information criterion; $\Delta\chi^2$ = chi-square difference test between the six-factor model with and without constraints.

* $p < .001$.

TABLE 3.—Fit indexes for nested models.

Model	Degrees of freedom	χ^2	χ^2/df	CFI	GFI	RMSEA	AIC	$\Delta\chi^2$
1	388	689.85*	1.78	0.92	0.94	0.033	843.85	/
2	393	907.24*	2.31	0.87	0.91	0.043	1051.25	217.39*
3	393	923.38*	2.35	0.86	0.91	0.044	1067.38	233.53*
4	397	1139.28*	2.87	0.81	0.89	0.051	1275.28	449.43*

Note. CFI = comparative fit index; GFI = goodness of fit index; RMSEA = root mean square error of approximation; AIC = Akaike's information criterion; $\Delta\chi^2$ = chi-square difference test between the best-fitting model and the three other nested models;
* $p < .001$.

To assess whether the six-factor model was the best representation of the data, we compared its fit to the fit of three theoretically plausible nested models. Therefore, the first model (Model 1) was the theoretical six-factor model proposed by Rieffe et al. (2008). The three other potential models were created on the basis of empirical results in combination with theoretical considerations. Model 2 was a five-factor model obtained by combining Verbal Sharing of Emotions and Not Hiding Emotions. These two dimensions could be theoretical linked because they concerned the verbal and overt expression of emotions (Rieffe et al., 2008). Moreover, these two dimensions were positively correlated ($r = .402$, $p < .001$). This model was called Acting Out Emotions in a previous version of the EAQ30 (Rieffe et al., 2008). Model 3 was also a five-factor model obtained by combining Attending to Others' Emotions and Analyses Emotions. These two dimensions were empirically correlated ($r = .327$, $p < .001$), and both relate to the way that children analyze emotions in general (their own emotions and other's emotions). This combination could correspond with one of the TEIque subscales (Emotion Perception) that integrated emotion perception in one's self and in others.[5] Finally, the fourth model (Model 4) was a four-factor model, integrating Model 2 (combination of Verbal Sharing of Emotions and Not Hiding Emotions) and Model 3 (combination of Attending to Others' Emotions and Analyses Emotions). Three other models could have been tested on the basis of the correlations between different EAQ30 subscales, but these other models were not theoretically relevant and thus we did not examine them. Table 3 presents the fit indexes for the different models.

As can be seen, the four different models presented RMSEA between .033 and .051 and a χ^2/df lower than 3:1. However, the six-factor model was the only model with a CFI greater than .90, the recommended threshold (Medsker et al., 1994). To compare these different models, we used a chi-square difference test. The results of the chi-square difference tests showed that the fits of the five- and four-factor models were significantly worse than the fit of the six-factor model. Moreover, the AIC is lower in the first model than in the three others, which is an indication of a better fit of the six-factor model.

[5]Emotion Perception: This scale concerns emotion perception in one's self as well as in others. High scores on the scale are obtained by individuals who are clear about what they feel at a particular point in time. They are also good at decoding other people's emotional expressions. In contrast, individuals with low scores on the emotion perception scale are often confused about how they feel and do not pay much attention to the emotional signals sent out by other people (Petrides, 2009, p. 59).

TABLE 4.—Fit indexes for multigroup comparison by age.

Model	*df*	χ^2	χ^2/df	CFI	GFI	RMSEA	AIC	$\Delta\chi^2$
Unconstrained	776	1108.68**	1.43	0.92	0.91	0.025	1416.68	/
Constrained	800	1149.19**	1.44	0.92	0.90	0.025	1409.19	40.51*

Note. CFI = comparative fit index; GFI = goodness of fit index; RMSEA = root mean square error of approximation; AIC = Akaike's information criterion; $\Delta\chi^2$ = chi-square difference test between the best-fitting model and the three other nested models.
* $p < .05$. ** $p < .001$.

Because some of the EAQ30 subscales were sensitive to age, which concurred with theoretical considerations (Denham, 2005), we computed a multigroup confirmatory factor analysis. We compared the factor structure of the EAQ30 for children between 8 and 12 years old and for adolescents between 13 and 16 years old. Thus, we compared two models. In the first one, regression weights among the factors were allowed to vary across the two groups (unconstrained model). In the second model, regression weights among the factors were constrained to be equal across the two age groups (constrained model). Results of this multigroup analysis are presented in Table 4. They revealed that the two models had good fit indexes: CFI and GFI were greater than .90, and the RMSEA was lower than .05. The results of the chi-square difference test showed a mild significant difference between the two models, which could be indicative of a difference between the children and adolescents' EAQ30 structure. As recommended in the literature, when we have to make a choice between different defendable models, the most reasonable choice should be determined by an "information theoretic fit measure" (Blunch, 2008, p. 200) such as the AIC. For this data set, the AIC was lower in the second model than in the first one, which indicates a better fit for the constrained model. These results thus suggest that the EAQ30 structure of children is not different from that of adolescents.

Correlations Between EAQ30 Subscales

Pearson product–moment correlations were computed between EAQ30 subscales to examine the factor intercorrelations. Furthermore, we correlated the theoretical Dutch factor scores with factor scores derived from the exploratory factor analysis of the Belgian data set. The Pearson product–moment correlations are presented in Table 5. These results suggested a high level of compatibility between the theoretical factor scores and the Belgian factor scores.

Convergent Validity

We evaluated convergent validity by computing Pearson product–moment correlations between the EAQ30 and both the alexithymia questionnaire and the TEIque–ASF. Results are presented in Table 6. The EAQ30 total score correlated positively with emotional intelligence and negatively with alexithymia (total score and subscales). The six EAQ30 subscales correlated positively with the TEIque–ASF and negatively with the total score of the alexithymia questionnaire for children.[6]

[6]We performed the same analyses separately for children (8- to 12-year-olds) and adolescents (13- to 16-year-olds). Results showed similar effect sizes in the two age groups.

TABLE 5.—Factor correlation matrix between factor scores derived from the Dutch coefficients and factor scores from the Belgian factor analysis.

Scale	Differentiating Emotions	Verbal Sharing of Emotions	Not Hiding Emotions	Bodily Awareness	Attending to Others' Emotions	Analyses of Emotions
Differentiating Emotions	**.867****	.343**	.160**	.321**	.044	–.045
Verbal Sharing of Emotions		**.863****	.402**	.109*	.161**	.085*
Not Hiding Emotions			**.854****	–.043	.274**	.193**
Bodily Awareness				**.854****	–.178**	–.267**
Attending to Others' Emotions					**.880****	.327**
Analyses of Emotions						**.876****

Note. $N = 707$. The diagonal (boldface) corresponds to the correlations between factor scores derived from the Belgian factor analysis and factor scores derived from the factor coefficients in the original Dutch factor analysis. The upper diagonal corresponds to the correlations among factor scores derived from the Belgian factor coefficients.

$^{*}p < .05$. $^{**}p < .001$.

Discriminant Validity[7]

To examine discriminant validity, we computed Pearson product–moment correlations between the EAQ30 and school results (Table 6). Results showed that only the Analyses of Emotions subscale of the EAQ30 was positively associated with the school results ($r = .24$, $p < .05$). The other subscales were not significantly associated with school performance.

Susceptibility to Socially Desirable Responding

Among EAQ30 subscales, only the dimension of Analyses of Emotions was associated with social desirability ($r = .24$, $p < .05$). The correlations between EAQ30 subscales and social desirability are presented in Table 6.

Concurrent Validity[8]

As expected, the EAQ30 total score was negatively associated with somatic complaints, state anxiety, and depressive symptoms (see Table 6). As can be observed, Differentiation of Emotions and Verbal Sharing of Emotions were negatively associated with these three measures. Not Hiding Emotions, Bodily Awareness, and Attending to Others' Emotions were partially negatively associated with somatic complaints anxiety and depression. Only the subscale Analyses of Emotions was not associated with these measures. Moreover, to explore the unique relations of EAQ30 subscales to validating criteria, we performed regression analyses. Results revealed that four subscales are particularly important in the prediction of the somatic complaints, anxiety, and depression. More specifically, regressions revealed a main effect of Differentiating Emotions and Bodily Awareness on somatic complaints, a main effect of Verbal Sharing of Emotions and Attending to Others' Emotions on anxiety, and a main effect of Verbal Sharing of Emotions and Bodily Awareness on depression. Together, these results suggest a negative relationship between four competences (Differentiating Emotions, Bodily Awareness, Verbal Sharing of Emotions, and Attending to Others' Emotions) and indicators of subjective physical and psychological health problems. All these effects persisted when gender was controlled (see Table 7).

[7]Discriminant validity refers to the degree to which scores on a test do not correlate with variables they are not supposed to correlate with given the nature of the construct.

[8]Concurrent validity is a criterion-related validation procedure characterized by the correlation between the predictor and the criterion obtained simultaneously (Cronbach & Meehl, 1955).

DISCUSSION

In this study, we provide preliminary but supportive evidence of the validity of the EAQ30, indicating that it is a useful inventory for researchers and practitioners who want to assess EC of French-speaking children. Reliably measuring individual differences in EC facilitates an understanding of the role of these competences in children's well-being as well as their social, physical, and psychological health. Indeed, in the adult literature, evidence in favor of the importance of EC for the individual's general adaptation to the environment is growing. However, in the childhood literature, research on EC and health is still very scarce. Therefore, the EAQ30 is an important first step to develop empirical knowledge about EC in children and their relationships with social adaptation and physical and psychological health. From a clinical perspective, the EAQ30 is an effective resource in the screening of children's emotional deficits. It allows practitioners to check which emotional competences are affected, potentially leading to the development of individualized interventions that treat or prevent social, physical, and psychological disorders.

In this study, we are the first to use a confirmatory analysis to test the stability of the EAQ30 structure and the first to investigate the convergent and discriminant validity as well as the susceptibility to socially desirable responding of the EAQ30. Internal consistencies of the EAQ30 total score and its six subscales were satisfactory for adolescents and minimally acceptable for children; they were close to the ranges obtained with the original Dutch version (Rieffe et al., 2008). A confirmatory factor analysis indicated that the Rieffe et al.'s (2008) six-factor structure fit our data better than competing models. Moreover, a multigroup analysis showed that the six-factor structure can be considered as equivalent in children and adolescents. As far as the factor structure is concerned, these findings provide a preliminary indication of the stability of the EAQ30 structure across languages and countries. These results converge with the findings of Lahaye et al. (2010) who showed that the congruence coefficients[9] between Belgian and Dutch factor structures were good to excellent according to the norms provided by MacCallum, Widaman, Zhang, and Hong (1999). Such stability suggests that the EAQ30 accurately captures the structure of children's emotional dispositions regardless of cultural differences.

[9]The congruence coefficient is an index of factor similarity. It is used to determine the factorial invariance of solutions across samples.

TABLE 6.—Convergent, discriminant, and concurrent validity of the EAQ30.

	N	EAQ30 Total	Differentiating Emotions	Verbal Sharing of Emotions	Not Hiding Emotions	Bodily Awareness	Attending to Others' Emotions	Analyses of Emotions
Convergent Validity								
Alexithymia	707	–.68**	–.54**	–.54**	–.39**	–.18**	–.27**	–.21**
DIF	707	–.53**	–.66**	–.37**	–.17**	–.41**	–.02	.11**
DDF	707	–.58**	–.44**	–.63**	–.41**	–.13**	–.17**	–.07
EOT	707	–.26**	.04	–.14**	–.23**	.21**	–.35**	–.46**
Emotional Intelligence	707	.57**	.43**	.38**	.30**	.21**	.24**	.20**
Discriminant Validity								
School performance	73	.14	–.04	.00	.01	.12	.17	.24*
Concurrent Validity								
Somatic complaints	82	–.52**	–.42**	–.35**	–.30**	–.44**	–.20	.11
Anxiety	81	–.39**	–.20	–.35**	–.16	–.24*	–.25*	–.05
Depression	88	–.52**	–.35**	–.43**	–.18	–.40**	–.25*	–.03
Social desirability	86	.07	–.03	–.07	–.07	.09	.05	.25*

Note. EAQ30 = Emotion Awareness Questionnaire 30; DIF = difficulty in identifying feelings; DDF = difficulty in describing feelings; EOT = externally oriented thinking.
* $p < .05$. ** $p < .01$.

Regarding demographic data, EAQ30 scores seemed dependent on age and gender. We found small but significant positive associations between age and EAQ30 total score, Differentiating Emotions, and Attending to Others' Emotions. These findings were consistent with the literature about the learning of EC (Borke, 1971; Denham, 2005). As children grow up and experience progressively more emotions, they learn how to recognize their emotions and react in emotional situations, resulting in more developed EC. However, the Verbal Sharing of Emotions, Not Hiding Emotions, Bodily Awareness, and Analyses of Emotions subscales were not influenced by age. A possible explanation is that Differentiating Emotions and Attending to other's Emotions are more sensitive than the other subscales to developmental factors. Or perhaps some competences (Verbal Sharing of Emotions, Not Hiding Emotions, Bodily Awareness, and Analyses of Emotions) are fully acquired before 8 years of age. Longitudinal studies are required to confirm our findings and to better understand the underlying mechanisms.

We also found gender differences on the global EAQ30 score—and on several subscales—that held when age was controlled. Girls scored higher than boys on Attending to Others' Emotions. This result is consistent with research on gender differences in empathy and altruism, two characteristics that require attention to others' emotions. In a meta-analysis, Eisenberg and Lennon (1983) revealed that women perceived themselves as more empathic than men. Studies of children's personality showed that girls between 6 and 14 years old were perceived by their parents as more altruistic than boys (De Fruyt & Vollrath, 2003; Rossier, Quartier, Enescu, & Iselin, 2007). The other gender differences were relatively unexpected: Boys scored higher on the EAQ30 global score, Differentiating Emotions, Verbal Sharing of Emotions, and Bodily Awareness. These findings are contrary to the commonly held belief that girls are more expressive and more aware of their emotions than boys. Perhaps girls tended to score lower than boys on the EAQ30 because girls were less confident in their EC or because girls

TABLE 7.—Hierarchical regression analyses predicting somatic complaints, anxiety, and depression by EAQ30 subscales and gender.

	Somatic Complaints		Anxiety		Depression	
	β	*t*	β	*t*	β	*t*
Step 1 (EAQ30 subscales)	R^2adj = .25		R^2adj = .14		R^2adj = .26	
	$F(6, 80) = 5.54$, $p < .001$		$F(6, 81) = 3.25$, $p < .01$		$F(6, 87) = 6.20$, $p < .001$	
Differentiating Emotions	–.23	–1.96*	.00	–0.003	–.11	–1.05
Verbal Sharing of Emotions	–.08	–.70	–.32	–2.62*	–.31	–2.80*
Not Hiding Emotions	–.15	–1.45	–.04	–0.37	–.01	–0.08
Bodily Awareness	–.25	–2.22*	–.11	–1.03	–.24	–2.34*
Attending to Others' Emotions	–.12	–1.14	–.22	–2.02*	–.18	–1.78
Analyses of emotions	.05	0.45	–.06	–0.54	–.06	–0.67
Step 2 (EAQ30 subscales when	R^2adj = .28		R^2adj = .13		R^2adj = .26	
gender is controlled)	$F(6, 80) = 5.36$, $p < .001$		$F(6, 81) = 2.78$, $p < .05$		$F(6, 87) = 5.43$, $p < .001$	
Differentiating Emotions	–.21	–1.84	.00	–0.003	–.10	–0.93
Verbal Sharing of Emotions	–.05	–.45	–.31	–2.45*	–.29	–2.59*
Not Hiding Emotions	–.10	–1.00	–.03	–0.24	–.01	–0.13
Bodily Awareness	–.23	–1.98*	–.11	–0.97	–.23	–2.17*
Attending to Others' Emotions	–.14	–1.29	–.22	–2.02*	–.18	–1.85
Analyses of emotions	.04	0.40	–.06	–0.55	–.07	–0.70
Gender	–.19	–1.80	–.05	–0.39	–1.00	–0.95

Note. EAQ30 = Emotion Awareness Questionnaire 30.
* $p < .05$.

expected more from themselves. The higher scores of boys on EAQ30 total score, Differentiating Emotions, Verbal Sharing of Emotions, and Bodily Awareness could also reflect real differences between boys and girls in the way they express, differentiate, and feel emotions. Future research should attempt to replicate these gender differences and to uncover the mechanism underlying them.

The EAQ30 shows good convergent validity with TEIque–ASF (a measure of emotional intelligence of adolescents) and with the Alexithymia Questionnaire for Children. Although these three constructs are closely related, they are theoretically distinguishable. The EAQ30 measures six dimensions of EC, whereas the Alexithymia Questionnaire for Children examines three deficits in EC; and the TEIque–ASF measures not only EC but also social competences, well-being, and self-control skills (Petrides & Furnham, 2001). Further research is required to demonstrate the incremental validity of the EAQ30 over these other questionnaires.

The discriminant validity of the EAQ30 was investigated in relation to school performance, an indicator of cognitive ability. Results showed that EC was weakly associated with school performance. These results dovetail with Mavroveli, Petrides, Shove, and Whitehead's (2008) finding that there is nearly no overlap between EC and school performance. That said, it is important to note that school performance could be influenced by EC, especially for children with low IQs (Petrides et al., 2004).

Social desirability is often considered as an individual characteristic that potentially biases the responses to self-report measures (Cronbach, 1946). The low correlations between EAQ30 scores and social desirability suggest that the EAQ30 is largely immune to social desirability effects, a feature that supports the validity of the EAQ30 as a self-report questionnaire. However, one can not conclude from this finding that the EAQ30 is insusceptible to state manipulations. Future studies will have to examine this possibility more thoroughly.

As the quality of an instrument also depends on its ability to predict interesting and meaningful outcomes, we investigated the predictive effect of the EAQ30 on three important health-related variables: somatic complaints, anxiety, and depressive symptoms. We chose these three criteria because they represent important indicators of children's well-being, and they have been shown to predict negative health outcomes later in life including depression, anxiety, personality disorders, behavioral problems, weight problems, and drug abuse (Kasen et al., 2001; Pine, Cohen, Gurley, Brook, & Ma, 1998; Pine, Goldstein, Wolk, & Weissman, 2001; Roza, Hosfstra, van der Ende, & Verhulst, 2003; Weissman et al., 1999; Zwaigenbaum, Szatmari, Boyle, & Offord, 1999). As we pointed out earlier, our data showed a negative association between the EAQ30 (except for Analyses of Emotions) and anxiety, depressive symptoms, and somatic complaints, suggesting that the EAQ30 could be useful and efficient in the screening and prevention of mental and somatic disorders. Note that even if these results provide an interesting indication about the links between the EAQ30 and health-related measures, it does not mean that high EAQ30 scores cause better psychological and physical health. Experimental and longitudinal studies are necessary to test causal relationships between the EAQ30 and indicators of physical and psychological health.

Some limitations of this research must be acknowledged. First, we measured all variables through self-report; future research should include objective measures of children's health to confirm the construct validity of the EAQ30. Second, additional studies should test the incremental and predictive validity of the EAQ30. Third, we assessed convergent validity using the TEIque–ASF and the Alexithymia Questionnaire for children, which were both translated in French for this study. However, beyond indexes of reliability (Cronbach's alphas), research has yet to examine the psychometric properties of these instruments in French. Finally, the questionnaire itself suffers from several weaknesses. First and foremost, the global score of the EAQ30 has to be interpreted with caution considering the negative correlations that exist between some of its subscales. Theoretically, to calculate a global score, all EAQ30 subscales should be positively associated. However, this limitation does not seem to bring into question the concurrent, convergent, and discriminant validity of the EAQ30. The second limitation concerns the Bodily Awareness subscale. In our view, the name of this subscale does not reflect adequately the items comprised in it: "When I am scared or nervous, I feel something in my tummy" (reversed); "My body feels different when I am upset about something" (reversed); and "I don't feel anything in my body when I am scared or nervous" seem to reflect a lower bodily reactivity in emotional situations rather than a higher bodily awareness. Therefore, it might be useful to find a new name for this subscale. Third, the EAQ30 only measures negative emotions. Positive emotions, however, represent an important part of children's feelings that also must be differentiated, understood, regulated, and expressed. Items based on positive emotions could be a worthwhile complement to the questionnaire. A final limitation concerns the items forming the subscales Verbal Sharing of Emotions and Attending to Others' Emotions. These items refer to sharing emotions with peers and do not measure emotional sharing with the family. However, some studies have reported that children mainly express their emotions to their parents (e.g., Rimé, 2005). Adolescents ranging from 12 to 17 years old communicate two thirds of their emotional experiences with their family and one third with their friends (e.g., Rauw & Rimé, 1991). Therefore, it would be appropriate to include items referring to emotion sharing with family.

Conclusions

This study represents the first rigorous psychometric investigation of a questionnaire about children's EC in a French-speaking population. Even though we suggest several ways for the improvement of the EAQ30, the results of this study seem promising. The factor structure is very stable across countries. The EAQ30 displays evidence of convergent and discriminant validity and does not appear to be susceptible to socially desirable responding. Considering the impact of somatic complaints, anxiety, and depressive symptoms on a child's future, strong negative correlations between EAQ30 and these three measures underscore the importance of assessing children's EC. The EAQ30 can be deemed a useful measure of children's EC and can be recommended for both clinical and research purposes, although future studies are necessary to confirm and elaborate on the nature of its predictive and incremental validity.

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