

Adaptation and validation of the French version of empathy questionnaire in preschoolers

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Abstract

At preschool age, children need to develop socio-emotional skills, including empathy, in order to adapt their response during social interactions with peers and adults in various contexts. When preschoolers face difficulties in their social interactions, it is relevant to assess their empathy in order to know whether a specific preventive intervention is needed. This study aimed to adapt and validate the French version of the Empathy Questionnaire (EmQue-vf), which was completed by Belgian mothers of 307 children aged from 2 to 6 years. Mothers also completed the Griffith Empathy Measure (GEM-vf), Theory of Mind Inventory (ToMI1-vf) and Emotion Regulation Checklist (ERC-vf). A CFA confirmed a three-factor structure for EmQue-vf, including 14 items loading onto three factors: (1) Emotion Contagion, (2) Attention to Others' Feelings, and (3) Prosocial Actions. This structure was confirmed for the boys' and girls' samples treated separately, as well as for the overall sample. Internal consistency ranged from acceptable for Emotion Contagion to good for Attention to Others' Feelings and Prosocial Actions. In terms of concurrent criterion validity with GEM-vf, the three factors of EmQue-vf correlated positively with the affective empathy score and only the Prosocial Actions scale was positively linked with the cognitive empathy score.

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In terms of construct validity, Pearson's correlations showed a positive link between age and Prosocial Actions. Moreover, the three EmQue-vf subscales were linked positively to Theory of Mind and emotion regulation scores. A negative link was obtained between Prosocial Actions and emotion dysregulation scores. In conclusion, EmQue-vf presents good psychometric qualities. It will be a useful in future research and interventions involving French-speaking children with and without developmental disorders.

KEYWORDS

attention to others' feelings, emotion contagion, empathy, French validation, prosocial actions

1 | INTRODUCTION

In the last two decades, research interest in empathy has been growing and the importance has been emphasized of assessing and supporting this competence from an early age (for a review, see Simon & Nader-Grosbois, 2023). In developmental psychology, empathy has been defined as an emotional response based on an understanding of another's emotional situation (Eisenberg et al., 2006, p. 647). However, theoretical models have evolved from a unidimensional to a multidimensional approach, forming the basis for distinct kinds of measures. Measures based on a unidimensional model assess a global level of empathy through questionnaires (e.g., Empathy Quotient for children and adult, Auyeung et al., 2009; Baron-Cohen & Wheelwright, 2004), whereas those developed with reference to a multidimensional background evaluate different components of empathy (for example, the Griffith Empathy Measure (Dadds et al., 2008)), or progressive stages of empathy (such as the Empathy Questionnaire, EmQue, Rieffe et al., 2010).

Based on past research, Hoffman (1987) designed a developmental model to highlight how children acquire empathic skills in four stages. In his view, empathy refers to a subject's emotional state induced by the emotional state of another person and corresponds more to the state of that person than to the state of the subject (Hoffman, 2000, p. 7). The first stage, during an infant's first year, is "Emotion Contagion": the automatic imitation of and synchronization with the other person's emotional reactions, such as facial expressions, gestures, vocalizations and behaviors, as if those emotions were the child's own (Decety, 2010; Hatfield et al., 1993; Hoffman, 1987, 2007). In the second stage, called "Attention to Others' Feelings," from 1 year of age, children develop their consciousness of other people's emotions. They feel less personal distress, allowing them to direct their attention and interest towards other people's emotions and to develop their early understanding of basic emotions (Decety, 2010, 2015; Hoffman, 1997, 2000). The early development of self-regulation skills helps them to soothe their own emotions and to become open to emotions felt by others. At the third stage, "Prosocial Actions," which begins in the second year of life, children can be concerned about others' emotions and become able to help, support or comfort other people who express distress (Eisenberg et al., 1999, 2006; Hoffman, 1987, 2007). The last stage, called "Empathy for Another's Life Condition," from late childhood, corresponds to empathic skills about the general context of another person's life (e.g., being empathic for homeless people).

With reference to this developmental model, Rieffe et al. (2010) created the Empathy Questionnaire (EmQue) to capture empathy development at early and preschool age. It was designed to assess parents' perception of empathy in children aged between 1 and 5 years. It consisted of 20 items presenting situations that children could experience

in their daily lives with other children. The initial exploratory factor analysis of EmQue conducted by Rieffe et al. (2010) emphasized three factors, corresponding to the first three stages described by Hoffman (1987). In support of the measure's validity, Rieffe et al. (2010) demonstrated that the three components of EmQue were related positively to prosocial behavior. A positive link between empathy and understanding of emotional and subjective mental states (referring to Theory of Mind) was reported in the original validation of EmQue, in accordance with the results of other studies (e.g., Bensalah et al., 2016; Hinnant & O'Brien, 2007). Moreover, it was demonstrated that children with high levels of emotion contagion regulate their emotions less well (Rieffe et al., 2010).

Given the promising psychometric properties of EmQue's initial version, several researchers have adapted and validated EmQue in other countries, with samples of differing age ranges. Table 1 presents information about the samples (N, age ranges) and main findings of studies examining the psychometric properties (reliability and validity, including factorial validity) of translated versions of EmQue. There are versions in Italian (Grazzani et al., 2017), in Lithuanian (Lazdauskas & Nasvytienė, 2021), in Japanese (Takamatsu et al., 2021), in Spanish (Lucas-Molina et al., 2018) and in Portuguese (da Silva et al., 2022). Most of these studies included preschoolers, but they focused on different ranges of age. For example, Grazzani et al. (2017) validated EmQue on a younger sample of children aged 18–36 months, Takamatsu et al. (2021) on children aged 1–6 years and Lucas-Molina et al. (2018) on children aged 3–4 years. All these validations confirmed the three-factor structure aligned with the first three developmental stages of empathy, as developed by Rieffe et al. (2010) for the original EmQue. However, the number of items varied across the translated versions. Although Rieffe et al. (2010) validated a version with 19 of the 20 initial items, the Italian version contained 13 items (Grazzani et al., 2017), which was confirmed in the Spanish version (Lucas-Molina et al., 2018) and in the Japanese version (Takamatsu et al., 2021). The Lithuanian version (Lazdauskas & Nasvytienė, 2021) and the Portuguese version (da Silva et al., 2022) comprised 15 items, but the selected items differed slightly between the two. Item 19 (*When another child cries, my child looks away*) was systematically excluded from analysis in all these studies, but apart from this the remaining choice of items varied, depending on the culture. All these versions showed an equivalent or better internal consistency than the original version. Finally, Grazzani et al. (2017) and Takamatsu et al. (2021) demonstrated that EmQue structure was invariant across gender, whereas Lazdauskas and Nasvytienė (2021) showed a partial invariance between the structure of EmQue for boys and girls.

To test the validity of EmQue across different cultures, the authors of these validations have explored the relation between the three subscales of the questionnaire and other areas of psychological development, such as emotion regulation, or social skills. At preschool age, Lucas-Molina et al. (2018), through their Spanish validation of EmQue, demonstrated that emotion regulation at the age of 3–4 years was linked positively with Prosocial Actions at the same age, while Attention to Others' Feelings at 3 years was positively related to emotion regulation at 4 years. These relations are consistent with the findings of other studies using other measures, which have emphasized a positive relationship between empathy and emotion regulation in preschoolers (Hein et al., 2018; Lee et al., 2016; Nader-Grosbois & Simon, 2023), so that empathic children managed their emotions better in critical socio-emotional situations (Hein et al., 2018; Lee et al., 2016; Lucas-Molina et al., 2018). Conversely, Nader-Grosbois and Simon (2023) highlighted that empathy, as assessed by the GEM (Dadds et al., 2008; French version, Nader-Grosbois & Simon, 2023), was linked negatively to emotion dysregulation in children between 3 and 12 years old. Moreover, da Silva et al. (2022) found a positive link between the three subscales (Emotion Contagion, Attention to Others' Feelings and Prosocial Actions) of the Portuguese version of EmQue and prosocial behaviors. This had also been demonstrated in earlier studies: empathic children use more prosocial behaviors, have more appropriate social skills (e.g., Belacchi & Farina, 2012; Findlay et al., 2006; Simon & Nader-Grosbois, 2021), and are more sensitive to injustice and inequity (Gevaux et al., 2020). A negative link between the Prosocial Actions subscale and aggression was also reported in this study (da Silva et al., 2022). Beyond prosocial actions, some past studies have concluded that empathy seems to be negatively related to externalized behavior problems, including aggressiveness (Simon & Nader-Grosbois, 2021).

Although EmQue has been adapted for use in several languages, it has not yet been translated and validated in French, one of the five most widely spoken languages in the world. The absence of a validated empathy

TABLE 1 Psychometrics qualities of EmQue for the original version and in other languages.

Authors	Sample	Factors (number of items)	Cronbach's alpha	Test-retest	Convergent validity	Discrimination with age	Concurrent validity
Rieffe et al. (2010) Original version	N = 109 1–5-years	19 items:	EC : $\alpha = .58$	/	EC: Empathy task - Attention to others' emotions: $r = -.01$ - Consolation: $r = -.39^*$	EC : $r = .04$ AOF : $r = .17^*$ PA : $r = .54^{**}$	EC : -SDQ—Prosocial behavior : $r = .23^{**}$ -EEQ—Emotion regulation : $r = -.16^*$ -EEQ—Recognition of others' emotions: $r = .19^*$ -EEQ—Emotion understanding: $r = .18^*$ -Frustration task—Diverison : $r = -.37^*$ -Desire task : $r = .20$
		EC – 6 items	AOF : $\alpha = .71$				
		AOF – 7 items PA – 6 items	PA : $\alpha = .80$				
		AOF: Empathy task - Attention to others' emotions): $r = .35^*$ - Consolation: $r = .25$		PA: Empathy task - Attention to others' emotions): $r = .32^*$ - Consolation: $r = .41^*$			AOF : -SDQ—Prosocial behavior : $r = .40^{**}$ -EEQ—Emotion regulation : $r = .02$ -EEQ—Recognition of others' emotions: $r = .48^*$ -EEQ—Emotion understanding: $r = .29^{**}$ -Frustration task—Diverison : $r = -.19$ -Desire task : $r = .32^*$
							PA : -SDQ—Prosocial behavior : $r = .67^{**}$ -EEQ—Emotion regulation : $r = -.01$ -EEQ—Recognition of others' emotions: $r = .43^{**}$ -EEQ—Emotion understanding: $r = .62^{**}$ -Frustration task—Diverison : $r = -.25$ -Desire task : $r = .34^*$

(Continues)

TABLE 1 (Continued)

Authors	Sample	Factors (number of items)	Cronbach's alpha	Test-retest	Convergent validity	Discrimination with age	Concurrent validity
Grazzani et al. (2017) Italian version	N = 304 18–36 months	13 items:	EC : $\alpha = .73$	/	/	EC: $r = .08$ AOF: $r = -.09$ PA: $r = .18^{**}$	/
		EC (4 items)	AOF : $\alpha = .74$				
		AOF (5 items) PA (4 items)	PA : $\alpha = .80$				
Lucas-Molina et al. (2018) Spanish version Similar to the Italian version	N = 103 3 and 4-years	13 items:	At 3 years:	/	/	EC: not reported AOF: $r = -.13^{*}$ PA: $r = .13^{*}$	EC at 3 years: - Emotion regulation at 3 years: $r = .10$ - Emotion regulation at 4 years: $r = .07$ EC at 4 years: - Emotion regulation at 3 years: $r = .06$ - Emotion regulation at 4 years: $r = .08$ AOF at 3 years: - Emotion regulation at 3 years: $r = .17$ - Emotion regulation at 4 years: $r = .29^{**}$ AOF at 4 years: - Emotion regulation at 3 years: $r = .12$ - Emotion regulation at 4 years: $r = .32^{**}$ PA at 3 years: - Emotion regulation at 3 years: $r = .41^{**}$ - Emotion regulation at 4 years: $r = .03$ PA at 4 years: - Emotion regulation at 3 years: $r = .33^{**}$ - Emotion regulation at 4 years: $r = .37^{**}$
		EC (4 items)	EC: $\alpha = .58$				
		AOF (5 items)	AOF: $\alpha = .64$				
		PA (4 items)	PA: $\alpha = .83$				
		structural	At 4 years:				
		stability one	EC: $\alpha = .60$				
		year later	AOF: $\alpha = .62$				
			PA: $\alpha = .75$				

(Continues)

TABLE 1 (Continued)

Authors	Sample	Factors (number of items)	Cronbach's alpha	Test-retest	Convergent validity	Discrimination with age	Concurrent validity
Takamatsu et al. (2021) <i>Japanese version</i> Similar to the Italian version	N = 550 1–6 years	20 items:	EC : $\alpha = .75$	/	/	EC: $r = -.04$ AOF: $r = -.06$ PA: $r = .20$	/
		EC (7 items)	AOF : $\alpha = .74$				
		AOF (7 items)	PA : $\alpha = .84$				
		PA (6 items)					
		13 items:					
Lazdauskas and Nasvytienė (2021) <i>Lithuanian version</i>	N = 218 2–6 years	EC (4 items)		On 22 children:	/	/	/
		AOF (5 items)	EC : $\alpha = .75$				
		PA (6 items)	AOF : $\alpha = .70$				
		PA (4 items)	PA : $\alpha = .83$				
			EC: $r = .83^{***}$				
da Silva et al. (2022) <i>Portuguese version</i>	N = 250 3–6 years	15 items:	EC : $\alpha = .76$	/	/	EC: not reported AOF: $r = -.13^*$ PA: $r = .13^*$	EC: - Emotion recognition: $r = .112$ - Prosocial behavior: $r = .324^{**}$ - Aggression: $r = .094$ AOF: - Emotion recognition: $r = .274^{**}$ - Prosocial behavior: $r = .241^{**}$ - Aggression: $r = .061$ PA: - Emotion recognition: $r = .263^{**}$ - Prosocial behavior: $r = .495^{**}$ - Aggression: $r = -.181^*$
		EC (5 items)	AOF : $\alpha = .81$				
		AOF (6 items)	PA : $\alpha = .82$				
		PA (4 items)					

Note: EC = emotion contagion; AOF = attention to others' feelings; PA = prosocial actions;
* $p < .05$; ** $p < .01$; *** $p < .001$.

measurement instrument in French, applicable to preschool children, limits the potential for research in this field and evaluation by psychologists, using a reliable measure adapted to typically and atypically developing children living in French-speaking regions and cultures.

1.1 | Objectives

To examine new hypotheses about empathy at preschool age, it is essential to use valid and reliable measures, including hetero-reported questionnaires, such as EmQue, based on developmental progression of empathy. Therefore, the aim of this study was to adapt EmQue in French, one of the five most widely spoken languages in the world, and validate EmQue-vf to measure parents' perception of empathic skills in their children aged between 2 and 6 years. Five objectives were targeted to gauge the psychometric properties of EmQue-vf: (1) to confirm the three-factor structure, namely Emotion Contagion (EC), Attention to Others' Feelings (AOF), and Prosocial Actions (PA); (2) to examine internal consistency; (3) to examine the concurrent criterion validity of EmQue-vf scores with both the affective and cognitive empathy scores of GEM-vf; and (4) to gauge the measure's construct validity through the links between the scores of the three EmQue-vf subscales and (a) age, (b) scores of Theory of Mind Inventory (ToMI-vf), and (c) scores of emotion regulation and emotion dysregulation, assessed by Emotion Regulation Checklist (ERC-vf).

In line with previous psychometric evaluations studies, it was hypothesized that EmQue-vf would be found to be composed of three factors, similar to those found by Rieffe et al. (2010), in coherence with Hoffman's model (2000). As the number of items varied across studies due to cultural and age differences, it was expected that EmQue-vf might include less items than the original version, due to the removal of poorly performing items. Further, it was decided to explore measurement invariance depending on children's gender, with an assumption of strict equivalence in the questionnaire structure between boys and girls. Regarding reliability, it was expected that the internal consistency of EmQue-vf scores would be acceptable, as in previous adaptations. Moreover, in terms of concurrent criterion validity, it was expected that AOF and PA would positively correlate with affective and cognitive empathy. Regarding construct validity, it was further hypothesized that EC, AOF and PA would be differently correlated with age, in line with Hoffman's conception (1987). It was expected that EC and AOF would decrease and that PA would increase with age, during the preschool period of development. Moreover, positive correlations were predicted between the EmQue-vf subscales and both the Theory of Mind score (Rieffe et al., 2010), and the emotion regulation score (Lucas-Molina et al., 2018; Rieffe et al., 2010). Finally, a negative association of AOF and PA with emotion dysregulation was expected.

2 | METHOD

2.1 | Participants

As inclusion criteria, participants had to be typically developing children, aged between 2 and 6 years. Children and their parents also had to speak French. Children who presented developmental delays or disorders (internalized or externalized behavior, suspicion of autism, language delay or intellectual disability) were excluded from the sample. From the initial sample of 344 children (see the preliminary analyses section), 307 Belgian preschoolers (175 girls and 132 boys) aged from 24 to 84 months ($M = 54.57$; $SD = 14.43$) were included in the study. They were recruited in nurseries and kindergartens of the French-speaking region of Belgium. 87.7% of the children lived with their two parents, whereas 4.3% and 3.7% of them principally lived with their mother or father, respectively. 4.3% of children lived alternately with their mother and father. Table 2 shows information about socioeconomic status, including parents' education level and family income. Concerning the level of education, most parents had a bachelor's (31.8% for

TABLE 2 Demographics characteristics of participants' families.

	M (SD)	(%)
<i>Mothers' education level</i>	5.14 (1.12)	
Primary school		2.1%
Vocational qualification		8.5%
High school qualification		12%
Bachelor's degree		31.8%
Master's degree		42%
<i>Fathers' education level</i>	4.78 (1.28)	
Primary school		2.5%
Vocational qualification		18.1%
High school qualification		18.8%
Bachelor's degree		21.3%
Master's degree		37.2%
PhD		2.2%
<i>Family income</i>	8.28 (2.47)	

mothers and 21.3% for fathers) or a master's degree (42% for mothers and 37.2% for fathers). In terms of family income, parents had to report the mean of their salaries and benefits on a 13-point subscale from 0–500 euros to more than 6000 euros. The median income reported by parents corresponded to the range of 4000–4500 euros per month.

2.2 | Measures

2.2.1 | Empathy questionnaire

In this study, following recommendations from Rieffe and colleagues, the 20 items of this questionnaire were first translated into French (EmQue-vf) by the two principal investigators, who are specialists in developmental psychology. A back-translation procedure (as recommended by Brislin, 1986) was then performed by a bilingual English- and French-speaking researcher in psychology who was not informed about the objective of this study. Finally, the back-translation was sent to Rieffe's team, which validated it. The similarity rate between the original version and the back-translation was 98.5%. The Likert scale used in the original version of EmQue was a 3-point scale from "not true" to "certainly true." To consider the frequency of children's behaviors more closely and avoid participants always choosing the central response (neutral response bias), this scale was changed in the French version to a 4-point Likert scale, from "never" to "always." Accordingly, parents had to estimate how frequently children's empathic reactions and/or behaviors had occurred in the last two months for each of the 20 items. In line with previous validation studies, the mean of each subscale was calculated (out of four points).

2.3 | Griffith empathy measure

Parents also completed the French version of the Griffith Empathy Measure (GEM, Dadds et al., 2008; GEM-vf, Nader-Grosbois & Simon, 2023), which assessed their perception of children's affective (13 items) and cognitive empathy (4

items). Through 17 items, parents indicated their degree of agreement on a 9-point Likert scale, ranging from “Strongly disagree” (−4) to “Strongly agree” (4). For each subscale, a mean score from −4 to 4 points was computed. The original version of this questionnaire was designed to evaluate the skills of children and adolescents aged 4–16 years, whereas the French version was validated among children aged 3–12 years. Internal consistency for the original version of the GEM was good for affective empathy (Cronbach's $\alpha = .83$) but limited for cognitive empathy (Cronbach's $\alpha = .62$). It was acceptable for total empathy (Cronbach's $\alpha = .79$). In the present study, internal consistency was acceptable for affective empathy (Cronbach's $\alpha = .72$) but limited for cognitive empathy (Cronbach's $\alpha = .58$). It was acceptable for total empathy (Cronbach's $\alpha = .76$).

2.4 | Theory of mind inventory

Parents completed the French version of the Theory of Mind inventory (ToMI-1, Hutchins et al., 2012; ToMI-1-vf, Houssa et al., 2014), assessing children's understanding of cognitive and affective mental states. This questionnaire was validated in French for children aged 3–6 years. Through 39 items, parents had to indicate the frequency or intensity of children's behaviors related to the application of Theory of Mind in everyday situations, on a continuum from “Absolutely not” (0) to “Completely” (20). The total score of ToMI-1-vf, based on the mean of each item, ranged from 0 to 20. Internal consistency of ToMI-1-vf was good in the validation study (Cronbach's $\alpha = .94$) and in the present study (Cronbach's $\alpha = .95$). As Theory of Mind is sometimes considered as cognitive empathy in the literature (e.g., Blair, 2005; Farrant et al., 2012), it was verified that the item concerning affective mental states in ToMI-vf (*My child understands that when a person frowns, they're feeling something different than when they smile*) was different from those of EmQue-vf to avoid overinflation of validity.

2.5 | Emotion regulation checklist

The French version of the Emotion Regulation Checklist (ERC, Cicchetti & Shield, 1997; ERC-vf, Nader-Grosbois & Mazzone, 2015) provides information about parents' perception of emotion regulation and dysregulation in children aged 3–12 years. On a 4-point Likert scale ranging from “Never” to “Always,” mothers or fathers evaluated the frequency of children's behaviors or reactions in daily life situations. A mean score from 0 to 4 points was computed for emotion regulation (eight items) and dysregulation (15 items). In the validation study, the internal consistency of ERC-vf was acceptable for emotion regulation (Cronbach's $\alpha = .66$) and for emotion dysregulation (Cronbach's $\alpha = .75$). In the present study, internal consistency was acceptable for emotion regulation (Cronbach's $\alpha = .66$) and good for emotion dysregulation (Cronbach's $\alpha = .83$).

2.5.1 | Procedure

The Ethics Committee of the Psychological Sciences Research Institute of UCLouvain approved the research procedure of the present study. Participants were recruited on a voluntary basis, through an invitation distributed by nursery managers and kindergarten directors. An information document, explaining the general aims of the study and the conditions for participation, and a consent form were given to interested parents. Once consent had been given, mothers received a short form to provide general information about the children and their family (e.g., number of siblings, parents' education level, family income). The four questionnaires relating to empathy (EmQue-vf and GEM-vf), Theory of Mind (ToMI-vf) and emotion regulation (ERC-vf) were also provided to mothers, who completed them in a random order. The information form and questionnaires were completed either on paper ($N = 202$) or online ($N = 105$). At the end of their participation, mothers and children received a small gift by way of thanks.

2.5.2 | Data analysis

A preliminary missing data analysis was performed to maximize the power of the statistical analyses. Before performing a confirmatory factor analysis, an item analysis was run to target the most sensitive items. To do this, difficulty and discrimination indexes were explored. To evaluate the difficulty index, the formula $p_i = (X - X_{\min}) / (X_{\max} - X_{\min})$ for polythomic items was used, and items below .2 or above .8 were deleted (Laveault & Grégoire, 2014). Finally, the discrimination index was evaluated using the method of Laveault and Grégoire (2014), which considers the difference between the difficulty index of the 27% of highest-scoring and lowest-scoring participants for each item. An index below .2 led to the suppression of the item (Laveault & Grégoire, 2014). To test the factorial validity of EmQue, a confirmatory factor analysis (CFA) was performed using Stata 17. The CFA allows measurement models to be developed by considering the degree of fit with a given sample (Kline, 2012). Some indicators of goodness of fit were considered in the CFA, using specific cut-off values, which are those used in the different validation studies. The root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR) were <.08, while the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) were >.9 and close to or greater than .95 (Cheung & Rensvold, 2002) respectively. Three models were tested. The initial model consisted of 20 items, while the second model consisted of 19 items, with item 19 excluded in accordance with the original version and other validations. The third model comprised 14 items, excluding items that showed a lack of sensitivity. Measurement invariance (MI) was then tested using multigroup CFA in the SEM framework. MI provides support for the equivalence of the measurement model between different groups (Koh & Zumbo, 2008). Three models were used to assess MI across genders: configural invariance (baseline), which tested MI without any constraints on gender; metric invariance (weak), where all factor loadings were constrained to be equal between genders; and scalar invariance (strong), which constrained the item intercepts between genders. For each model, Δ RMSEA, Δ CFI, Δ SRMR, $\Delta \chi^2$ and χ^2/df were considered. MI across gender was rejected if Δ RMSEA, Δ CFI, Δ SRMR were >.01 (Chen, 2007), if χ^2/df was >2 and if the p-value associated with $\Delta \chi^2$ was significant (Cheung & Rensvold, 2002). Finally, internal consistency and validity were assessed using IBM SPSS 27.

3 | RESULTS

3.1 | Preliminary analyses

Prior to the planned analyses, the EmQue variables were screened to examine missing values and to exclude potential outliers. The percentage of missing data across EmQue variables was 2.03% on average (range = .9%–4.1%). Moreover, the pattern of missingness was completely random (Little's MCAR test: $\chi^2 = 253.556$, $DF = 253$, $p = .478$). To maximize statistical power, missing values were therefore imputed using expectation maximization imputation. The pattern of missingness was not random for the other measures concerning empathy, emotion regulation and Theory of Mind. Missing data were therefore not imputed. Next, the screening of each variable led to the exclusion of 37 participants, identified as univariate outliers because their Z-score was greater than 3 or less than -3. Consequently, the final sample consisted of 307 children. Descriptive statistics are presented in Table 3.

3.2 | Item analysis

In order to select the most relevant items for CFA, item analysis was performed, comprising difficulty and discrimination indexes. First, regarding the range, all response modalities were used for all the items, except for items 7 and 10, for which the answer "Always" was never used. Difficulty index analysis demonstrated that items 7 ($p_i = .14$) and 19

TABLE 3 Means and standard deviations of scores in EmQue-vf, in GEM-vf, in ToMI1-vf and ERC-vf.

	By age						By gender			
	Total	2yo	3yo	4yo	5yo	6yo	Girls		Boys	
		M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
N	307	35	66	74	99	33	175	132		
Emotion contagion (max = 4)	2.01 (.48)	2.01 (.49)	1.95 (.49)	2.10 (.49)	1.94 (.46)	2.09 (.43)	2.01 (.47)	2.02 (.50)		
Attention to others' feelings (max = 4)	2.87 (.49)	2.86 (.43)	2.91 (.52)	2.95 (.45)	2.82 (.49)	2.81 (.54)	2.82 (.49)	2.93 (.47)		
Prosocial actions (max = 4)	2.26 (.57)	1.92 (.55)	2.15 (.58)	2.35 (.54)	2.29 (.52)	2.58 (.58)	2.27 (.59)	2.25 (.55)		
Affective empathy (max = 4)	1.15 (1.01)	.65 (.77)	.70 (1.07)	1.32 (.89)	1.27 (1.00)	1.62 (.85)	1.14 (.96)	1.16 (1.08)		
Cognitive empathy (max = 4)	1.11 (1.37)	.30 (1.09)	1.02 (1.09)	1.20 (1.53)	1.20 (1.43)	1.29 (1.41)	.96 (1.36)	1.30 (1.37)		
Total empathy (max = 4)	1.08 (.93)	.45 (.75)	.86 (.80)	1.12 (.98)	1.22 (.97)	1.39 (.84)	.99 (.91)	1.21 (.96)		
Theory of Mind (max = 20)	14.36 (2.31)	11.98 (2.37)	12.91 (2.10)	14.63 (1.89)	15.18 (1.96)	15.74 (1.97)	14.5 (2.22)	14.15 (2.42)		
Emotion regulation (max = 4)	3.33 (.35)	3.27 (.22)	3.26 (.34)	3.41 (.35)	3.31 (.35)	3.36 (.37)	3.32 (.34)	3.33 (.35)		
Emotion dysregulation (max = 4)	1.94 (.40)	2.11 (.31)	2.03 (.39)	1.90 (.45)	1.93 (.34)	1.81 (.48)	1.90 (.36)	2.01 (.45)		

TABLE 4 Results of the confirmatory factor analyses (CFA).

Model	χ^2	df	χ^2/df	RMSEA	CFI	TLI	SRMR
Model 1	589.642	167	3.53	.091	.754	.720	.088
Model 2	543.396	149	3.64	.093	.766	.732	.087
Model 3	134.446	74	1.81	.053	.946	.934	.059

Note: df = degree of freedom; NC = normed chi-square; RMSEA = root mean square error of approximation; CFI = Bentler comparative fit index; TLI = Tucker–Lewis index; SRMR = standardized root mean square residual.

(p_i = .08) were below .2, qualifying these items as less optimal. In the discrimination index analysis, five items were perceived as not very discriminating (Laveault & Grégoire, 2014): the discrimination index of items 2 (D = .13), 3 (D = .17), 7 (D = .11), 10 (D = .19) and 11 (D = .13) were below the threshold of .2 suggested in Laveault and Grégoire (2014). To conclude, in accordance with other validation studies of EmQue, due to lack of sensitivity and a low difficulty index, item 19 was excluded from the CFA. Moreover, due to low difficulty and discrimination indexes, items 2, 3, 7, 10, and 11 were eliminated from the further CFA.

3.3 | Factorial validity

Table 4 presents the results of the various tested models. The initial CFA, referred to as Model 1, was conducted with the 20 original items. However, Model 1 exhibited poor fit with the data. Specifically, the RMSEA exceeded the acceptable threshold, while the CFI and TLI were below the recommended cut-offs. Subsequently, based on item analysis and considering other versions of EmQue, item 19 was excluded from the CFA. The revised Model 2, consisting of 19 items, failed to meet the desired goodness-of-fit criteria. As a result, a third model was tested, removing the five items highlighted in the item analysis. Model 3, containing 14 items, demonstrated a favorable fit, satisfying all the indicators' cut-off values. Moreover, the CFA also showed that covariances between subscales were all significant (cov between .3 and .52, p = .000). The final model (depicted in Figure 1) encompassed three subscales: (1) Emotion Contagion (EC) consisting of four items, (2) Attention to Others' Feelings (AOF) comprising six items, and (3) Prosocial Actions (PA) encompassing four items. In the Emotion Contagion subscale, items 7 (*When another child has a bad fall my child pretends to fall over too shortly after*) and 10 (*When another child is upset, my child needs to be comforted too*) were deleted. Moreover, in accordance with other studies, item 19 (*When another child cries, my child looks away*) was also suppressed. Concerning Attention to Others' Feelings, only item 3 (*When my child sees other children laughing, he/she starts laughing too*) was removed, while items 2 (*When I make clear that I want some peace and quiet, my child tries not to bother me*) and 11 (*When I make clear that I want to do something by myself (e.g. read), my child leaves me alone for a while*) were deleted from the Prosocial Actions subscale.

3.4 | Measurement invariance across gender

Table 5 shows the results for the multigroup CFA assessing the equality of structure of EmQue-vf between girls and boys. First, the configural (baseline) invariance model presented a good fit ($\chi^2_{(dl = 148)} = 228.572$, RMSEA = .06, CFI = .932, SRMR = .072). Second, a nonsignificant change was shown for the metric (weak) invariance model, with $\Delta\chi^2_{(dl = 11)} = 15.82$ (p = .14), $\Delta\text{RMSEA} = .001$ and $\Delta\text{CFI} = .004$, indicating that all factor loadings were equal between boys and girls. Finally, scalar (strong) invariance could be assumed, due to the lack of significant change from the configural invariance ($\Delta\chi^2_{(dl = 22)} = 26.07$, p = .24, $\Delta\text{RMSEA} = .003$, $\Delta\text{CFI} = .004$). To conclude, these results supported that the three-factor structure of EmQue-vf was equivalent between girls and boys.

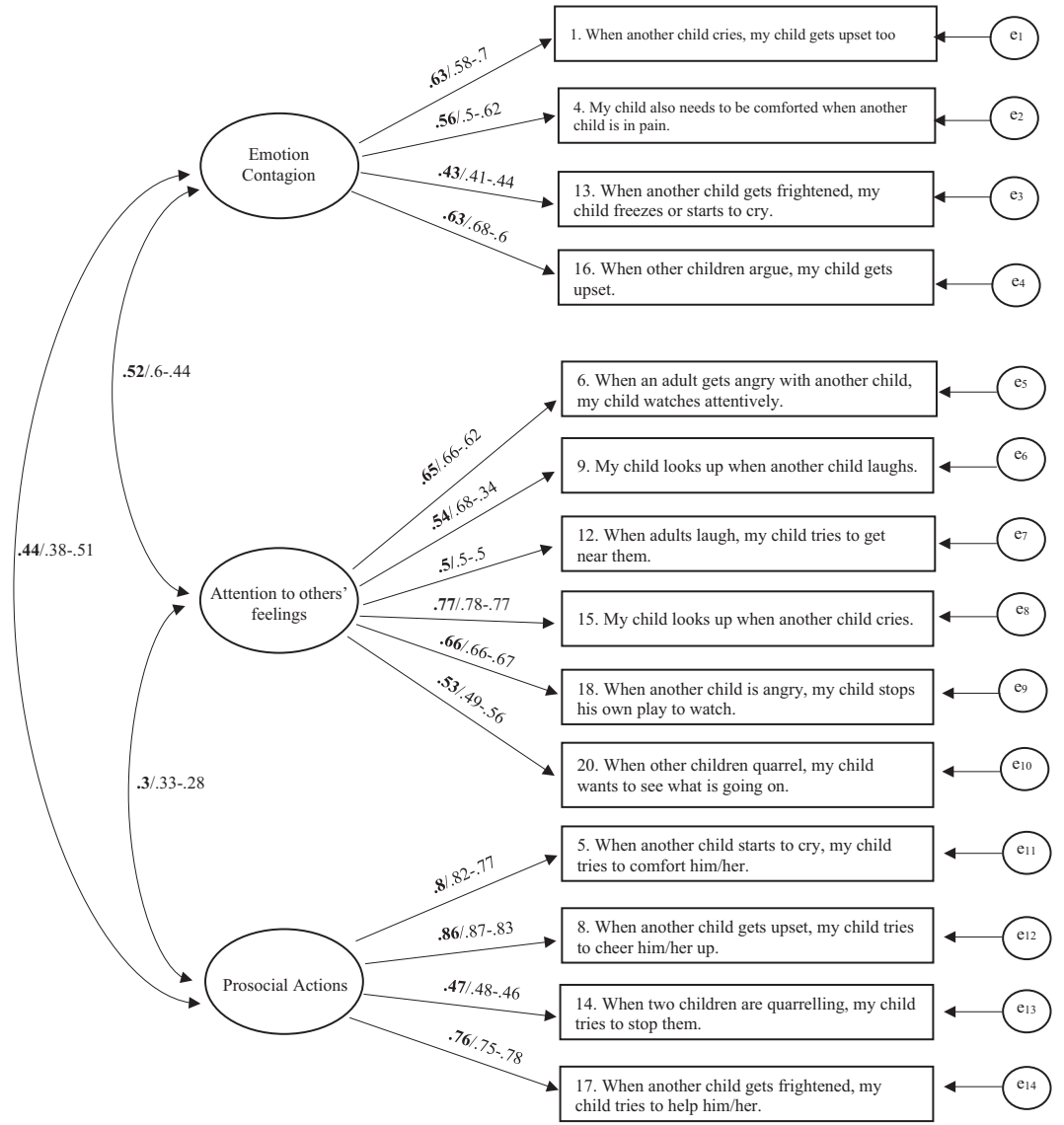


FIGURE 1 Factor structure, loadings, and factor correlations of the EmQue-vf. Note: Factor loadings are presented as overall/girls-boys.

TABLE 5 Measurement invariance across gender.

Model	χ^2	df	χ^2/df	$\Delta\chi^2$ (p)	RMSEA	ΔRMSEA	CFI	ΔCFI	SRMR	ΔSRMR
Configural	228.572***	148	1.54	–	.060	–	.932	–	.072	–
Metric	244.391***	159	1.59	15.82 (.14)	.059	.001	.928	.004	.079	.007
Scalar	254.644***	170	1.53	26.07 (.24)	.057	.003	.928	.004	.079	.007

Note: *** $p < .001$

TABLE 6 Cronbach's alpha and average interitem correlations.

	Number of items	Cronbach's alpha	Average inter-item correlations
Emotion contagion	4	.65	.316
Attention to others' feelings	6	.78	.366
Prosocial actions	4	.81	.513

TABLE 7 Pearson's correlations for concurrent criterion validity and construct validity.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	–								
2.	.015	–							
3.	–.061	.402***	–						
4.	.263***	.325***	.294***	–					
5.	.245***	.464***	.302***	.311***	–				
6.	.146*	.022	.102	.183**	.170**	–			
7.	.243***	.268***	.241***	.307***	.671***	.845***	–		
8.	.577***	.106	.151*	.418***	.352***	.389***	.485***	–	
9.	.127*	.177**	.293***	.456***	.294***	.320***	.401***	.365***	–
10.	–.187**	–.039	–.029	–.217***	–.216***	–.264***	–.316***	–.331***	–.317***

Note: 1 = age; 2 = Emotion Contagion (EmQue-vf); 3 = Attention to others' Feelings (EmQue-vf); 4 = Prosocial actions (EmQue-vf); 5 = Affective empathy (GEM-vf); 6 = Cognitive empathy (GEM-vf); 7 = Total empathy (GEM-vf); 8 = Theory of Mind (ToMI-vf); 9 = Emotion regulation (ERC-vf); 10 = Emotion dysregulation (ERC-vf); * $p < .05$; ** $p < .01$; *** $p < .001$.

3.5 | Reliability

Internal consistency analyses (Cronbach's alpha and interitem correlations) were conducted to test the reliability of the EmQue-vf scores. Table 6 shows internal consistency coefficients for the three subscales. The AOF and PA subscales met this criterion, as they had Cronbach's alphas greater than .7, which is considered to be adequate (Clark & Watson, 1995). However, the internal consistency of EC was below this cut-off, as in the original version. The average interitem correlations of the subscales were in the .15–.50 range, which is consistent with the recommendations of Clark and Watson (1995), except for PA, which was slightly higher.

3.6 | Validity

Concurrent criterion validity was explored by examining the association between the EmQue-vf scales and the GEM-vf scales. Table 7 shows Pearson's correlations between the three subscales of EmQue-vf and children's affective and cognitive empathy. Positive correlations were obtained between the three EmQue subscales and the affective empathy subscale of the GEM-vf (r between .302 and .464, $p = .001$) as well as between the three EmQue subscales and total empathy (r between .241 and .307, $p < .001$). However, only the link between PA and cognitive empathy was positive ($r = .183$, $p = .002$).

Concerning construct validity, Table 7 shows Pearson's correlations between the EmQue-vf scales and children's age, Theory of Mind and emotion (dys)regulation. A positive correlation was observed between age and PA ($r = .246$, $p = .001$), while Pearson's correlations were close to zero for EC and AOF. In addition, a one-way MANOVA was

TABLE 8 Items of the [masked for peer review] version of the Empathy Questionnaire (EmQue-vf) for children aged 2–6 years.

Items	Jamais	Parfois	Souvent	Toujours
1. Quand un autre enfant pleure, mon enfant est contrarié aussi				
4. Mon enfant a aussi besoin d'être réconforté quand un autre enfant souffre				
5. Quand un autre enfant commence à pleurer, mon enfant essaie de le réconforter				
6. Quand un adulte s'énerve sur un autre enfant, mon enfant regarde attentivement				
8. Quand un autre enfant est contrarié, mon enfant essaie de le réconforter				
9. Mon enfant regarde quand un autre enfant rit				
12. Quand des adultes rient, mon enfant essaie de se rapprocher d'eux				
13. Quand un autre enfant est effrayé, mon enfant arrête de bouger ou commence à pleurer				
14. Quand deux enfants se disputent, mon enfant essaie de les arrêter				
15. Mon enfant regarde quand un enfant pleure				
16. Quand un autre enfant se dispute, mon enfant est contrarié				
17. Quand un autre enfant est effrayé, mon enfant essaie de l'aider				
18. Quand un autre enfant est en colère, mon enfant s'arrête de jouer pour regarder				
20. Quand d'autres enfants se disputent, mon enfant veut voir ce qu'il se passe				

performed to investigate children's empathic skills differences depending on their age group, stratified by year. A principal effect of age group was demonstrated (Pillai's $F = 3.372, p < .001, \eta_p^2 = .043$), and between-subjects test found a difference only in PA ($F = 7.402, p < .000, \eta_p^2 = .089$). Bonferroni's posthoc test highlighted a difference between 2-year-old children and 4-year-old children (mean difference = $-.43, p = .002$), 5-year-old children (mean difference = $-.36, p = .008$) and 6-year-old children (mean difference = $-.65, p < .000$). A difference between 3-year-old children and 6-year-old children (mean difference = $-.43, p < .003$) was also observed.

Concerning the link between EmQue-vf and Theory of Mind, mothers' perception of their children's AOF and PA was positively linked to their perception of their children's mental state understanding in ToMI-vf ($r = .151, p = .015$ and $r = .418, p = .001$, respectively). Moreover, mothers' perception of children's emotion regulation in ERC-vf was positively correlated with the scores in the three subscales of EmQue-vf (r between $.177$ and $.456, p$ between $.001$ and $.003$). However, only PA was negatively correlated with the emotion dysregulation score in ERC-vf ($r = -.217, p = .001$).

4 | DISCUSSION

The aim of this study was to adapt and evaluate the psychometric properties of a French version of EmQue for children aged 2–6 years (EmQue-vf). The results of the CFA confirmed the three-factor structure obtained by Rieffe et al. (2010), with 14 items (see Table 8). Parents can use the questionnaire to indicate the frequency of children's reactions

and behaviors in response to others' emotions within the last two months, allowing difficulties in empathic skills, such as a high level of emotion contagion or a low level of prosocial actions, at the end of the preschool period to be highlighted. Regarding covariances between subscales, those found in the present study were similar to the covariances of the Italian (from .43 to .46, Grazzani et al., 2017), Lithuanian (from .46 to .49, Lazdauskas & Nasvytienė, 2021), Portuguese (.49 to .54, da Silva et al., 2022) and Japanese (.32 to .58, Takamatsu et al., 2021) versions. However, given that the theoretical background of this questionnaire referred to a developmental approach, in which behaviors and reactions associated with previous stages disappear when the next stage is reached, it may be considered surprising that such strong links were obtained between the subscales (especially between Emotion Contagion and the two other subscales). According to Hoffman's (1987) model, when children grew older, their emotion contagion reactions tend to be replaced by more appropriate reactions and behaviors, indicating their consciousness of others' emotions and prosocial actions. A possible explanation for this is that the situations described in the items concern a moderate level of emotion contagion that preschool children could experience. Moderate emotion contagion may lead children to pay more attention to others' feelings and to perform more prosocial actions to sooth others' emotions. In addition, the results for the relation between the EmQue-vf subscales and age showed that emotion contagion and attention to others' feelings tend to remain stable through time at preschool period, unlike Prosocial Actions, which increase with age. These results are close to those obtained by Grazzani et al. (2017) for the three components and by Rieffe et al. (2010), Lucas-Molina et al. (2018) and da Silva et al. (2022) for EC and PA. In line with Bensalah et al. (2016), affective responses of empathy did not improve as the children grew older, unlike behavioral empathy, which continued to develop with age.

In keeping with the findings of Grazzani et al. (2017) and Takamatsu et al. (2021), measurement invariance testing revealed the same structure of EmQue between boys and girls. Moreover, Cronbach's alpha of EmQue-vf was similar to that of other validations, which ranged from .58 to .83 (da Silva et al., 2022; Lazdauskas & Nasvytienė, 2021; Lucas-Molina et al., 2018; Takamatsu et al., 2021), as can be seen in Table 1.

Regarding construct validity, the three subscales of EmQue-vf were significantly and positively related to affective empathy. However, only the PA subscale was positively linked with cognitive empathy, as has also been demonstrated by other studies assessing the relation between cognitive empathy and social skills, including prosocial behaviors (Čavojová, 2012; Simon & Nader-Grosbois, 2021). According to Hoffman's (1987) developmental model and the theoretical conception of empathy, emotion contagion and attention to others' feelings appear earlier than cognitive empathy. EC and AOF emerge in the first year of children's life (Hoffman, 1987) and are automatic and unconscious (Heyes, 2018), whereas cognitive empathy develops from the age of 3 years (Brink et al., 2011; Decety et al., 2015) and consists of a controlled response (Heyes, 2018). Moreover, as reported by Heyes (2018), cognitive empathy is not necessarily activated by affective empathy. Therefore, some children with high levels of EC and/or AOF may have some difficulties in understanding others' emotions. Conversely, children able to deal with their own emotion contagion are more likely to demonstrate cognitive empathy.

To evaluate construct validity, the relation between empathy as shown in the three scales of EmQue-vf and Theory of Mind was examined. The results showed that only Attention to Others' feelings and Prosocial Actions were positively associated with mental state understanding. Children who were concerned by others' emotions and who implemented prosocial behaviors in response to these emotions therefore had a better understanding of mental states. These results were in line with the findings of Rieffe et al. (2010), who assessed Theory of Mind through measures of the understanding of emotion and desire. Further studies could be carried out to gain a better understanding of the relation between the multiple components of empathy and affective and cognitive Theory of Mind, using longitudinal designs with typically developing children and children with neurodevelopmental disorders (e.g., intellectual disability, autism spectrum disorder and internalized or externalized behavioral disorder).

Similarly, emotion regulation seemed to be positively related with the three subscales of EmQue-vf. Lucas-Molina et al. (2018) obtained similar results in the Spanish validation, except for the Emotion Contagion subscale, which was not correlated with emotion regulation in their study. Although the literature has highlighted a positive relation between empathy and emotion regulation at preschool age (Lee et al., 2016), Rieffe et al. (2010) demonstrated that

emotion contagion was associated with lower levels of emotion regulation. Therefore, it was surprising that Emotion Contagion and emotion regulation were positively correlated in the present study. To be able to regulate an emotion, children have to be sensitive to the other person's emotion. The automated emotional response that generates emotion contagion may contribute to the children's activation of more complex emotional regulation processes. In other words, too high a level of emotion contagion may push children to find new emotional regulation strategies to soothe their distress. However, validity analysis emphasized that prosocial actions were negatively associated with emotion dysregulation. In other words, children who have difficulties in managing their emotions engage in fewer prosocial behaviors to comfort their peers or adults. In contrast with the findings of Rieffe et al. (2010), no relationship between emotion contagion and emotion dysregulation was observed in the present study. This could be linked to the fact that emotion contagion means that children are affected by the distress of others, while emotion dysregulation refers to children's difficulty in managing their own emotions (e.g., in a situation of frustration). Parents may therefore be able to identify children's difficulties in managing their emotions more easily in contexts associated with emotional dysregulation rather than emotional contagion. However, to improve our understanding of the relation between empathy components and emotion (dys)regulation, longitudinal studies need to be conducted.

Despite these promising results showing that EmQue-vf is a valid in a sample of preschoolers and gives support to clinical and research issues, some limitations should be highlighted. First, although nurseries and schools of different social classes were contacted, children who took part in this study were from families of relatively high socioeconomic status. The results could therefore be influenced by the parents' high level of education, given that, according to Malti et al. (2010), children of parents with a high level of education have better empathic skills than children of parents with lower levels of education. Families of high socioeconomic status could be more attentive to and supportive of children's emotions. Replicating this study with subjects of more diversified socioeconomic status could be useful in providing a better picture of the empathic skills of children from the general population. Second, the present study considered only mothers' perceptions without taking into account the perceptions of other familiar adults, such as fathers, or teachers who observe children in another social environment. In the initial version of this study, mothers and fathers were invited to complete questionnaires separately. Unfortunately, too few responses were received from fathers, and it was decided to disregard them. Unlike in the study of Rieffe et al. (2010), no performance-based measure was conducted to provide further evidence of the validity of this questionnaire. The present study may have been biased by its use of a single informant assessment method: the correlations between the scales of the different questionnaires may have been overinflated by the fact that mothers completed all the questionnaires. However, the results obtained were mainly consistent with those of the literature. Administering a performance-based measure, such as those developed by Bensalah et al. (2016) or Strayer (1993), could provide information about how children of preschool and primary school age really felt about others' emotions during empathy tasks and could give nuance to the link between the subscales of EmQue and other domains, including emotion regulation, Theory of Mind and social competences.

To conclude, the French version of EmQue appears to be a relevant measure for understanding empathic skills at preschool age in French-speaking culture, as the study showed that this questionnaire has appropriate psychometric properties. With this measure, parents can indicate how their children react and/or behave in situations involving emotions. EmQue-vf is therefore a potentially relevant measure to support new research questions and original hypotheses in the field of developmental psychology and psychopathology, in children living in French-speaking countries and cultures. Researchers could administer this hetero-reported questionnaire for completion by adults familiar with the children, in order to throw light on how the developmental stages of empathy are related to other psychological domains. EmQue-vf could also be used to explore and compare the empathic skills of children with typical or atypical development (e.g., intellectual disabilities, autism spectrum disorder or behavior disorders). Finally, the efficacy of group and/or individual interventions could be tested using EmQue-vf, with the questionnaire being completed before and after the sessions. For example, the effects of training programmes (e.g., Roots of Empathy, Gordon, 2001), and of the use of children's literature (e.g., Kucirkova, 2019) or videos (e.g., Li & Zhang, 2023) on preschoolers' empathy could be observed through parents' perceptions. This questionnaire could also be a relevant measure in clinical settings, allowing clinicians to identify excessive emotional contagion, which may prevent chil-

dren from regulating their own emotions and behaving appropriately in response to others' emotions. In addition, professionals could gain information from parents by means of the questionnaire about how children pay attention to or avoid others' emotions, and how they respond to, comfort and/or help children. All these insights provide an opportunity for professionals to design appropriate support for children's empathy-related difficulties. For example, clinicians could help children with high levels of contagion to identify their own emotions and develop new emotion regulation strategies. Using visual materials (video or images), they could also help children to analyze the social cues of a situation in order to understand it better, which could help them respond more appropriately.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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