



Adaptation and Validation of a French Version of the Griffith Empathy Measure

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Abstract

This study aimed to validate a French adaptation of the Griffith Empathy Measure (GEM-vf). Belgian mothers of 516 children from 3 to 12 years old completed the French versions of the GEM, the Empathy Questionnaire (EmQue-vf), the Theory of Mind Inventory-1 (ToMI-1-vf) and the Emotion Regulation Checklist (ERC-vf). The Theory of Mind Task Battery was administered to the children. A principal component analysis showed a two-factor structure in GEM-vf: affective and cognitive empathy. Internal consistency was good. The GEM-vf scores varied depending on age. Affective empathy was higher in girls. In terms of convergent validity, positive and significant correlations were obtained between total, affective and cognitive empathy scores in GEM-vf and scores in ToM skills and in emotion regulation. The three scores in GEM-vf were negatively and significantly correlated with emotion dysregulation. In a subsample of 299 children from 3 to 6 years old, positive and significant correlations were found between scores for total and affective empathy in GEM-vf and for attention to others' feelings and prosocial actions in EmQue-vf. Cognitive empathy scores in GEM-vf were significantly related to those for prosocial actions in EmQue-vf. The GEM-vf presents good reliability and validity and could be useful to assess typically and atypically developing children in research and clinical practice.

Keywords Empathy · Theory of mind · Emotion regulation · Prosocial actions · Assessment

Introduction

In the socioemotional development process from infancy to early adolescence, empathy and Theory of Mind (ToM) play a major role in developing positive social relationships. The abilities to pay attention and to understand feelings, emotions and mental states in others emerge early and progress during the preschool and school years through various social experiences. In order to examine new hypotheses based on recent conceptions of empathy and to improve the detection of difficulties in empathy in children during the preschool and elementary school period, it is essential to assess their profiles of strengths and weaknesses by means of reliable instruments. The use of such instruments could help deepen our knowledge through new studies of empathy in healthy or atypically developing children and provide relevant information for prevention or intervention programs. However, the

lack of a validated French instrument measuring empathy that can be used with children living in French-speaking countries and cultures represents a serious problem. It limits the possibility for researchers and psychologists to examine their empathy profiles using a reliable measure. This study aimed to adapt into French the Griffith Empathy Measure (GEM) questionnaire and check its psychometric properties, in view of its solid theoretical basis and its value as demonstrated by the diverse uses that have been made of it in numerous studies. Although the GEM has been adapted into several languages, it has not yet been validated in French, one of the five most widely spoken languages in the world.

Empathy in Development

Although empathy is considered to be necessary for prosocial behavior and moral development (e.g. Denham, 2007, 2017; Eisenberg, 2005), there is no single definition of it that is universally agreed, because empathy involves several processes (Decety & Cowell, 2014). In developmental psychology and psychopathology, theoretical models of empathy have evolved from unitary to multi-component conceptions,

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influencing how empathic skills are defined (Barbot et al., 2022; Nader-Grosbois & Simon, 2023) and how they are measured in children (for a review, see Simon & Nader-Grosbois, 2023b). In the developmental model designed by Hoffman (1987), empathy referred to the state of a subject that is induced by the state of another person, to that it corresponds more closely than to the state of the subject (Hoffman, 2000, p.7). Four stages of empathy were distinguished: (1) “Emotion contagion”, displayed in infants and representing an automatic affective reaction to another person’s apparent emotion or distress; (2) “Attention to others’ feeling”, displayed from the age of one, and reflecting an interest in the emotions or distress expressed by others; (3) “Prosocial actions”, which begin in the second year of life, when the child feels concerned about others’ emotions and becomes able to help, support or comfort other people who display distress; and (4) “Empathy for another’s life condition”, from late childhood, corresponding to empathic skills concerning the general context of another person’s life. In multidimensional models influenced by studies conducted in developmental psychopathology and neuropsychology, affective, cognitive and behavioral empathy were differentiated. The affective component refers to an emotional response and a capacity to share others’ emotions appropriately, while the cognitive component concerns the ability to understand others’ emotions or distress, by taking others’ perspective and decoding socioemotional cues in social situations; the behavioral component is displayed through prosocial actions (e.g., Barbot et al., 2022; Blair, 2005; Cuff et al., 2016; Davis, 1983; Decety, 2015; Dvash & Shamay-Tsoory, 2014; Eisenberg & Fabes, 1990; Eisenberg, 2005; Nader-Grosbois & Simon, 2023). In the literature, cognitive empathy is often quasi-synonymous with affective ToM (e.g., Blair, 2005; Nader-Grosbois & Simon, 2023). The distinction between affective and cognitive empathy was supported by behavioral and neuroimaging studies (e.g., Decety & Cowell, 2014; Decety, et al., 2018; Dvash & Shamay-Tsoory, 2014). In an analogous way, ToM also encompasses multiple processes that could be activated differently depending on social situations and required mental states – either emotions and desires (affective ToM) or knowledge, beliefs, intentions, etc. (cognitive ToM) – in others (Flavell, 1999; Nader-Grosbois, 2011). Intricate links between cognitive empathy and ToM have been reported (e.g., Eisenberg et al., 2006; Nader-Grosbois & Simon, 2023).

Assessment of Empathy in Children

Depending on the theoretical background and the definition of empathy used, different measures have been designed to study how empathy develops from infancy to adolescence, to highlight protective versus risk factors that could impact its evolution and to investigate links with other domains

(Eisenberg & Fabes, 1990; for a survey, see Simon & Nader-Grosbois, 2023b).

First, observational designs have been set up to decode facial affect or gestural reactions to others’ emotions and distress in situations where adults simulate the expression of these emotions, to identify the level of empathy in infants, toddlers or preschoolers (e.g. Kochanska et al., 2010; Sigman et al. 1992; Spinrad & Stifter, 2006; Skwerer & Tager-Flusberg, 2016; Zahn-Waxler et al., 1992a, b). These coding methods are expensive to use with large samples and offer a limited approach to empathy skills depending on very specific target contexts.

Second, videos or pictures illustrating stories have been used to present hypothetical situations in order to elicit empathetic reactions or to invite the child to respond in tasks. These designs result either in a general score for empathy (e.g. Affective Situations Test for Empathy, Feshbach & Roe, 1968; Empathy Measure for Preschoolers, EMP, Sezov, 2002; Empathy Continuum, EC, Strayer, 1993) or in scores for affective, cognitive and behavioral empathy (e.g., Kids’ Empathic Development Scale, KEDS, Reid et al., 2013; Empathy Task, Bensalah et al., 2016a, b). Although these tasks are very relevant, there are potential biases due to the motivational factor or to the cognitive and verbal abilities that the children generally need to use.

Third, to remedy these methodological biases, an assessment in which adults report on children’s empathy through a questionnaire can be useful. In a unitary approach, some other-reported questionnaires give an overall score for empathy, for example, the Empathy Scale of Infant–Toddler Social and Emotional Assessment (ITSEA, Carter et al., 2003; French adaptation ESEF, Bracha et al., 2007), the Empathy Scale of My Child (Kochanska et al., 1994), the Empathy Quotient – Children (EQ-C, Auyeung et al., 2009) or the Adolescent Empathy Quotient (Auyeung et al., 2012). The Empathy and Theory of Mind Scale (EToMS, Wang & Wang, 2015) offers the possibility of obtaining a general score for empathy and a score for ToM skills used for good and bad purposes.

Fourth, based on multidimensional conceptions of empathy, questionnaires have been designed to provide differentiated scores. Based on the developmental model of Hoffman (1987, 2000), the Empathy Questionnaire (EmQue, Rieffe et al., 2010; French adaptation EmQue-vf, Simon et al., [in revision](#)) assesses adults’ perceptions of a child’s ability to empathize in daily life, with reference to the three first stages of empathy. It produces three scores, for emotion contagion, attention to others’ feelings and prosocial actions. In addition, questionnaires assess different dimensions, particularly with regard to affective and cognitive empathy. Self-report questionnaires are completed by children at school age: for example, the adaptation of the Interpersonal Reactivity Index (IRI) for children (Litvack-Miller et al., 1997),

the Bryant's Index of Empathy (Bryant, 1982), the Basic Empathy Scale (BES) for adolescents (Jolliffe & Farrington, 2006), a French adaptation of BES for children (Bensalah et al., 2016a, b), the Feeling & Thinking (F&T, Garton & Gringart, 2005), or the Cognitive, Affective and Somatic Empathy Scales (CASES, Raine & Chen, 2018). There is also an other-reported questionnaire, the Griffith Empathy Measure, (GEM, Dadds et al., 2008), which provides two scores for affective empathy and cognitive empathy and can be completed by adults (parents or teachers) with regard to children at preschool and school age.

In research and in intervention programs, it is important to use a reliable questionnaire that can be completed by multiple informants who are involved in the child's life, especially when the child is young and/or has conditions that reduce his or her ability to understand items and to use self-report forms. As Dadds et al., (2008, p. 112) mention, the use of self-reports on empathy is problematic: children under the age of about 8 years have insufficient cognitive and/or verbal abilities to report on internal states, and there a lack of convergence in older children between their reports about affective empathy, their scores on picture-story indices and their prosocial behavior. This study therefore focused on the validation of a French adaptation of the GEM. The differentiation of empathy components is very important to examine at preschool and elementary school age, specific characteristics of typically developing (TD) children and of atypically developing children, notably those presenting externalized or internalized behavior disorders or autism spectrum disorders (ASD) or intellectual disabilities (Blair, 2005; Nader-Grosbois & Simon, 2023; Simon & Nader-Grosbois, 2023a).

The Griffith Empathy Measure: Construction and Validation

Based on a multidimensional design, the Griffith Empathy Measure (GEM, Dadds et al., 2008). It adapts Bryant's Index of Empathy (Bryant, 1982) which was a self-reported questionnaire for children and adolescents, turning it into an other-reported questionnaire for parents by reformulating items in third-person format. For each of the 23 items, the parent rates the degree of agreement with statements about behaviors that could be displayed by the child or adolescent in everyday social situations, on a 9-point Likert scale, ranging from "strongly disagree" to "strongly agree". The total score can be computed by averaging the adult's rating in all items. Two subscores for affective empathy and cognitive empathy can be calculated by averaging the rating for the respective items included in each factor. Higher scores reflect a greater degree of empathy.

The validation study for the GEM (Dadds et al., 2008) showed its good reliability and validity. The principal

components analysis with Oblimin rotation with Kaiser normalization, applied to a sample of 2612 children from 4 to 16 years of age, identified a two-factor structure for cognitive and affective empathy, accounting for 22.32% and 15.03% of variance respectively. A confirmatory factor analysis was performed, with maximum likelihood estimation to check model fit and to test this two-factor structure across age groups and genders. This analysis showed that the GEM can be used for a wide range of ages and for both genders as an overall scale of empathy using the 23 items ($\alpha=0.81$); alternately, a cognitive empathy subscale ($\alpha=0.62$, 6 items) and an affective empathy subscale ($\alpha=0.83$, 9 items) can be differentiated after omitting items that load on both subscales. Main effects for three age groups (4–6, 7–10, 11–16 years) were obtained for the total and cognitive empathy scores, but not for the affective empathy score. Significant effects for gender were found, with girls showing higher overall, affective and cognitive empathy. Based on 127 parents' GEM ratings, test–retest stability over 6 months was confirmed. Both mothers' and fathers' ratings of 155 children aged 5–12 years showed an acceptable agreement for the three scores. The convergent validity was confirmed by positive significant correlations ($p < 0.01$) between scores in 49 adolescents' self-ratings of empathy in the Bryant Index for Empathy and mothers' ratings for the three GEM scores. Behavioral observations of 28 boys from 6 to 12 years who participated in three activities with a pet mouse were rated by observers from videotapes with respect to three dimensions: (1) nurturing (caring, empathic, gentle behavior), (2) cruelty (careless and/or aggressive behavior likely to distress the animal) and (3) engagement (active verbal and/or nonverbal involvement with the animal). The results showed the expected convergence between cruel behavior toward the pet mouse and low GEM affective empathy, and conversely between nurturing behavior and high GEM affective empathy. Moreover, 23 children from 7 to 12 years, including 15 with oppositional defiant disorder and 8 with internalizing problems, were assessed with the GEM and the Interpersonal Response Task (IRT, Hawes & Dadds, 2004). Mothers' ratings of empathy in the GEM (particularly the total and affective scores) were linked with both the forfeiting of rewards and decision reaction times in IRT. Good psychometric properties of GEM were thus confirmed.

Interest and Utility of GEM for Typically and Atypically Developing Children

The GEM allows multi-informant data to be collected about empathy from mothers, fathers, teachers or other professionals close to the child. It overcomes the limitations and potential biases of performance measures and can complement observations and results obtained by the latter. Given

its interest, the GEM has been translated and adapted into several languages, including German, Chinese, and Spanish, but not yet into French. In the literature, the GEM has been used in numerous recent studies, showing its applicability to healthy, TD children or atypically developing children in diverse social environments.

Several studies have used the GEM with TD children at preschool age or at school age, particularly between 6 and 12 years (Bigelow et al., 2021; Dawel et al., 2015; Decety, et al., 2018; Demedardi et al., 2021; Gevaux et al., 2020; Guo & Feng, 2017; Kohls et al., 2009; Lavertu et al., 2022; McDonald et al., 2015; Rasmussen et al., 2016; Rong et al., 2022; Simon & Nader-Grosbois, 2021; Tuerk et al., 2021; Vera-Estay et al., 2016; Zhang & Wang, 2019). Links between their empathic skills, personality traits and responsiveness to social rewards have been explored (Kohls et al., 2009). Dawel et al. (2015) examined how affective and cognitive empathy in TD children correlated with their ability to discern authenticity in emotional facial expressions (happy, sad or scared). Some studies have analyzed links between these children's empathy profiles and interactions with animals (Dadds et al., 2008; McDonald et al., 2015). Simon and Nader-Grosbois (2021) examined mothers' and fathers' perceptions of cognitive and affective empathy in preschoolers, and their variability according to age, gender and personality. Links between both dimensions of empathy and the children's social adjustment were also investigated. Demedardi et al. (2021) studied whether emotional understanding and empathy in children were predictors of prosocial lying. Associations between video game playing and empathy, prosocial behavior, social adaptive skills or social behavior problems were explored by Lavertu et al. (2022). Vera-Estay et al. (2016) investigated the potential moderating and mediating role of executive functions and social cognition (empathy and ToM) in the link between children's age and moral maturity. Tuerk et al. (2021) tested the biopsychosocial SOcio-Cognitive Integration of Abilities model integrating temperament, executive functioning, communicative skills and social cognition (including empathy). Associations between children's empathy and their reactions to unequal distributions of resources between two puppets and their parents' teaching of "just world beliefs" were studied by Gevaux et al. (2020). Bigelow et al. (2021) examined whether children's language mediate the relationship between age and both cognitive and affective ToM, and also affective or cognitive empathy. In a developmental neuroscience study, Decety et al. (2018) analyzed the electrophysiological responses when preschoolers perceived painful versus neutral stimuli and the association between these responses and perspective taking and empathic concern (assessed by parents who completed the GEM), as well as their relation to parental empathy and children's own prosocial behavior. Guo and Feng (2017) investigated the links

between parenting styles (emotional warmth, rejection) as perceived by children and their altruistic behavior and the intervening role of their empathy (rated by their mothers in the GEM). Efficiency of an intervention toward preschoolers was evaluated by means of the GEM as pre- and post-tests (Rasmussen et al., 2016).

In addition, numerous comparative studies of atypically developing children have explored aspects of affective and cognitive empathy using the GEM. These often involve comparisons between one or two clinical groups and TD children, mainly at school age and in a few studies at preschool age.

Most of the studies using the GEM have investigated affective and cognitive empathy in children or adolescents presenting externalized behavioral disorders, including complex conduct problems such as aggressive behavior (Dadds et al., 2012; Hawes et al., 2020; Deschamps et al., 2018; Fleming et al., 2022; Malcolm-Smith et al., 2015), disruptive behavior disorder (DBD) (Datyner et al., 2016; Deschamps et al., 2015), or opposition-defiant disorder (ODD) (Hawes et al., 2020; O'Kearney et al., 2017; Pasalich et al., 2014), or presenting attention deficit or hyperactivity disorders (ADHD) (Deschamps et al., 2015; Gumustas et al., 2017; Kohls et al., 2014). The main aim of these studies was to identify specific weaknesses and strengths of children's empathy according to their differentiated clinical symptoms of externalized behavior disorders, in order to improve differential diagnostic processes and provide guidelines for clinical intervention. Some studies have also focused on links between such children's affective or cognitive empathy and their difficulties in prosocial behavior (Deschamps et al., 2015) or their proactive and reactive aggression (Hawes et al., 2020; Deschamps et al., 2018; Malcolm-Smith et al., 2015). Other studies have examined links between difficulties in emotion recognition, understanding of emotions, emotion perspective taking or ToM, and affective or cognitive empathy (Lui et al., 2016; Malcolm-Smith et al., 2015; O'Kearney et al., 2017). Kohls et al. (2014) compared empathy (measured with the GEM), affiliative tendency, interpersonal competences and neural activation in response to both social reward types in children with ADHD or ASD and TD children. The GEM was used at pre- and post-test in children with conduct problems to assess the efficiency of emotion recognition training (Dadds et al., 2012), of a Coaching and Rewarding Emotional Skills (CARES) program (Datyner et al., 2016) or of Parent-Child Interaction Therapy (PCIT) (Fleming et al., 2022).

Several studies have assessed affective and cognitive empathy, by means of the GEM, in children with "callous-unemotional traits" (CU) (Dadds et al., 2009, 2012; Datyner et al., 2016; Georgiou et al., 2019a, b; Fleming et al., 2022; Georgiou et al., 2019a, b; Hartman et al., 2019; Hawes & Dadds, 2012; Hawes et al., 2020; Kimonis et al., 2016;

Lui et al., 2016; McDonald et al., 2018; O’Kearney et al., 2017; Pasalich et al., 2014). Links between the intensity of CU traits and affective or cognitive empathy in preschoolers and children at school age have been examined (Dadds et al., 2009; Hawes et al., 2020; Georgiou et al., 2019a, b; Hartman et al., 2019; Kimonis et al., 2016; Lui et al., 2016; Malcolm-Smith et al., 2015; McDonald et al., 2018; O’Kearney et al., 2017). For example, empathy and anti-social behavior in these children have been studied (Dadds et al., 2009; Kimonis et al., 2016). The relationships between animal abuse, CU traits and empathy have been explored in children whose mothers were exposed to partner violence (Hartman et al., 2019).

In addition, several studies of children with ASD have used the GEM to examine their affective and cognitive empathy and shown differentiated links with the severity of ASD symptoms (Andrews et al., 2013; Alkire et al., 2021; Deschamps et al., 2014; Georgiou et al., 2019a, b; Greimel et al., 2011; Jin et al., 2020; Kirst et al., 2022; Kohls et al., 2014; Shi et al., 2020; Soorya et al., 2015). Recently, there has been a growing consensus regarding this imbalance between cognitive and affective empathy in children and adolescents with ASD, based on the use of the GEM (e.g., Georgiou et al., 2019a, b). The role of mutual emotional experiences in social-interactive success, ToM skills and social processing in association with empathy in school-aged children with ASD has been explored (Alkire et al., 2021). Some studies have investigated links between empathy and executive functions in children with high-functioning ASD (Jin et al., 2020). A few studies have directly examined the neural mechanisms of impaired empathy in clinical groups, including ASD, using a measure of Regions-of-interest-based functional connectivity and the GEM (e.g. Shi et al., 2020). The GEM has been used at pre- and post-test, to test the efficiency of training programs in empathy and emotional skills in children with Asperger’s syndrome or ASD: for example, a cognitive-behavioral intervention program aimed at improving affectionate communication and friendship skills (Andrews et al., 2013), the Seaver-NETT program (Nonverbal communication, Emotion recognition, and Theory of mind Training) (Soorya et al., 2015) or the parent-assisted serious game Zirkus Empathico (Kirst et al., 2022).

Some studies have used the GEM with children with intellectual disabilities (Williams syndrome, Osorio et al., 2019; X-fragile syndrome, Miller et al., 2022; Down syndrome and nonspecific intellectual disabilities, Simon & Nader-Grosbois, submitted). Miller et al. (2022) tested whether empathy is impaired and associated with anxiety in girls with fragile X syndrome. Osorio et al. (2019) analyzed the associations between altered patterns of fetal testosterone and hypersociability, affective and cognitive empathy, anxiety and autistic symptoms in children with Williams’ syndrome. Simon and Nader-Grosbois (submitted) compared

affective and cognitive empathy in children with intellectual disabilities and TD children matched for chronological age or developmental age, to examine developmental delay or deficit hypotheses of empathy. Links between empathy, ToM, emotion regulation and social adjustment have been studied in children with intellectual disabilities (Simon & Nader-Grosbois, in preparation-c). More rarely, the GEM has been used with children presenting internalized problems such as anxiety (e. g., O’Kearney et al., 2017), with mild traumatic brain injury (mTBI) (D’Hondt et al., 2017), or at risk of abuse and maternal maltreatment (Meidan & Uzefovsky, 2020).

Objectives and Hypotheses of the Study

To investigate new hypotheses about empathy at preschool and school age in French-speaking children at preschool and school age, it is essential to use valid and reliable measures, including other-reported questionnaires such as the GEM that allow both affective and cognitive empathy to be assessed, in line with the recently developed theoretical background. Such measures should easily and quickly provide a view of the strengths and weaknesses in empathy in typically or atypically developing children. The main aim of this study was to validate the Griffith Empathy Measure-French version (GEM-vf) in children aged between 3 and 12 years and assess its psychometric properties.

The first objective was to verify the two-factor structure, namely affective empathy and cognitive empathy, in line with the multidimensional conceptualization on which the questionnaire is based, and to test reliability through internal consistency. It was hypothesized that GEM-vf would be composed of two factors similar to those found by Dadds et al. (2008), cognitive and affective empathy (*H1a*). The internal consistency overall and for each of the two GEM-vf component scores was expected to be acceptable (*H2a*).

The second objective was to examine the variability of scores in GEM-vf depending on age and gender. It was postulated that total, affective and cognitive empathy scores would correlate positively with age and differ significantly by age group, reflecting a progression in these skills at preschool and elementary school age (*H2a*). Based on the assumption of equivalence between girls and boys in French culture in Belgium, it was predicted that the total, affective and cognitive empathy scores in GEM-vf would not differ depending on the gender (*H2b*).

The third objective was to verify construct validity by checking convergent validity through associations between scores in GEM-vf and those in the French version of the Theory of Mind Inventory (ToMI-1-vf), of the Theory of Mind task Battery and of the Emotion Regulation Checklist (ERC-vf). Specifically, in a subsample of preschoolers,

links between GEM-vf scores and two scores in the Empathy Questionnaire–French version (EmQue-vf) would also be checked. It was hypothesized that positive links would be found between on the one hand, total, affective and cognitive empathy in GEM-vf and on the other, ToM skills (*H3a*) and emotion regulation (*H3b*). Negative significant links were predicted between these three scores in GEM-vf and emotion dysregulation (*H3c*). Specifically for a subsample of preschoolers, it was hypothesized that positive links would be found between scores for total, affective and cognitive empathy in GEM-vf and scores for attention to others' feelings and prosocial actions in EmQue-vf (*H3d*).

Method

Participants

516 children aged from 3 to 12 years ($M = 6.42$; $SD = 2.65$) and their parents took part in this study. Recruitment was carried out through the principals of kindergartens and elementary schools in the French-speaking area of Belgium. Table 1 shows information about socioeconomic status, including parents' education level and family income, the children's living arrangements and the presence of siblings. The parents indicated their level of education on a seven-point scale from low (elementary school not completed) to high (university). The mothers had an average level corresponding to Master's degree, and fathers, to Bachelor degree. In terms of family income, the parents reported mean salaries and benefits on a 13-point subscale from 0–500 euros to more than 6000 euros. The mean income reported by parents corresponded to 3000 to 3500 euros per month. The great majority of children lived with their two parents. Almost half of the children had only one brother or sister.

Measures

Griffith Empathy Measure

As mentioned in the introduction, the original questionnaire of the Griffith Empathy Measure (GEM, Dadds et al., 2008) consists of 23 items. It aims to assess parents' perception of children's affective and cognitive empathy between the ages of 4 and 16. Parents complete it using a 9-point Likert scale from -4 (strongly disagree) to 4 (strongly agree) for each statement. Seven items are recoded inversely. The GEM allows a total score for empathy to be calculated, corresponding to the mean for all 23 items. The two subscales for affective and for cognitive empathy consist of 9 and 6 items respectively, with the two specific scores that are calculated for them corresponding to the mean for the respective group of items. This questionnaire was translated

Table 1 Demographic characteristics of participants

	<i>M</i> (SD)	%
<i>Mothers' education level</i>		
Elementary school	5.05 (1.14)	2.6%
Vocational qualification		8.0%
High school qualification		15.3%
Bachelor's degree		32.1%
Master's degree		39.0%
PhD		3.0%
<i>Fathers' education level</i>		
Primary school	4.76 (1.23)	2.3%
Vocational degree		16.4%
High school degree		22.3%
Bachelor's degree		22.7%
Master's degree		33.6%
PhD		2.7%
<i>Family income</i>		
	8.53 (2.74)	
<i>Living arrangement</i>		
Child lives with both parents together		80.7%
Child lives with alternating custody		7.8%
Child lives only or principally with mother		4.7%
Child lives only or principally with father		2.9%
<i>Sibling</i>		
Children without siblings		21.3%
Children with one sibling		51.6%
Children with at least two siblings		27.1%

into French, independently, by the principal investigator (a specialist in developmental psychology) and by an expert in English-French translation. An adapted French version (GEM-vf) was formulated by comparing these preliminary translations. A back-translation was then made by a bilingual English- and French-speaking researcher in psychology who was not informed about the goal of this study. A comparison between the original and this back-translation was made, and the similarity rate was 98%.

Empathy Questionnaire

Mothers of a subsample of 299 children aged between 3 to 6 years completed the French version of the Empathy Questionnaire (EmQue, Rieffe et al., 2010; EmQue-vf, Simon et al., 2023a). This other-reported questionnaire of 14 items assesses three hierarchical components, referring to Hoffman's (1987) developmental model: (1) emotion contagion, (2) attention to others' feelings and (3) prosocial actions. On a 4-point Likert scale from "never" (1) to "always" (4), the mothers estimated how frequently their children had displayed empathic reactions and/or behaviors in the last two months. In terms of the internal consistency of EmQue-vf, Cronbach's alpha varied between 0.65 (emotion contagion),

0.78 (attention to others' feelings) and 0.81 (prosocial actions) in the validation study. In the present study, for the two considered components, the values were nearly similar: 0.78 (attention to others' feelings) and 0.798 (prosocial actions).

Theory of Mind Inventory

The French version of the Theory of Mind Inventory-first version (ToMI-1, Hutchins et al., 2012; ToMI-1-vf, Houssa et al., 2014) is a questionnaire assessing parents' perception of children's understanding of affective and cognitive mental states, with reference to the nine mental states described by Flavell (1999). For 39 items, parents indicate on a continuum from "absolutely not" (0) to "completely" (20) the frequency or intensity of children's behaviors and reactions regarding their Theory of Mind skills in daily life. Three subscales are differentiated: (1) ToMI-cognitive-thoughts, (2) socioemotional ToMI and (3) ToMI-cognitive-beliefs. The scores of the three subscales and the total score of the ToMI-1-vf refer to the mean of each item, ranging from 0 to 20. In the validation study, Cronbach's alpha was 0.94 for the total score, 0.94 for ToMI-cognitive-thoughts, 0.76 for ToMI-socioemotional and 0.72 for ToMI-cognitive-beliefs. In the present study, Cronbach's alpha was 0.95 for the total score, 0.94 for ToMI-cognitive-thoughts, 0.80 for socioemotional ToMI and 0.72 for ToMI-cognitive-beliefs.

Theory of Mind Task Battery

The French version of this ToM-task Battery (Hutchins et al., 2008; ToM task Battery-vf, Nader-Grosbois & Houssa, 2016) consists of nine tasks assessing the understanding of affective, cognitive and mixed mental states in children aged 2 to 12 years. This performance-based measure concerns (1) emotion recognition, (2) perspective-taking, (3) inference of desire-based emotion, (4) inference of perception-based belief, (5) inference of perception-based action, (6) false belief, (7) inference of belief- and reality-based emotion and second-order emotion, (8) message-desire discrepancy and (9) second-order false belief. Each task contains (a) a control question to make sure the child understands, (b) a prompt question to guide the child and (c) a test question evaluating the child's understanding of a mental state (15 test questions). One point is attributed to each test question, giving a maximum total score of 15 points. The specific scores concerning the understanding of affective and cognitive mental states separately are out of a maximum of 6 points each, while the score for mixed mental states is out of a maximum of 3 points. Internal consistency for the total score on ToM task Battery-vf revealed a Cronbach's alpha of 0.75 in the validation study and 0.77 in the present study.

Emotion Regulation Checklist

The mothers completed the French version of the Emotion Regulation Checklist (ERC, Shields & Cicchetti, 1997; ERC-vf, Nader-Grosbois & Mazzone, 2015). This is a questionnaire of 24 items that is used to assess adults' perception of children's emotion regulation and dysregulation in daily life. For each item, formulated as a statement, the mothers indicated, on a 4-point Likert scale from "never" (1) to "always" (4), how frequently their child displayed emotional responses, frustration control or mood lability, angry reactivity and dysregulated negative affects. Two specific scores can be calculated respectively for emotion regulation and emotion dysregulation. This measure can be used for children aged between 3 and 12 years. Cronbach's alphas were 0.72 and 0.82 for emotion regulation and dysregulation in the validation study of ERC-vf, and 0.68 and 0.82 respectively in the present study.

Procedure

This project was approved by the Ethics Committee of the Psychological Sciences Research Institute of UCLouvain. Participants were recruited on a voluntary basis, through an invitation distributed by principals of kindergartens and elementary schools. Parents received an information document, explaining the goal of the study, the conditions for participation, and a consent form to fill in if they agree to participate. Mothers who signed the consent form received a short form to give sociodemographic information about their children and family (e.g., parents' education level, family income, number of siblings). The four questionnaires about empathy (GEM-vf and EmQue-vf), Theory of Mind (ToMI-1-vf) and emotion regulation Checklist (ERC-vf) were also sent to the mothers, who completed them randomly. The information form and questionnaires were completed either on a paper version or online. Finally, the ToM-task Battery-vf was administered to the children at school or at home, in a quiet room. At the end of their participation, parents and children received a small gift.

Results

Descriptive Statistics

Table 2 presents means and standard deviations for scores in GEM-vf, ToMI-1-vf, ToM task Battery-vf and ERC-vf, for all samples, by gender and age.

Table 2 Means and standard deviations for GEM-vf, ToMI-1-vf, ToM task Battery-vf and ERC-vf

	Total	Age groups			Gender groups	
		3 to 5 yo	6 to 8 yo	9 to 12 yo	Girls	Boys
N	516	243	140	132	304	212
	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)
GEM-vf	1.35 (1.02)	1.09 (.95)	1.51 (.97)	1.65 (1.09)	1.38 (1.04)	1.31 (.98)
Affective empathy (max = 4)	1.44 (1.12)	1.14 (1.03)	1.66 (1.05)	1.72 (1.21)	1.52 (1.11)	1.31 (1.12)
Cognitive empathy (max = 4)	1.26 (1.50)	1.04 (1.44)	1.34 (1.40)	1.59 (1.64)	1.24 (1.51)	1.30 (1.48)
Theory of Mind Inventory-vf						
ToMI – Total (max = 20)	15.81 (2.49)	14.38 (2.21)	16.51 (1.91)	17.46 (2.11)	15.88 (2.54)	15.69 (2.42)
ToMI – Thoughts (max = 20)	14.20 (3.42)	12.14 (3.03)	15.09 (2.58)	16.80 (2.55)	14.33 (3.48)	14.00 (3.33)
ToMI – Socioemotional (max = 20)	17.20 (1.97)	16.60 (1.93)	17.66 (1.73)	17.74 (1.99)	17.26 (2.00)	17.10 (1.91)
ToMI – Beliefs (max = 20)	17.36 (2.21)	16.41 (2.25)	18.03 (1.65)	18.30 (1.99)	17.38 (2.25)	17.32 (2.15)
ToM-task Battery-vf						
ToM-Battery – Total (max = 15)	9.86 (3.13)	8.05 (2.67)	10.70 (2.37)	12.83 (1.82)	9.97 (3.12)	9.71 (3.15)
ToM-Battery – Affective (max = 6)	5.30 (.96)	4.92 (1.10)	5.61 (.61)	5.79 (.49)	5.34 (.97)	5.26 (.95)
ToM-Battery—Cognitive (max = 6)	3.20 (1.69)	2.25 (1.38)	3.47 (1.28)	4.94 (1.08)	3.20 (1.69)	3.21 (1.69)
ToM-Battery—Mixed (max = 3)	1.38 (1.31)	.90 (1.12)	1.66 (1.32)	2.11 (1.29)	1.44 (1.33)	1.30(1.30)
ERC-vf						
Emotion Regulation (max = 4)	3.32 (.39)	3.32 (.37)	3.28 (.51)	3.36 (.42)	3.28 (.42)	3.36 (.35)
Emotion Dysregulation (max = 4)	1.94 (.40)	1.96 (.37)	1.85 (.47)	1.85 (.52)	1.90 (.38)	1.99 (.42)

yo years old, *GEM-vf* Griffith Empathy Measure-French, *EmQue-vf* Empathy Questionnaire-French, *ToM-Battery-vf* ToM Task Battery-French, *ERC-vf* Emotion Regulation Checklist-French

Content Validity and Factorial Structure

A principal component analysis with oblimin rotation was performed, using IBM SPSS Statistics 27.0, to determine the factorial structure of GEM-vf. In accordance with the components of affective and cognitive empathy found by Dadds et al. (2008), the number of factors was forced at 2. A first analysis with the 23 items was computed and showed an adequate adjustment of the data ($KMO=0.817$; Bartlett's Test of Sphericity: $p < 0.001$). The loading of item 3 was less than 0.3. Four items (7, 9, 16 and 22) loaded on the wrong factor and the content of item 21 did not seem to refer to affective or cognitive empathy. Consequently, these six items were removed from the analysis. The second exploratory factor analysis also showed a proper adjustment ($KMO=0.827$; Bartlett's Test of Sphericity: $p < 0.001$). The first factor, referring to affective empathy, explained 26.7% of the variance, while the second, cognitive empathy, explained 11% of the variance. The final model (see Table 3) contained 17 items, distributed as follows: 13 items for affective empathy and 4 for cognitive empathy.

Reliability

Internal consistency was assessed to test the reliability of GEM-vf. The Cronbach's alpha should be greater than or equal to 0.7 to be adequate and the average inter-item

correlations should be in the range of 0.15 to 0.50, as recommended by Clark and Watson (1995). Table 4 shows Cronbach's alphas and inter-item correlations for the overall items and items of both components. For the total and affective empathy, internal consistency were very good and met the two criterion. For cognitive empathy, Cronbach's alpha was lower than expected and inter-item correlations met the criterion.

Variability With Age

Pearson's correlations were computed between age and the three scores in GEM-vf. Significant and positive correlations were found between age and total empathy ($r=0.262$, $p < 0.001$), affective empathy ($r=0.237$, $p < 0.001$) and cognitive empathy ($r=0.180$, $p < 0.001$). A one-way MANOVA was run to check whether empathy differed depending on age group (see Table 2 for means and standard deviations, and Figs. 1, 2, 3). A main effect of group was demonstrated (Pillai's $F=9.768$, $p < 0.001$, $\eta_p^2=0.037$). The between-subjects test found significant differences in affective empathy ($F=16.738$, $p < 0.001$, $\eta_p^2=0.061$) and in cognitive empathy ($F=6.131$, $p=0.002$, $\eta_p^2=0.023$). Bonferroni's post-hoc highlighted a difference in affective empathy between the 3–5 years and 6–8 years groups (mean difference = -0.52, $p < 0.001$) as well as between the 3–5 years and 9–12 years groups (mean difference = -0.58, $p < 0.001$). For cognitive

Table 3 Results of the principal components analysis with oblimin rotation

	Affective empathy	Cognitive empathy
1. It makes my child sad to see another child who can't find anyone to play with	.680	
2. My child treats dogs and cats as though they have feelings like people	.360	
3. My child feels sorry for another child who is upset	.682	
4. My child becomes sad when other children around him/her are sad	.762	
5. My child doesn't understand why other people cry out of happiness		.621
6. My child seems to react to the moods of people around him/her	.504	
7. My child likes to watch other people open presents, even when he/she doesn't get one him-/herself	.318	
8. Seeing another child who is crying makes my child cry or get upset	.725	
9. My child gets upset when he/she sees another child being hurt	.705	
10. When I get sad my child doesn't seem to notice		.541
11. Seeing another child laugh makes my child laugh	.481	
12. Sad movies or TV shows make my child sad	.600	
13. It's hard for my child to understand why someone else gets upset		.771
14. My child gets upset when he/she sees an animal being hurt	.591	
15. My child feels sad for other people who are physically disabled (e.g., in a wheelchair)	.505	
16. My child rarely understands why other people cry		.754
17. My child can continue to feel okay even if people around are upset	-.420	

Table 4 Cronbach's alpha and average inter-item correlations in GEM-vf

	Number of items	Cronbach's alpha	Inter-item correlations
Total empathy	17	.80	.195
Affective empathy	13	.82	.268
Cognitive empathy	4	.62	.288

empathy, a difference was obtained between the 3–5 years and 9–12 years groups (mean difference = -0.55, $p = 0.002$). The one-way ANOVA that was run for the total empathy score showed a main effect of age group ($F = 16.127$, $p < 0.001$, $\eta^2 = 0.059$). Moreover, Bonferroni's post-hoc showed differences in total empathy between the 3–5 years and 6–8 years groups (mean difference = -0.42, $p < 0.001$) and between the 3–5 years and 9–12 years groups (mean difference = -0.55, $p < 0.001$).

Fig. 1 Distribution of total empathy of the GEM-vf by age group. Notes. GEM-vf: Griffith Empathy Measure-French version; ** $p < .01$; *** $p < .001$

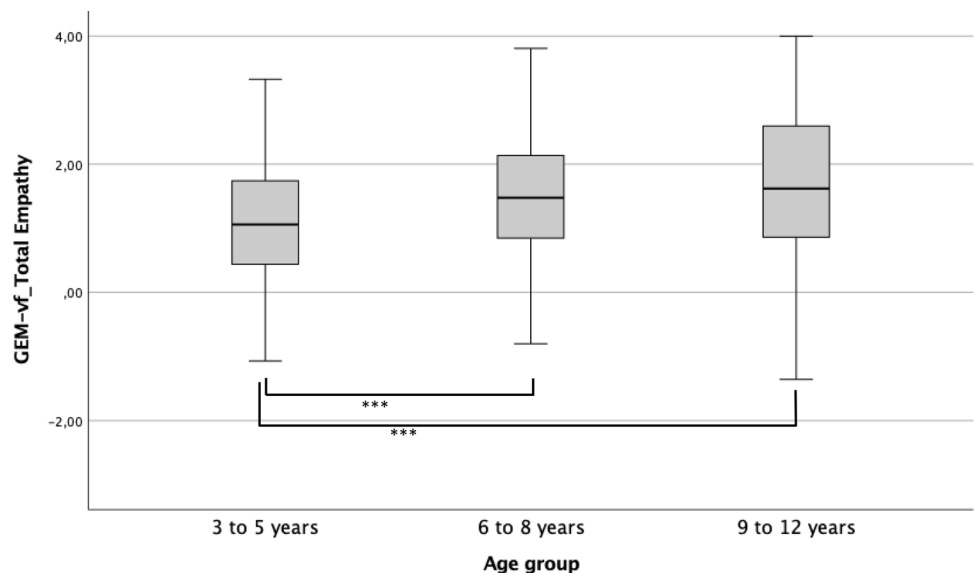


Fig. 2 Distribution of affective empathy of the GEM-vf by age group. Notes. GEM-vf: Griffith Empathy Measure–French version; ** $p < .01$; *** $p < .001$

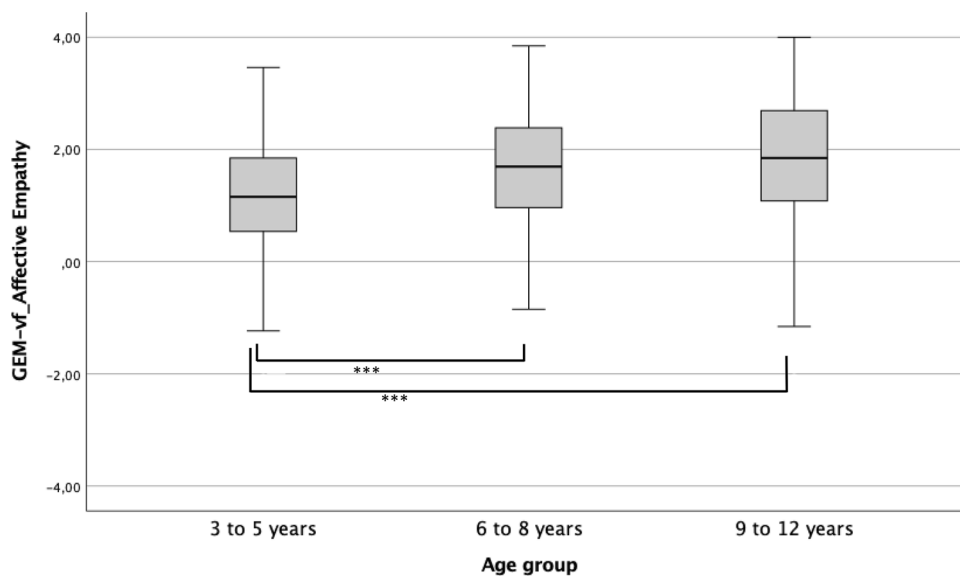
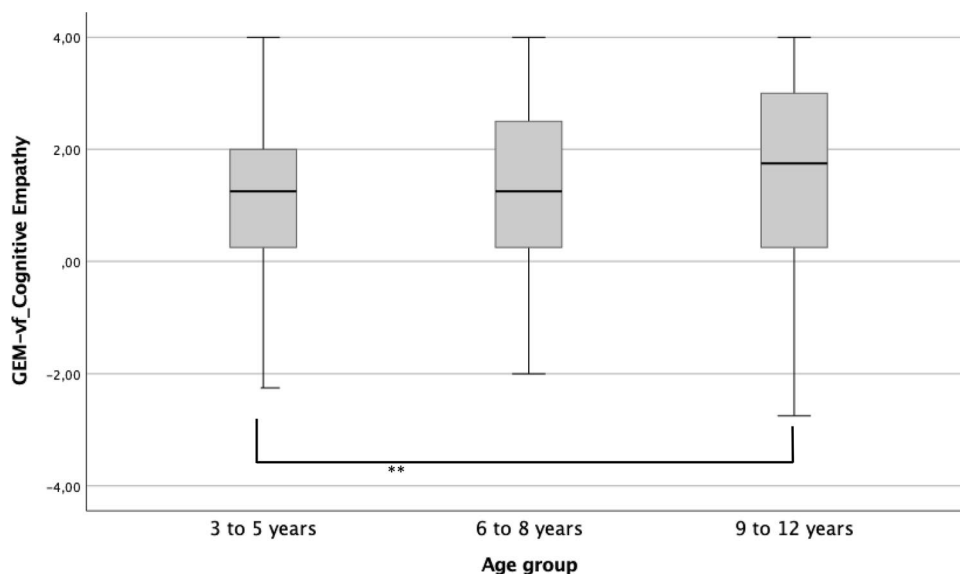


Fig. 3 Distribution of cognitive empathy of the GEM-vf by age group. Notes. GEM-vf: Griffith Empathy Measure–French version; ** $p < .01$



Gender Effect

To examine gender difference in affective, cognitive and total empathy scores, a one-way MANOVA was conducted (see Table 2 for means and standard deviations); this showed no main effect of gender (Pillai's $F = 2.666$, $p = 0.07$, $\eta^2 = 0.010$). However, between-subjects tests demonstrated a significant difference depending on gender in affective empathy ($F = 4.559$, $p = 0.033$, $\eta^2 = 0.009$), in the sense that girls had better affective empathy skills than boys; they did not differ significantly for cognitive empathy ($F = 0.197$, $p = 0.658$, $\eta^2 = 0.000$) or for total empathy ($F = 0.708$, $p = 0.4$, $\eta^2 = 0.001$).

Construct and Convergent Validity

Convergent validity was tested by Pearson's coefficients of correlation analyses between scores in GEM-vf and in ToMI-1-vf, ToM-task Battery-vf and ERC-vf for all samples. Table 5 presents the results of correlations between all these measures. The total, affective and cognitive empathy scores in GEM-vf were positively and significantly linked with the three subscores (thoughts, beliefs, socioemotional), the total score in ToMI-1-vf ($p < 0.001$) and the subscores (affective, cognitive, mixed ToM) and the total score of ToM-task Battery-vf (p between 0.001 and 0.042). Moreover, the three scores in empathy in GEM-vf correlated

Table 5 Pearson's correlations between scores in GEM-vf, ToMI-1-vf, ToM task Battery-vf and ERC-vf

	Theory of Mind Inventory-vf				ToM task Battery-vf				Emotion regulation checklist-vf		
	ToMI Thoughts	ToMI Sociocemotional	ToMI Beliefs	ToMI Total	ToM-Battery Affective	ToM-Battery Cognitive	ToM-Battery Mixed	ToM-Battery Total	Emotion Regulation	Emotion Dysregulation	
Total empathy	.455***	.470***	.399***	.490***	.138**	.233***	.147**	.230***	.372***	-.326***	
Affective empathy	.349***	.298***	.290***	.367***	.125**	.195***	.131**	.203***	.293***	-.201***	
Cognitive empathy	.359***	.419***	.327***	.391***	.094*	.170***	.101*	.16***	.277***	-.284***	

GEM-vf Griffith Empathy Measure-French version, ToM-Battery ToM Task Battery-French version, ToMI Theory of Mind Inventory-French version, ERC-vf Emotion Regulation Checklist-French version

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

positively and significantly with the score in emotion regulation in ERC-vf ($p < 0.001$). Significant and negative correlations were obtained between the three scores in GEM-vf and the score in emotion dysregulation in ERC-vf ($p < 0.001$).

Table 6 presents means and standard deviations for scores in the measures of empathy (GEM-vf and EmQue-vf) in the subsample of 299 preschoolers. Table 7 presents the results of Pearson's correlations between scores in the two empathy measures. Positive and significant correlations were obtained between the scores for total empathy and affective empathy in GEM-vf and the scores for attention to others' feelings and prosocial actions in EmQue-vf ($p < 0.001$). The score for cognitive empathy was significantly and positively related to the score for prosocial actions ($p = 0.002$), but the correlation with attention to others' emotions was close to nul.

Discussion

The main goal of this study was to evaluate the psychometric properties of a French version of the GEM, in children aged from 3 to 12 years. Firstly, as expected (H1a), the two-factor structure differentiating affective empathy (13 items) and cognitive empathy (4 items) was confirmed, similar to the bi-dimensional structure found by Dadds et al. (2008) for the original GEM (total (23 items), affective empathy (9 items), cognitive empathy (6 items)). GEM-vf also displayed conceptual validity in terms of the differentiation between the ability to react affectively and emotionally to others' emotions and distress (affective empathy) and the ability to take other people's perspective in order to understand their emotions (cognitive empathy), in line with a multi-dimensional model of empathy (e.g. Blair, 2005; Cuff et al., 2016; Davis, 1983; Decety, 2015; Dvash & Shamay-Tsoory, 2014; Eisenberg & Fabes, 1990; Eisenberg, 2005). GEM-vf has fewer items than the original version, due to the removal of poorly performing items. The number of items can vary between different studies to reflect cultural and age differences in the samples (thus the sample in validation study conducted by Dadds et al., 2008 consisted of children aged 4 to 16 years, in contrast with our sample of 3-to-12-year-olds). Moreover, Dadds et al. (2008) distinguished between the use of the whole GEM to calculate a total score for empathy and the use of specific affective or cognitive empathy subscales (with fewer items) to calculate two subscores. As predicted (H1b), the findings for the internal consistency of GEM-vf were very good for the total score and score for affective empathy and nearly acceptable for cognitive empathy.

Secondly, as expected (H2a), empathy was found to differ significantly depending on age group (3–5, 6–8, 9–12 years), with total, affective and cognitive empathy increasing during these periods of development (preschool and elementary school age). Dadds et al. (2008) also reported main effects

Table 6 Means and standard deviations for GEM-vf and EmQue-vf for the subsample of preschoolers

	Total	Girls	Boys
N	299	172	127
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
GEM-vf	1.11 (.92)	1.07 (.91)	1.16 (.95)
Affective empathy (max = 4)	1.20 (1.03)	1.23 (.98)	1.16 (1.10)
Cognitive empathy (max = 4)	1.02 (1.43)	.92 (1.39)	1.15 (1.48)
EmQue-vf			
Attention to others' feelings (max = 24)	17.48 (3.03)	17.28 (3.20)	17.75 (2.77)
Prosocial actions (max = 16)	9.53 (2.11)	9.58 (2.35)	9.48 (2.32)

Table 7 Pearson's correlations between scores in GEM-vf and EmQue-vf in the subsample of preschoolers

	EmQue-vf	
	Attention to Others' Feelings	Prosocial Actions
GEM-vf		
Total empathy	.253***	.327***
Affective empathy	.325***	.327***
Cognitive empathy	.095	.187**

GEM-vf Griffith Empathy Measure-French version, EmQue-vf Empathy Questionnaire-French version

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

for three age groups (4–6, 7–10, 11–16 years) in a larger period, for total empathy and for cognitive empathy, showing an increase depending on age, but not for affective empathy scores. Moreover, a gender effect was emphasized for affective empathy, which was found to be higher in girls than in boys, but not for total empathy and cognitive empathy. Our hypothesis of no difference depending on gender (*H2b*) was confirmed (except for affective empathy, where the direction of difference was the same as that found in the study conducted by Dadds et al. (2008)). By contrast, Dadds et al. also reported differences in favor of girls for cognitive and total empathy. Our finding of equal levels of cognitive and total empathy in French-speaking girls and boys could be interpreted in light of the fact that parents and professionals are increasingly being encouraged to support socioemotional skills, using similar socialization of emotions practices, through reactions and conversations about emotions, for girls and boys at preschool and elementary school age. In Belgium this has particularly been the case over the last decade.

Thirdly, concerning convergent validity, it is interesting to observe, for the subsample of children from 3 to 6 years old, that affective empathy was positively linked with attention to others' feelings and prosocial actions (assessed by EmQue-vf), and that cognitive empathy, requiring more elaborate cognitive processes, was positively linked only with

prosocial actions, as expected (*H3d*). In other words, when young children showed high levels of affective and cognitive empathy, they were likely to display prosocial actions, such as comforting, giving help to peers or adults when they expressed distress, or sharing positive and negative emotions with them. These findings were consistent with a developmental progression that varies according to multiple dimensions (affective, cognitive and behavioral) of empathy, as well as with Hoffman's developmental model. As expected (*H3a*), the convergent validity of GEM-vf in French-speaking children at preschool and elementary school ages was supported by positive and significant links between total, affective and cognitive empathy (in GEM-vf) and ToM skills for diverse affective and cognitive mental states – both explicit ToM (through performance in ToM task Battery-vf) and applied ToM (through mothers' perceptions of children's ToM in social situations of daily life). This suggests that the more children empathize with other children or adults in daily life by responding affectively in an appropriate manner and giving help or comfort, the more they understand their positive and negative emotions, desires, beliefs (or false beliefs), thoughts, intentions or knowledge, etc., and vice versa. These results are consistent with ideas about the intricate development of certain abilities in empathy and ToM and their links that have been emphasized in several empirical studies (e.g., Bensalah et al., 2016a, b; Hinnant & O'Brien, 2007; Rieffe et al., 2010; Simon & Nader-Grosbois, in preparation-a). Moreover, as predicted, total, affective and cognitive empathy (evaluated by GEM-vf) were related positively to emotion regulation (*H3b*) and negatively to emotion dysregulation (*H3c*) (in ERC-vf). The higher the level of empathy children showed in both dimensions, the better they regulated their own emotions, and the less they showed emotion dysregulation in critical social situations, and vice versa. These findings were consistent with those of other studies (notably for preschoolers, Hein et al., 2018; Lee et al., 2016; Lucas-Molina et al., 2018, 2023; Simon & Nader-Grosbois, in preparation-b).

The findings of this study must be considered with some limitations in mind and future instrumental research should address them to complete the appreciation about

psychometric properties of GEM-vf. As the internal consistency was relatively low, specifically for the cognitive empathy subscale, which had a low number of items, some new items could be introduced for this subscale in order to reinforce the assessment of this dimension. As the test–retest stability of GEM-vf could not be verified due to the small number of questionnaires completed at retest one month later, it should be examined in another study. In future, in order to assess inter-rater agreement, the points of view of multiple informants (parents, teachers) should be compared. It could be relevant to test the validity of GEM-vf through the association with score obtained in a performance-based measure assessing also the two dimensions of empathy. Moreover, the divergent validity of GEM-vf should be also tested.

In terms of research implications, the GEM-vf could be useful for investigating in a nuanced way how affective and cognitive empathy evolve in healthy and atypically developing children, and the extent to which their empathy profiles are linked with their ToM abilities, their emotion regulation and their social adjustment in interactions with peers and adults. Given its applicability to children presenting various clinical disorders (ASD, intellectual disability, externalized or internalized disorders, etc.), GEM-vf could be employed to test hypotheses about the specific nature of empathy development in such children.

In terms of implications for practice, GEM-vf could be helpful in identifying weaknesses in empathy in order to provide input for prevention programs for children at risk (notably externalizing problem or bullying behavior toward others), to focus on these deficits in clinical interventions with individuals or with clinical subgroups and to test the effectiveness of interventions.

Conclusion

The GEM-vf showed some good psychometric properties and seems to be a reliable tool that can be used in research to examine new hypotheses integrating both affective and cognitive empathy, and for assessment in the context of intervention, with French-speaking children at preschool and elementary school age. We recommend the use of GEM-vf in combination with another empathy measure, such as EmQue or Empathy Tasks, if complementary information is needed to guide intervention.

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Authors Contributions NNG elaborated the research project, its hypotheses and methodology and wrote the paper as first author. PS collected the data, runned the statistics analyses and improved the paper as first author.

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Data Availability The raw data supporting the conclusion of this article will be made available by the author, without undue reservation.

Declarations

Ethical Approval This project was approved by the Ethics Committee of the Psychological Sciences Research Institute of UCLouvain.

Consent to Participate A consent form was received for all participants of this study.

Conflicts of Interest The authors have no conflicts of interest to report.

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