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Empathy and Theory of Mind in Preschoolers

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ABSTRACT

Empathy and Theory of Mind (ToM) undergo major development in preschoolers and help them in their social interactions. This study investigated (1) how affective, cognitive and behavioral empathy are linked with ToM relating to affective and cognitive mental states; and (2) whether subgroups of children could be differentiated according to their skills in these two domains. Mothers of 364 three-to-six-year-old children completed the French version of the Griffith Empathy Measure, Empathy Questionnaire, and Theory of Mind Inventory. The ToM Tasks Battery was also administered to children. A path analysis model showed positive relationships between distinct dimensions of empathy and ToM. Hierarchical cluster analyses identified four subgroups of cases, including one of children at risk of difficulties in empathy and ToM. This study emphasizes the importance of assessing these domains to detect children at risk and refer them to intervention programmes that target the development of these skills.

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Empathy; theory of mind; social cognition; preschool

Introduction

The preschool period is an important period for the development of social cognition, especially empathy (Decety, 2015) and Theory of Mind (ToM; Wellman & Liu, 2004). These abilities contribute to children's social adjustment by fostering prosocial behaviors, peer cooperation and positive relationships (Denham et al., 2003; Findlay et al., 2006; Girard et al., 2015; Yeates et al., 2007). Early detection of developmental difficulties is crucial to prevent social maladjustment, such as externalized (Houssa & Nader-Grosbois, 2016) and/or internalized behavior problems (Simon & Nader-Grosbois, 2021; Tibi-Elhanany & Shamay-Tsoory, 2011), as well as bullying behaviors (Anastassiou-Hadjicharalambous & Warden, 2008; Deschamps et al., 2018). It is thus essential to identify preschoolers who might be at risk of weaknesses in ToM or empathy. A better understanding of the dynamic links between the different dimensions of empathy and ToM during this developmental period appears relevant to provide appropriate care for children.

Empathy and its development

Empathy is commonly defined as the ability to feel and understand others' emotions without confusion between self and others (Batson et al., 1987; Decety & Meyer, 2008; Decety & Michalska, 2010; Eisenberg et al., 2006; Eisenberg & Strayer, 1990). Some authors have differentiated affective, cognitive and behavioral dimensions in this construct (Ball et al., 2017; Bensalah et al., 2016; Ford et al., 2011). Affective empathy refers to the affective sharing of other persons' emotions; it is considered to be an unconscious/automatic process (Decety et al., 2015) that

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develops from infancy (Hoffman et al., 2000; Rieffe et al., 2010). Regarding the development of this dimension, the evidence appears contradictory. Some empirical studies have highlighted an increase in affective empathy during the preschool period (Farina & Belacchi, 2014; Lucas-Molina et al., 2018; Rieffe et al., 2010). In contrast, other studies have reported stagnation (Bensalah et al., 2016; Ford et al., 2011; Howe et al., 2008; Roberts & Strayer, 1996).

Cognitive empathy, which is a conscious and intentional process, involves the understanding of emotional states of others (Decety et al., 2015). Although cognitive empathy mainly develops during preschool age, the first signs of the understanding of others appear at an early age (Roth-Hanania et al., 2011). Few studies have explored the age-related development of cognitive empathy, and here too, the evidence is inconsistent. For example, Bensalah et al. (2016) found that cognitive empathy increases as children grow up, whereas Nader-Grosbois and Simon (2023) and Bigelow et al. (2021) found no evidence of progress at preschool and school age.

Behavioral empathy corresponds to prosocial behaviors which stem from the sharing and understanding of others' emotions (Tamayo et al., 2016). It appears at about the age of two or three years (Hoffman, 2000; Persson, 2005) and increases with age (Bensalah et al., 2016; Catherine & Schonert-Reichl, 2011). However, only a few studies have integrated it as a component of empathy (Rieffe et al., 2010; Spinrad & Eisenberg, 2017; Tamayo et al., 2016; Teherani et al., 2008), while other studies have conceptualized it as an outcome of the empathy process (Heyes, 2018; Oliveira-Silva & Gonçalves, 2011).

According to Hoffman (2000), empathy follows a developmental sequence from early age to adulthood, through five stages. From birth, affective empathy emerges through *reactive crying*, as infants cry in response to another baby's distress without distinguishing self from others (i.e. emotional contagion). With growth, emotional contagion decreases. In the *egocentric empathic distress* stage (6–12 months), children still feel distressed when witnessing another's suffering but confuse it with their own. At around the age of two, *quasi-egocentric empathic distress* appears. Children recognize others' distress and try to help, but use strategies that they themselves find comforting (e.g. offering their own toy). As *veridical empathic distress* develops (at preschool age), they are able to see things from other people's viewpoint and adjust their responses to fit their actual needs. By the age of five, *empathic distress beyond the situation* develops. Children empathize with broader social issues and more complex emotions.

ToM and its development

ToM is defined as the ability to understand and attribute mental states to oneself and others (Wellman, 1991), enabling the prediction and interpretation of others' behaviors (Astington & Baird, 2005; Deneault & Ricard, 2013). Flavell (1999) identifies nine mental states within ToM, categorized as either cognitive ToM (understanding attention, intentions, perception, thoughts, beliefs, knowledge and pretense) or affective ToM (understanding emotions and desires). At an early age, several foundational abilities for the development of ToM have been identified, corresponding to the *Early ToM* stage (Hedden & Zhang, 2002; Hutchins et al., 2008), including joint attention (Carpendale & Lewis, 2009), social referencing (Deneault & Morin, 2007), recognition of basic emotions (Astington & Baird, 2005) and the emergence of desire (Wellman & Bartsch, 1994). At around two years old, children begin to grasp pretense (Leslie, 1987) and desires (Wellman, 1991). Gradually, children begin to consciously recognize mental states and attribute them to others, signaling the emergence of explicit ToM (Wellman, 1991). At three years old, children start to reach the *Basic ToM stage* or first-order ToM (Hedden & Zhang, 2002; Hutchins et al., 2008) by understanding causes and consequences of emotions (Wellman & Liu, 2004), while the understanding of beliefs and false beliefs develops at around four to five years old (Baron-Cohen, 2001; Wellman & Liu, 2004). At this stage, children gain a deeper understanding of mental states and their influence on behavior (Hedden & Zhang, 2002; Hutchins et al., 2008). At round the age of six, children begin to develop *Advanced ToM* or second-order ToM (Hedden & Zhang, 2002; Hutchins et al., 2008), understanding that others can have beliefs

about others' beliefs, requiring more complex reasoning (Baron-Cohen, 2001). This ToM development, through key stages, reflects the way in which children gradually gain the ability to understand and attribute more complex mental states (affective, cognitive, and mixed), allowing them to better take others' perspectives as distinct from their own in various social situations.

Links between empathy and ToM

Despite decades of research, there is a longstanding and ongoing debate over the distinction between empathy and ToM. As highlighted by Cerniglia et al. (2019), the variety of theoretical models and studies on these issues reflects the complexity of defining the intersections between empathy and ToM (Cerniglia et al., 2019; Decety & Meyer, 2008). Decety and Grèzes (2006) suggest that the development of empathy and ToM relies on the prior ability to distinguish one's own agency from that of others. Furthermore, the authors consider these as two distinct but interrelated constructs. Based on behavioral and physiological studies in developmental psychology, children aged four to five years are said to display mature empathic skills, being able to share the emotions of others, distinguish themselves from others and propose appropriate prosocial behaviors (Decety & Jackson, 2006; Eisenberg & Eggum, 2008; Eisenberg & Miller, 1987). At the same age, children are also considered to have developed the cognitive mechanisms underlying the development of ToM skills (Baron-Cohen et al., 2013).

Most of the few cross-sectional studies that have explored the link between empathy and ToM in preschoolers have reported a positive relationship (e.g. Bensalah et al., 2016; Gallant et al., 2020; Hinnant & O'Brien, 2007; Wang & Wang, 2015). In other words, children who share and understand others' emotions more, and/or who engage more in prosocial behaviors (Bensalah et al., 2016), also tend to demonstrate a greater understanding of others' mental states (Gallant et al., 2020; Hinnant & O'Brien, 2007; Wang & Wang, 2015). However, some cross-sectional and longitudinal studies have found no such association (Bigelow et al., 2021; Fink et al., 2014; Ford et al., 2011). Bigelow et al. (2021) suggested that the absence of association between cognitive and affective ToM and cognitive empathy could be due to the assessment methods, which may evaluate specific components of cognitive empathy that are unrelated to ToM. As stated above, the variations in the conceptualization of empathy and ToM and, consequently, the measures used in these studies (e.g. performance-based task *versus* questionnaires, assessment of one mental state *versus* multiple mental states, assessment of a global construct *versus* specific dimensions), could also explain the divergence of results across studies. Recently, Kim and Kang (2023) considered empathy and ToM through global scores derived from mothers' reports on empathy and ToM questionnaires. They showed that both constructs are linked in different ways in four subgroups of children aged five to six years: one group with moderate levels of both empathy and ToM, a second group with low empathy and high ToM, a third group with high empathy and low ToM, and a fourth with high levels of both empathy and ToM. Together, although this approach is limited to some extent—i.e. because of its operationalization of empathy and ToM as composites—it suggests that empathy and ToM may be linked differently for different subgroups, which has important implications for intervention/remediation.

In sum, given the results of previous studies focused on the preschool period, as well as theoretical and methodological inconsistencies, it appears important to further examine the relationships between the specific dimensions of empathy and ToM to better grasp their interconnection. Furthermore, identifying specific subgroups of children based on their multidimensional empathy and ToM profiles could help target subgroups that might benefit from preventive training tailored to their profiles of strengths and weaknesses.

The present study

Objective 1 of this study was to investigate the specific links between age, empathy (across its affective, cognitive, and behavioral dimensions) and affective and cognitive ToM, as assessed in

both cases through maternal perception. First, it was hypothesized that children's age was positively related to empathy and ToM levels, as reported by their mothers (Hypothesis 1). That way, the inconsistent developmental trends reported in the literature could be clarified, and the potential effect of age could be controlled for in follow-up analyses. Next, based on the social constructivist approach (Meltzoff & Decety, 2003; Nader-Grosbois & Thirion-Marissiaux, 2011) and results of previous studies (e.g. Bensalah et al., 2016; Gallant et al., 2020; Hinnant & O'Brien, 2007), three further hypotheses were outlined. The first of these (Hypothesis 2) suggested that children's affective empathy as reported by their mothers was positively linked to their affective and cognitive ToM. This link, it was hypothesized, was due to emotional sharing, which could foster an understanding of affective and cognitive mental states. Hypothesis 3 stated that cognitive empathy as evaluated by mothers was positively related to affective and cognitive ToM, since both involve perspective-taking processes. Hypothesis 4 proposed that children's behavioral empathy as evaluated by mothers was positively related to their affective and cognitive ToM. As prosocial actions emerge around the age of two years (Hoffman, 2000; Persson, 2005), engaging in social behaviors adjusted to the needs and emotions of others would help children to better understand affective and cognitive mental states.

Building upon Kim and Kang (2023)'s approach, Objective 2 of this study was to identify distinct subgroups of children based on their strengths and weaknesses across the dimensions of empathy and ToM, as perceived by mothers. Accordingly, Hypothesis 5 proposed that at least four subgroups of children would be identified: (a) a 'high skills' group with high levels in all empathy and ToM dimensions, (b) a 'moderate skills' group with average levels of empathy and ToM, (c) an 'at-risk' group showing weaknesses across multiple dimensions, and (d) at least one 'heterogeneous' group with strengths in some areas and weaknesses in others, without theoretical expectations as to which dimensions would be associated with either strengths or weaknesses.

Method

Participants

The participants were 364 French-speaking children (207 girls and 157 boys) with a mean age of 4.40 (SD = 1.02, range = 3-6) years (see Table 1) and their mothers. Children who were eligible as participants did not present any developmental disorders (e.g. behavioral problems, ADHD, intellectual disabilities, language delay, autism spectrum disorder). 87% of the children lived with both their parents, 9.2% lived principally with their mother (5.1%) or their father (4.1%), and 3.8% lived alternately with their mother and their father. Table 2 presents the distribution of parents' educational level, showing a bachelor's degree as the median education level

Table 1. Descriptive statistics.

	M (SD)	Skewness	Kurtosis
N	364		
Age (in years)	4.40 (1.02)	.069	−1.140
Questionnaires			
AE – GEM-vf (max = 4)	1.21 (.89)	−0.287	.981
CE – GEM-vf (max = 4)	1.00 (1.25)	−0.435	.527
BE – EmQue-vf (max = 16)	9.39 (2.01)	.076	.627
ToMI-T (max = 20)	12.45 (2.62)	−0.353	1.171
ToMI-SE (max = 20)	16.64 (1.71)	−0.748	1.046
ToMI-B (max = 20)	16.64 (1.93)	−0.731	1.325
Performance-based measures			
Affective ToM (max = 6)	5.02 (1.06)	−1.263	1.721
Cognitive ToM (max = 6)	2.37 (1.42)	.231	−0.541
Mixed ToM (max = 3)	.93 (1.12)	.885	−0.656

Notes. AE: affective empathy; CE: cognitive empathy; BE: behavioral empathy; ToMI-T: understanding of thoughts; ToMI-SE: understanding of socioemotional states; ToMI-B: understanding of beliefs.

Table 2. Demographics characteristics of participants' families.

	%
Mothers' educational level	
Primary school	2.4%
Vocational qualification	9.1%
Secondary school diploma	14.1%
Bachelor's degree	31.1%
Master's degree	39.2%
PhD	4.1%
Fathers' educational level	
Primary school	3.2%
Vocational qualification	21.1%
Secondary school diploma	18.2%
Bachelor's degree	21.1%
Master's degree	34.6%
PhD	1.8%

for mothers and fathers. The median family monthly income was 4000-4500 euros (ranging from 1000 to 1499 to more than 6000 euros).

Measures

Griffith empathy measure – French version

The Griffith Empathy Measure (GEM, Dadds et al., 2008; French version, GEM-vf, Nader-Grosbois & Simon, 2023) is a questionnaire evaluating parents' perception of affective empathy (AE - e.g. *My child becomes sad when other children around him/her are sad*) and cognitive empathy (CE—e.g. *My child rarely understands why other people cry)* in children. Through 17 items (13 for affective empathy and 4 for cognitive empathy), mothers indicated their level of agreement on a 9-point Likert scale from −4 (strongly disagree) to 4 (strongly agree). A mean score out of a maximum of 4 points can be calculated for each subscale. In the French version, internal consistency was good for AE (Cronbach's α = .82) but limited for CE (Cronbach's α = .61), given the broadness of the CE construct relative to the limited number of items (Nader-Grosbois & Simon, 2023). In line with this, the present study found that internal consistency was acceptable for AE (Cronbach's α = .76) but limited for CE (Cronbach's α = .55).

Empathy questionnaire: prosocial actions scale

The Prosocial Actions scale of the Empathy Questionnaire (EmQue, Rieffe et al., 2010), French adaptation and validation (EmQue-vf, Simon et al., 2024), was used to collect mothers' perceptions about their child's behavioral empathy. Through the 4 items scored on a 4-point Likert scale from 1 (never) to 4 (always), mothers indicated the frequency of children's empathic behaviors in response to others' emotions in everyday situations (e.g. *When another child gets frightened, my child tries to help him/her)*. A mean score out of a maximum of 4 points can be calculated. The internal consistency of this subscale was good in the French validation of the EmQue-vf (Cronbach's α = .81) and in the present study (Cronbach's α = .80).

Theory of mind inventory – French version

This questionnaire (ToMI, Hutchins et al., 2012; ToMI-vf, Houssa et al., 2014) was completed by mothers to evaluate their perceptions of the understanding of affective and cognitive mental states in their children. On a 20-point continuum, mothers indicated their degree of agreement in connection with 39 items about the level of their children's understanding of emotions, beliefs, desire, intentions and/or perceptions in daily situations (from 'absolutely not' to 'absolutely'). The questionnaire covered early, basic and advanced ToM. Three ToM subscores can be calculated for (1) thoughts (ToMI-T - e.g. *My child understands that people don't always say what*

they think so as not to hurt others), (2) socioemotional states (ToMI-SE, e.g. *My child understands that when someone frowns, they feel something different from when they smile*) and (3) beliefs (ToMI-B—e.g. *My child understands that to find out what's in a box without any instructions, you have to see or hear what's in the box*). A mean score out of a maximum of 20 points can be calculated for each subscale and for the overall score. Cronbach's α for the French validation study was .94 for ToMI-T, .76 for ToMI-SE, and .72 for ToMI-B; these figures were consistent with those of the present study, i.e. .91 for ToMI-T, .77 for ToMI-SE, and .66 for ToMI-B.

Theory of mind task battery – French version

Using the ToM Task Battery (Hutchins et al., 2008; French version, Nader-Grosbois & Houssa, 2016, Nader-Grosbois et al., 2024), the children's performance was assessed in terms of their understanding of affective, cognitive and mixed mental states. This battery consists of nine tasks of increasing complexity, presented in the form of images or stories. The first six tasks assess first-order ToM, while the last three assess second-order ToM. Each task includes control questions (which briefly assess children's memory of the story) and ToM test questions, to which children may provide a verbal response or point to the picture corresponding to their answer. A correct answer to a test question scored 1 point, with a maximum score of 15 points for the whole battery. The affective ToM subscale (out of 6 points) evaluates the understanding of affective mental states, such as emotion recognition or inference of an emotion based on desire. The cognitive ToM subscale (out of 6 points) assesses children's perspective-taking and understanding of the beliefs of others (including false beliefs). The mixed ToM subscale (out of 3 points) taps into children's understanding of situations involving mixed mental states, such as the discrepancy between a message and a desire.

Procedure

This study was approved by the Hospital-Faculty Ethics Committee of Saint-Luc-UCLouvain (protocol code B403201941776 on 29 November 2019). Children were recruited from kindergartens in the French-speaking areas of Belgium. If the directors and teachers agreed to support the project, the parents of children at the kindergarten received an information letter (explaining the study's objectives and rules about confidentiality, data anonymization and the possibility of ending their participation in the study) and a consent form. Once parents had agreed to participate, the ToM-task Battery was individually administered to their child at school or at home. Mothers also completed the GEM-vf, the prosocial actions subscale of EmQue-vf and the ToMI-vf. Children and mothers received a gift by way of thanks.

Data analysis

To optimize statistical power and make full use of the data available, a missing data analysis was first conducted. Moreover, all variables of interest were inspected for basic statistical assumptions in view of the planned analyses (e.g. distribution features and multicollinearity diagnosis) using IBM SPSS 29. To investigate the links between the different dimensions of empathy and ToM (Objective 1 and Hypotheses 1-3), a multivariate multiple regression model was performed in the path analytic framework as implemented in Stata 18. This model used empathy dimensions as independent variables and ToM variables as dependent variables. Age was also modeled as a predictor to account for its potential influence in empathy and ToM scores. This analysis thus made possible the simultaneous examination of several associations between independent and dependent variables, thereby allowing all hypotheses of the first objective to be tested simultaneously in a single analysis (thus probably decreasing the risk of Type-I errors). Moreover, by considering multiple variables simultaneously, the path model control for third variables effects that may affect both the independent and dependent variables, allowing for better isolation of the specific effect of one variable on another (Kline, 2023). To respond to the second objective (Hypothesis 5), a hierarchical

cluster analysis was run on cases to identify specific subgroups of preschoolers with similar profiles of empathy (AE, CE, and BE) and ToM (ToMI-T, ToMI-SE and ToMI-B), as reported by mothers, using standardized scores on the questionnaires. This analysis was followed by a one-way MANOVA to identify the differences between clusters on age, AE, CE, BE, ToMI-T, ToMI-SE and ToMI-B. Finally, children's performance in the ToM Task Battery was analyzed in a second one-way MANOVA to explore whether there was significant difference between clusters of children.

Results

Preliminary analyses

The rate of missing data was 15.9% on average (with a range from 11.0% to 26.3%). As the pattern of missingness was completely random (Little's MCAR: X^2 = 69.775, DF = 60, p = .182), missing data was imputed using expectation maximization imputation (Little & Rubin, 2019), increasing statistical power for the planned analyses. The normality of the data was checked and deemed acceptable, based on skewness and kurtosis values (Table 1). Moreover, no multicollinearity was observed, based on the variance inflation index (VIF between 1.038 and 1.149). Table 1 shows the descriptive statistics of all variables, including mean, standard deviation and skewness and kurtosis values. Table 3 presents zero-order correlations between all variables, including children's age and the dimensions of empathy and ToM assessed by questionnaires or by performance-based measures. Partial correlations between empathy and ToM, controlled for age, are also presented in Table 3. The results showed positive correlational links, controlling for children's age, between dimensions of empathy and ToM based on mothers' perceptions as recorded in the questionnaires (r ranging between .184 and .364, p<.001).

Objective 1: paths analysis model

As shown in Figure 1, empathy dimensions and age were integrated in the model as independent variables, while those of ToM were modeled as dependent variables. Independent variables were set to intercorrelate freely, thereby accounting for each one's influences on all dependent variables (which were themselves intercorrelated freely to control for their overlapping variance). Figure 1 presents the main (standardized) estimates regarding the relationships between affective, cognitive, and behavioral empathy and ToM, representing the understanding of thoughts, beliefs and socioemotional states. Overall, this model explained 47% of the variance in the dependent variables (R^2 = .47). Specifically, the combined independent variables explained 37%, 27% and 24% of the variances of ToMI-T, ToMI-SE and ToMI-B respectively. Path coefficient values are presented in Table 4.

With regard to Hypothesis 1, the results showed that age was positively and significantly related to affective (r = .16, p = .001) and behavioral empathy (r = .18, p < .001), but not to cognitive empathy (r = .06, p = .198). Further, age was positively linked to ToMI-T (β = .40, p < .001), ToMI-SE (β = .12, p = .009), and ToMI-B (β = .31, p < .001). Regarding the relationships between affective empathy and ToM (Hypothesis 2), affective empathy was positively related to ToMI-T (β = .12, p = .009), ToMI-SE (β = .12, p = .014) and ToMI-B (β = .13, p = .007), with effects of similar magnitude. Moreover, consistently with Hypothesis 3, cognitive empathy was also positively linked to ToMI-T (β = .24, p < .001), ToMI-SE (β=32, p < .001) and ToMI-B (β = .22, p < .001). Finally, in line with Hypothesis 4, a positive association was observed between behavioral empathy and ToMI-T (β = .20, p < .001), ToMI-SE (β = .24, p < .001) and ToMI-B (β = .12, p = .015).

Objective 2: hierarchical cluster analysis of cases

To investigate Hypothesis 5, a hierarchical cluster analysis was performed on cases to identify subgroups of children depending on their empathic and ToM skills, as perceived by mothers.

Table 3. Zero-order correlations and partial correlations, controlling for children's age, between empathy and ToM variables.

	1. Age	2.AE	3.CE	4.Total GEM	5.BE	6.ToMI-T	7.ToMI-SE	8.ToMI-B	9.Total ToMI	10.Affective ToM	11.Cognitive ToM	12.Mixed ToM	13.Total ToM
2. AE	.162**	–	.163**	.671***	.310***	.231***	.234***	.202***	.265***	.021	.067	−0.039	.000
3. CE	.067	.172***	–	.844***	.155**	.304***	.364***	.259***	.360***	.063	.045	−0.064	.042
4. Total GEM	.131*	.668***	.847***	–	.314***	.376***	.393***	.281***	.415***	.059	.067	−0.063	.032
5. BE	.180***	.330***	.164**	.300***	–	.289***	.310***	.184***	.311***	.019	.025	.042	.055
6. ToMI-T	−0.479***	.278***	.298***	.372***	.336***	–	.608***	.521***	.937***	.240***	.051	.153**	.161**
7. ToMI-SE	.210***	.260***	.369***	.413***	.336***	.623***	–	.648***	.823***	.201***	.130*	.082	.179**
8. ToMI-B	.377***	.246***	.264***	.328***	.235***	.604***	.666***	–	.757***	.183***	.140**	.116*	.185**
9. ToMI-Total	.440***	.300***	.346***	.422***	.354***	.945***	.807***	.768***	–	.203***	.087	.129*	.191***
10. Affective ToM	.428***	.088	.086	.089	.093	.395***	.267***	.315***	.345***	–	.213***	.225***	.642***
11. Cognitive ToM	.469***	.134*	.072	.109	.106*	.264***	.211**	.291***	.254***	.371***	–	.211***	.747***
12. Mixed ToM	.305***	.012	−0.40	−0.022	.073	.274***	.140**	.218***	.240***	.324***	.320***	–	.696***
13.Total ToM	.548***	.155**	.047	.102	.138*	.414***	.297***	.377***	.389***	.746***	.818***	.693***	–

Notes. Dashes represents the diagonal. Zero-order correlations are presented below the diagonal. Partial correlations, controlling for children's age, are presented above the diagonal. AE: Affective empathy-GEM-vf; BE: Cognitive empathy-GEM-vf; Total GEM: Total empathy-GEM-vf; BE: Behavioral empathy-EmQue-vf; ToMI-T: Thoughts-ToMI-vf; ToMI-SE: Socioemotional-ToMI-vf; ToMI-B: Beliefs-ToMI-vf; Total ToMI: Total-ToMI-vf; Affective ToM: Affective ToM-ToM Task Battery; Cognitive ToM: Cognitive ToM-ToM Task Battery; Mixed ToM: Mixed ToM-ToM Task Battery; Total ToM: Total-ToM Task Battery, *$p < .05$, **$p < .01$, ***$p < .001$.

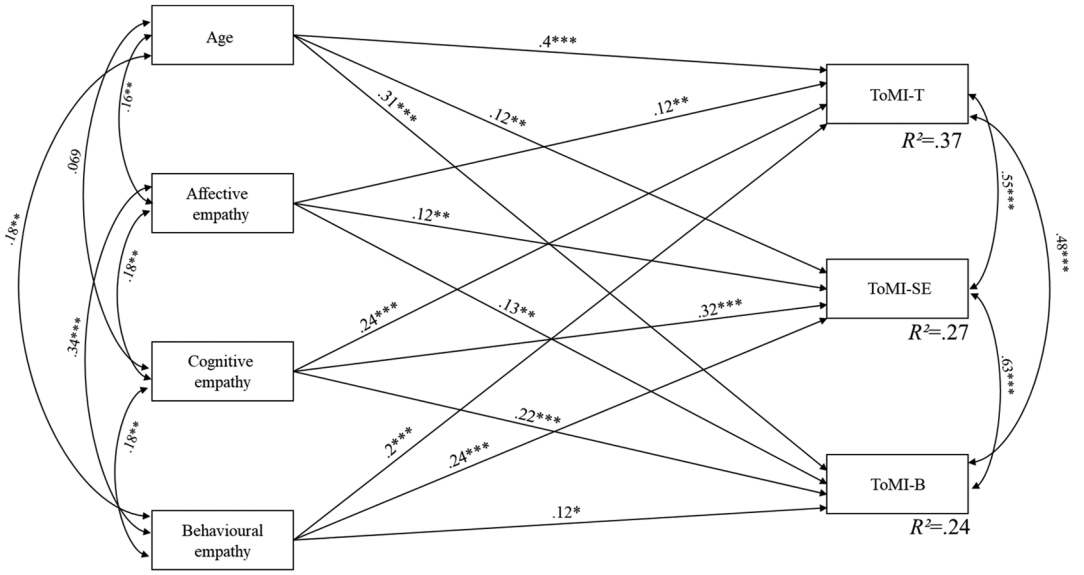


Figure 1. Paths from empathy to ToM, as perceived by mothers.
Notes. ToMI-T: understanding of thoughts, ToMI-SE: understanding of socioemotional states; ToMI-B: understanding of beliefs. *$p < .05$, **$p < .01$, ***$p < .001$.

Table 4. All coefficients of paths between empathy and ToM as perceived by mothers.

	B	*SE*	*β*	*z*	*p*
ToMI-T					
Age	1.04	.111	.40	9.37	< .001
AE	.35	.135	.116	2.58	.009
CE	.51	.091	.235	5.522	< .001
BE	.267	.06	.199	4.435	< .001
ToMI-SE					
Age	.212	.082	.118	2.58	.009
AE	.244	.099	.118	2.452	.014
CE	.47	.067	.319	6.958	< .001
BE	.217	.044	.237	4.905	< .001
ToMI-B					
Age	.61	.091	.309	6.63	< .001
AE	.295	.11	.13	2.667	.007
CE	.359	.074	.224	4.808	< .001
BE	.119	.049	.118	2.419	.015

Notes. AE: affective empathy; CE: cognitive empathy; BE: behavioral empathy; ToMI-T: understanding of thoughts; ToMI-SE: understanding of socioemotional states; ToMI-B: understanding of beliefs.

Ward's method using squared Euclidean distances was used on AE, CE, BE, ToMI-T, ToMI-SE and ToMI-B, converted into Z scores to standardize their influence in the clustering solution. Based on the dendrogram (see Figure 2), the silhouette of clustering, and the clinical significance of each cluster (Hair et al., 2022), four clusters were retained.

The descriptive statistics based on standardized scores for each cluster are presented in Table 5. Figure 3 plots the empathy and ToM standardized scores as well as the associated mean age for each cluster. To gauge group differences according to cluster membership, a one-way MANOVA was run, including children's age and mothers' perceptions of empathy (AE, BE and CE) and ToM (ToMI-T, ToMI-SE and ToMI-B) as dependent variables. This analysis showed a significant group effect (Pillai's $F = 28.065$, $p < .001$, $\eta_p^2 = .356$). For each variable, group differences were observed (F between 17.542 and 161.375, $p < .001$, η_p^2 between .086 and .574). Games-Howell post-hoc analyses[1] revealed specific differences between clusters.

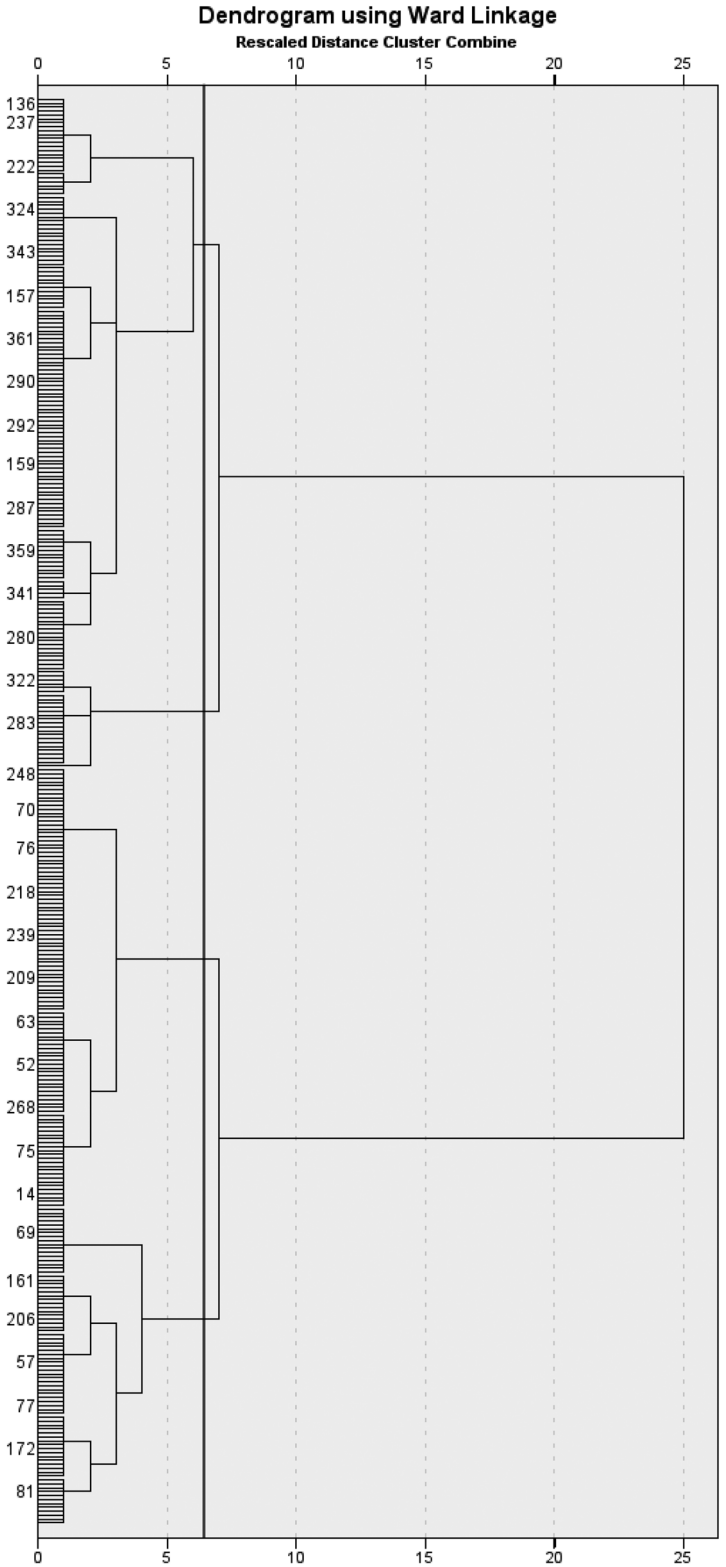


Figure 2. Dendrogram resulting from hierarchical cluster analysis of cases with ward's method and euclidean distance, based on children's empathy and ToM, as perceived by mothers.

Regarding age, Cluster 1 ($n = 112$, $M = 4.79$ years old, SD= .89) and Cluster 2 ($n = 81$, $M = 4.68$ years old, SD= .96), which were the oldest subgroups, differed from Cluster 3 ($n = 146$, $M = 4.05$ years old, SD= 1.01) and Cluster 4 ($n = 25$, $M = 3.84$ years old, SD= 1.23) ($p<.001$).

Children in Cluster 2 were perceived by mothers as having the highest level of empathy and ToM across all dimensions. More specifically, they differed significantly from all other clusters in AE ($p < .001$), CE (p between .013 and .001), BE ($p < .001$), ToMI-T (p between .003 and .001) and ToMI-SE ($p <.001$). For ToMI-B, Cluster 2 differed significantly from Cluster 3 ($p <.001$) and Cluster 4 ($p <.001$).

Cluster 1 was also associated with a good level of empathy and ToM, according to maternal perception, although slightly lower than Cluster 2. In terms of AE, children from Cluster 2 did not differ from Cluster 3 ($p = .986$), with both groups showing moderate levels on this dimension. Moreover, the difference between Cluster 2 and Cluster 4 was marginal ($p = .066$). They also differed significantly from all other clusters in CE (p between .013 and .001), ToMI-T (p between .003 and < .001) and ToMI-SE ($p < .001$), except for behavioral empathy when compared to Cluster 3 ($p = .494$), and ToMI-B when compared to Cluster 2 ($p = .975$).

Children in Cluster 3 were seen as having moderate levels of empathy and ToM, with scores close to average. However, they did not differ from Cluster 1 ($p = .986$) and Cluster 4 ($p = .102$) on AE, or from Cluster 1 ($p = .494$) on BE. In contrast, they differed significantly from all other clusters on CE ($p <.001$) as well on ToMI-T (p between .015 and .001), ToMI-SE ($p <.001$) and ToMI-B ($p < .001$).

Finally, Cluster 4 included children perceived as having the lowest levels of empathy and ToM. Except for AE when compared to Cluster 3 ($p = .102$), they differed significantly from all other clusters on CE ($p < .001$) and BE (p between .003 and < .001) as well as on ToMI-T (p between .015 and < .001), ToMI-SE ($p < .001$) and ToMI-B ($p < .001$).

Through a second one-way MANOVA, children's performance in the ToM Task Battery was analyzed to examine whether there was significant difference between clusters of children. Standardized scores of age, affective ToM, cognitive ToM and mixed ToM were included in the analysis. A significant group effect was reported (Pillai's $F = 6.319$, $p<.001$, $\eta_p^2 = .066$). For each variable, group differences were observed (F between 5.425 and 17.542, p between .001 and < .001, η_p^2 between .043 and .128). As variance homogeneity was assumed, Bonferroni post-hoc analyses were used to identify specific differences between clusters.

Children's performance in the ToM Task Battery revealed average scores across all clusters. However, statistical differences emerged between groups (see Table 5 for descriptive statistics). Figure 4 presents the ToM Task Battery standardized scores as well as the associated mean age for each cluster. In line with their mothers' reports, children from Cluster 1 and Cluster 2 presented better performance on ToM than those of Cluster 3 and Cluster 4. More specifically, Cluster 1 and Cluster 2 scored higher on affective and cognitive ToM than Cluster 3 (p between .059 and < .001) and Cluster 4 (p between .005 and < .001). In terms of mixed ToM, a significant difference was found between Cluster 1 and Cluster 3 ($p = .001$). These results suggest that, despite similar overall performance levels, more subtle group distinctions can be observed, particularly for the affective and cognitive dimensions of ToM.

Discussion

This study had two main objectives. The first was to investigate the relationship between age, empathy and ToM skills in preschoolers. The results revealed an age-related effect on the development of empathy and ToM. Regarding the links between empathy and ToM, positive associations were emphasized, varying in intensity depending on the dimensions of empathy and ToM. The second objective was to identify specific subgroups of children based on their strengths and weaknesses in these domains according to their mothers' perceptions. Due to the variability in these processes, the study detected four subgroups, demonstrating the importance of

Table 5. Descriptive statistics (based on standardized scores) of the four clusters obtained through hierarchical cluster analysis according to empathy and ToM, as perceived by mothers.

	Cluster 1 *M* (SD)	Cluster 2 *M* (SD)	Cluster 3 *M* (SD)	Cluster 4 *M* (SD)	*F*	η_p^2
N	112	81	146	25		
Chronological age (in months)	.37 (.87)	.27 (.93)	−0.34 (.97)	−0.54 (1.00)	17.542***	.128
Empathy questionnaire						
AE – GEM-vf	−0.13 (.66)	.72 (.91)	−0.17 (1.3)	−0.75 (1.14)	24.752***	.171
CE – GEM-vf	.25 (.65)	.61 (.89)	−0.34 (1.01)	−1.14 (.83)	37.839***	.240
BE – EmQue-vf	−0.19 (.54)	1.15 (.73)	−0.32 (.91)	−0.98 (.77)	85.193***	.415
ToMI						
ToMI-T	.45 (.48)	.83 (.83)	−0.57 (.72)	−1.36 (1.17)	109.328***	.477
ToMI-SE	.42 (.57)	.79 (.67)	−0.39 (.69)	−2.14 (.73)	161.375***	.574
ToMI-B	.53 (.54)	.57 (.83)	−0.41 (.78)	−1.81 (.91)	99.035***	.452
ToM Task Battery						
Affective ToM	.39 (.67)	.23 (.88)	−0.34 (1.06)	−0.49 (1.30)	16.782***	.123
Cognitive ToM	.25 (.97)	.17 (.96)	−0.17 (.98)	−0.68 (.90)	9.056***	.070
Mixed ToM	.27 (1.11)	.06 (1.07)	−0.21 (.84)	−0.15 (.70)	5.425***	.043

Notes. AE: affective empathy; CE: cognitive empathy; BE: behavioral empathy; ToMI-T: understanding of thoughts; ToMI-SE: understanding of socioemotional states; ToMI-B: understanding of thoughts beliefs. *p < .05, **p < .01, ***p < .001.

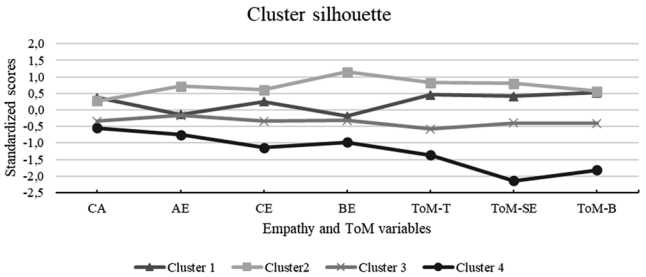


Figure 3. Graphical silhouette of each cluster, based on standardized scores of children's empathy and ToM, as perceived by mothers.
Notes. CA: age; AE: affective empathy; CE: cognitive empathy; BE: behavioral empathy; ToMI-T: thoughts ToM; ToMI-SE: socioemotional ToM; ToMI-B: beliefs ToM.

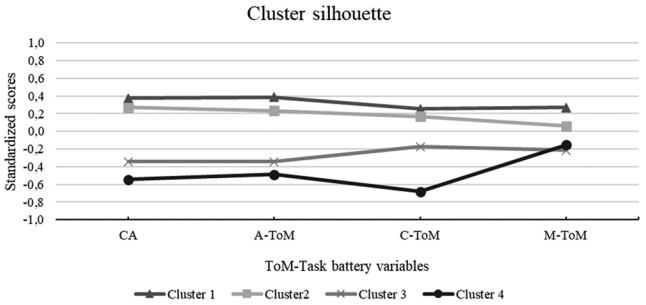


Figure 4. Graphical representation of children's performance on ToM Task Battery across clusters, using standardized scores.
Notes. CA: age; A-ToM: affective ToM; C-ToM: cognitive ToM; M-ToM: Mixed ToM.

identifying preschoolers based on their empathy and ToM skills as perceived by their mothers. Understanding these aspects is essential for guiding targeted interventions when difficulties are identified in children.

In line with Hypothesis 1, this study first examined the influence of age on empathy and ToM. Consistently with the findings from other studies, mothers perceived their preschoolers as showing increased progress in their affective (Farina & Belacchi, 2014; Schwenck et al., 2014) and behavioral (Bensalah et al., 2016; Catherine & Schonert-Reichl, 2011) empathic skills as they grew

older. Likewise, affective ToM, through ToMI-SE, and cognitive ToM, assessed through ToMI-T and ToMI-B, demonstrated significant improvements as children grew older, according to their mothers (Houssa et al., accepted; Nader-Grosbois et al., 2024; Wellman et al., 2001). In sum, our findings are consistent with the developmental sequences of both empathy (Hoffman, 2000) and ToM (Baron-Cohen, 2001; Leslie, 1987; Wellman, 1991; Wellman & Bartsch, 1994; Wellman & Liu, 2004) already outlined in the literature. These increases in affective and behavioral empathy, as well as ToM, as perceived by mothers, may be due to children's cognitive maturation, acquired with age and driven in particular by executive functions (Garon et al., 2008). Moreover, as children grow up, they encounter a broader range of social situations with peers and adults in various environments. These experiences provide more opportunities to activate their empathy and ToM abilities or to observe others demonstrating these abilities. This diversity exposes them to the differentiation between their own and others' perspectives as well as emotional and social cues, in interpersonal relationships. These experiences may help children better understand others' emotions and mental states and respond to their feelings. However, in line with Bigelow et al. (2021), cognitive empathy was not linked to age within the age range of our sample. It may be more challenging for mothers to infer the cognitive processes of their preschool-aged children when they are faced with others' emotions or distress. In contrast, it may be easier for them to observe how their children express affective and behavioral empathy, both verbally and non-verbally. The absence of a link between age and cognitive empathy could be due to the limited reliability and the items proposed to the mothers. Cognitive empathy was assessed using only four items, which may limit mothers' ability to evaluate the variety of social situations. These situations could become more complex over time, so that cognitive empathy plays more of a role.

Regarding the relationships between empathy and ToM, the results confirm the hypotheses relating to Objective 1 of this study. The path analysis model revealed that the three dimensions of empathy were positively related to the three dimensions of ToM when children's skills were rated by mothers. These results were close to those obtained in previous studies, whether they considered empathy and ToM as overall constructs (Gallant et al., 2020; Hinnant & O'Brien, 2007) or not (Bensalah et al., 2016). Children perceived by mothers as sharing and understanding others' emotions, and engaging in prosocial behaviors, were also reported to have a better understanding of thoughts, beliefs and socioemotional states in daily life. In line with Hypothesis 2, experiencing others' emotions may help children focus on the social cues in different social situations (e.g. Bird & Viding, 2014; Heyes, 2018), which in turn may facilitate a deeper understanding of others' thoughts, beliefs, feelings and desires. Furthermore, as predicted by Hypothesis 3, the positive relationship between cognitive empathy and ToM may be explained by their shared reliance on perspective-taking abilities (Decety, 2015; Decety & Lamm, 2006). Finally, children who engage in prosocial behaviors tailored to the needs of another person would likely be better able to understand that person's mental states, as choosing appropriate behaviors would require the recognition and interpretation of the person's underlying thoughts, emotions, desires and beliefs (Hypothesis 4). These findings support the notion that empathy and ToM are two interrelated domains of social cognition (Cerniglia et al., 2019; Decety & Meyer, 2008). The positive relationships between the dimensions of empathy and ToM are consistent with positions suggesting that these domains are mutually reinforcing during childhood (Hughes & Leekam, 2004; Yeates et al., 2007).

The results relating to Objective 2 provided evidence supporting Hypothesis 5. First, the four identified subgroups supported the developmental evolution of empathy and ToM with age (Bensalah et al., 2016; Catherine & Schonert-Reichl, 2011; Howe et al., 2008; Schwenck et al., 2014; Wellman & Liu, 2004), with the two older subgroups being evaluated by mothers as having better skills than the two younger subgroups. As discussed, the development of both processes could be fostered by the maturation of children's cognitive and executive functions, as well as by a broader range of social experiences. However, the results were more nuanced when each dimension of empathy and ToM was analyzed across the four subgroups. Children included in Cluster 1 (112 participants) and Cluster 2 (81 participants), who were the oldest, were perceived as having good abilities in the three dimensions of empathy and the three subscales of ToM.

However, children in Cluster 2 demonstrated the highest scores in affective, cognitive and behavioral empathy, as well as in understanding thoughts and socioemotional mental states, compared to the other three subgroups. Nevertheless, their skills generally remained within the upper average range, except for behavioral empathy, which was above average. In line with Kim and Kang (2023), this subgroup could be characterized as having high levels of empathy and ToM skills, thus confirming Hypothesis 5a. However, mothers' perception of the skills of the children included in Cluster 1 and in Cluster 3 (146 children) remained about average for all dimensions of empathy and ToM. Significant differences therefore appeared between the two subgroups for cognitive empathy and the three components of ToM. Consequently, Cluster 1 could be identified as 'moderate empathy and ToM—with higher cognitive empathy and understanding of mental states' and Cluster 3 as 'moderate empathy and ToM' (Hypothesis 5b). The results of these three subgroups of children are in line with studies demonstrating a positive relationship between empathy and ToM (Bensalah et al., 2016; Gallant et al., 2020; Hinnant & O'Brien, 2007). Finally, confirming Hypothesis 5c, children included in Cluster 4 (25 children) seemed to be 'at risk' or 'vulnerable' subgroups, as was also the case in Kim and Kang (2023). These children were perceived as having some deficits in cognitive empathy and the three components of ToM. Their affective empathy was moderate, while some difficulties could be identified in their behavioral empathy. As understanding of cognitive mental states (notably beliefs and false beliefs) progresses more in children between four and six years old (Baron-Cohen, 2001; Thirion-Marissiaux & Nader-Grosbois, 2008), these children, who were just under four years old, may have been in the early stages of this developmental process. It could be hypothesized that their abilities to understand mental states were still emerging. However, as cognitive empathy and affective ToM emerge from three years old (Hoffman, 2000; Wellman & Liu, 2004), their lower scores in these skills may represent real deficits. These results support the assumption of an overlap between cognitive empathy and affective and cognitive ToM, suggesting the potential activation of the same brain structures (e.g. Cerniglia et al., 2019; Decety & Meyer, 2008; Farrant et al., 2012). Thus, children in different subgroups, with their respective strengths or weaknesses in cognitive empathy, exhibit similar patterns of strengths or weaknesses in ToM. For instance, according to their mothers, children in Cluster 4 show difficulties in both cognitive empathy and ToM, while being perceived as having average skills in affective and behavioral empathy. Contrary to Hypothesis 5d, no heterogenous subgroup was identified in the analysis. This diversity in empathy and ToM profiles may be attributed to variations in the developmental factors influencing these domains. Previous research has highlighted the significant role of individual factors in shaping the development of both empathy and ToM, such as personality (Mink et al., 2014; Simon & Nader-Grosbois, 2021; Taylor et al., 2013), executive functions (Eisenberg et al., 1996; Hughes & Ensor, 2007; Valiente et al., 2004) and language (Hale & Tager-Flusberg, 2003; Li & Yu, 2015; Rhee et al., 2013). Previous studies have also demonstrated that family factors could foster the development of these abilities, such as parental style (O'Reilly & Peterson, 2014; Taylor et al., 2015), parental socialization of emotions (Eisenberg et al., 2019; Pavarini et al., 2013; Taylor et al., 2013) and attachment style (Murphy & Laible, 2013; Panfile & Laible, 2012; Szpak & Białecka-Pikul, 2020). However, performance in the ToM Task Battery did not differ greatly between subgroups: children from all subgroups showed average scores for each component of ToM, although some specific differences were identified. The items in the ToM questionnaire cover a wide range of mental states across diverse and complex situations. In contrast, the tasks included in the ToM Task Battery may not fully capture the variety of social scenarios that children encounter in daily life. This discrepancy may explain why children's difficulties are not detectable in the ToM battery tasks.

Limitations

Despite the new insights that this study provides, some limitations should be highlighted. First, the participants were predominantly from high socio-economic backgrounds, with highly educated

parents and high family incomes. Replicating this study with a more diverse sample could establish whether children with weaknesses in their empathy and ToM profiles come from groups considered to be at risk on the basis of their parents' educational and socio-economic status. Second, only the mothers' responses to the empathy and ToM questionnaires were included (because too few fathers had completed them). Therefore, it is important to keep in mind that the results are based on maternal perception. Including fathers and teachers[2]' assessments could offer a broader perspective on children's empathic and ToM reactions in different contexts at school, during interactions with peers. Third, the internal consistency for cognitive empathy (Cronbach's $\alpha = .55$) was limited due to the use of a four-item scale, with each item assessing the understanding of a specific emotion. The construct of cognitive empathy is broad and heterogeneous, and the use of only four items may not fully capture its various facets in a broader range of situations, which could help explain the low internal consistency observed. Therefore, caution is needed in interpreting these results. It could be relevant to evaluate empathy and ToM with a combination of hetero-reported questionnaires and performance-based measures (such as the ToM battery developed by Wellman & Liu, 2004). Additionally, videos or virtual reality devices could be employed. Presenting social situations in which protagonists encounter the emotions and mental states of others would provide dynamic and context-rich stimuli, making the assessment of empathy and ToM more immersive and relevant. Despite these limitations, the study contributes to the field by highlighting the association between empathy and ToM in preschool children. Future research should explore whether the relationships between empathy and ToM in their different dimensions change with age during the preschool period and later. Moreover, predictive or bidirectional relationships between these constructs should be examined through longitudinal designs (Simon & Nader-Grosbois, 2025; Wade et al., 2016), which may reveal whether early difficulties persist or diminish over time.

Conclusion

This study provides a better understanding of the relationships between empathy and ToM at preschool age. It also reveals that some subgroups of typically developing preschoolers may experience difficulties in these areas, according to maternal perceptions. It therefore seems important to pay attention to the nature of their weaknesses. These could be targeted by preventive training programmes to promote or rebalance their social cognitive skills, supporting their social adjustment. Training studies have identified several techniques that are effective in targeting social cognition, including reading storybooks that include emotional conversations (Aram & Besser, 2009; Kucirkova, 2019; Ornaghi et al., 2015), learning terms for mental states (Lohmann & Tomasello, 2003) and role plays in which children simulate emotional scenarios (Neal, 2021). Additionally, activities based on images or videos could help children to identify their emotions, recognize facial expressions, understand emotions and respond with prosocial behaviors (Aslan & Köksal Akyol, 2020; Gordon, 2001; Soliman et al., 2021).

Notes

1. Chosen because variance homogeneity was not assumed, and sample sizes were variable.
2. It is worth noting that teachers were asked to complete the questionnaires; however, the Covid-19 pandemic disrupted data collection, as teachers lacked the time to complete them.

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