

EMPIRICAL ARTICLE

Intersections Among Attachment, Empathy and Emotion Regulation in Middle Childhood

Eva Pires¹  | Marília Fernandes¹ | Carla Fernandes¹ | António J. Santos¹  | Brian E. Vaughn² | Manuela Veríssimo¹

¹William James Center for Research (WJCR), ISPA-Instituto Universitário, Lisboa, Portugal | ²Auburn University, Auburn, Alabama, USA

Correspondence: Marília Fernandes (mfernandes@ispa.pt)

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ABSTRACT

Within secure attachment relationships, caregivers function as primary sources of self-regulation and foster empathy. Affective empathy refers to the direct sharing of others' emotional states, whereas cognitive empathy involves understanding the meaning of others' affective displays. Although robust evidence links secure attachment to empathy, research examining the mediating role of emotion regulation (ER) during middle childhood remains limited. Participants were 214 children (108 girls) aged 8–12 years ($M = 9.28 \pm 1.09$) and their parents (86.3% mothers). Children completed the Security Scale (SS), assessing Safe Haven (SH) and Secure Base (SB), as well the Questionnaire to Assess Affective and Cognitive Empathy in Children (QACE). Primary caregivers completed the Emotion Regulation Checklist assessing children's ER and lability/negativity. Results indicated that global ER was positively associated with cognitive ($r_{CEC} = 0.17, p < 0.05$) but not affective empathy. Mediation analyses revealed that attachment was significantly associated with children's empathy ($\beta = 0.40\text{--}0.53, p < 0.001$); however, ER did not mediate this association. Hierarchical regression analyses indicated that maternal SH and paternal SB were strongly associated with cognitive and global empathy, whereas only maternal SH was strongly associated with affective empathy. These results underscore the robustness of attachment theory as an organising framework for socioemotional development regarding the processes during middle childhood.

1 | Introduction

Attachment has long been considered a central organising construct for human social–emotional development (e.g., Sroufe 2005; Waters and Sroufe 1983). The co-construction of a secure attachment during infancy and toddlerhood requires an integration of behaviour, affect and cognition in the service of maintaining a sufficient degree of proximity and contact between the infant and adult caregiver. This interaction provides both a base for growth and exploration as well as a safe haven in moments when the child's resources are depleted or the child is exposed to physical or psychological threats to integrity.

Bowlby (1969) insisted that attachment bonds have an emotional core that impacts all aspects of the caregiver-child relationship,

but he did not explicitly address the developmental changes in affects themselves. Sroufe (1996) attempted to integrate a developmental progression of affects (specifically joy, fear and anger) over the early years of life with the co-construction of attachment relationships and argued that the child's capacity to appreciate affect laden experiences progresses from early 'prototypes' to 'precursors' to 'mature' forms over the infancy and toddler periods. Importantly, Sroufe (1996) insisted that emotions develop within the same social context of caregiver and child which is the source of social attachments. That is, emotions are social experiences that serve as signals regarding the child's internal states. And, in the context of a secure attachment relationship, the caregiver(s) act as sources of affect regulation that help the child maintain an adaptive balance (i.e., neither too little nor too much affect excitation) appropriate to the current social and physical

context, or, a successful return to balance when a challenge exceeds the child's capacity to cope. These experiences of joint regulation within the parent–child relationship provide the foundation for the child's own self-regulation efforts, perhaps initially with scaffolding from caregivers, accompanied by positive reinforcement for the child's successes in the face of challenge (and appropriate assistance should the challenge prove overwhelming). In this way, secure attachments promote emotional self-regulation (see also Kopp 2009, for a parallel interpretation). At this point in time, there is an abundance of evidence supporting the claim that attachment security is positively associated (or attachment insecurity is negatively associated) with children's emotion regulation (ER) from infancy to young adulthood (e.g., Cassidy 1994; Girmé et al. 2020).

Empathy has been conventionally conceptualised as a multidimensional construct, that operates through different processes (Stern and Cassidy 2018). From a developmental standpoint, this complex socioemotional capacity has been extensively studied in conjunction with attachment security, with growing evidence highlighting how early relationships shape specific empathic pathways. It is clear that the capacity to accurately infer the emotions of peers from expressive behaviour (both positive and negative emotions) is possible for human children by the end of the second year of life (e.g., Knafo et al. 2008) and aspects of these capacities may be widely shared among mammals (De Waal and Preston 2017; Panksepp and Lahvis 2011).

Currently, a convention in the empathy development literature characterises 'affective' empathy as analogous to neonatal affect contagion in infants, whereby children directly experience the affects displayed by conspecifics without cognitively processing or acting on the meaning of those displays to intervene on the other's behalf (Davis 1983). Moving beyond definitions restricted to distress-related responses, contemporary models conceptualise that affective empathy involves sharing or understanding another person's emotions while preserving self–other differentiation, allowing individuals to recognise that the experienced emotion originates in the other (Decety 2015; Eisenberg et al. 2005; Singer and Lamm 2009). This distinguishes empathy from emotional contagion, which reflects a more automatic and undifferentiated emotional matching process.

On the other hand, 'cognitive' empathy is characterised as processes allowing the observer to understand the implied meanings of conspecifics' affect displays and to propose specific acts that could alter the affective state of the other (Davis 1983; Decety 2015). In much of the theoretical literature, empathy development is closely tied to cognitive skills such as perspective-taking and Theory of Mind (ToM). While these are distinct constructs, they are inherently subsumed under the broader process of cognitive empathy (Bensalah et al. 2016). Perspective-taking is the cognitive operationalization of ToM, enabling the inference of others' thoughts, beliefs and desires (Bensalah et al. 2016). However, they do not require sharing those emotions (Gallant et al. 2020). In fact, research investigating the links between ToM and measures of cognitive and affective empathy highlights a clear distinction between these constructs, as their differing developmental trajectories (Gallant et al. 2020).

In line with attachment research, empathic sensitivity and responsiveness are deeply social but also depend critically on both evolved and socially acquired structures and capacities. (e.g., Decety 2015). It is not surprising that a considerable amount of research has examined associations between the quality of attachment to caregivers and empathic sensitivity (to the emotional state of others) and awareness of the meaning(s) of emotion signals, as empathic responsiveness (i.e., motivation to take action to relieve distress for the person whose emotion signals advertise their status), also referred to as compassionate responsiveness (e.g., Knafo et al. 2008). Moreover, empirical evidence indicates that individuals prone to elevated levels of personal distress are less inclined to help those in suffering (Eisenberg et al. 1996; Preckel et al. 2018; Singer and Lamm 2009).

According to evolutionary theory, empathy and attachment have coevolved. Caregiving systems evolved empathy to meet their offspring's biological needs, thereby promoting care and the survival of the species (Ruckstaetter et al. 2017). In this way, secure attachment relationships foster an environment conducive to interpersonal development and socioemotional skills, such as empathy (De Sanctis and Mesurado 2022).

Stern and Cassidy (2018) provided a comprehensive review of associations between attachment security and empathy across development, from infancy through adolescence. They argued that individual differences in both attachment security and empathic capacity emerge during the first year of life, although the biological bases of these domains likely differ in some respects. They concluded that attachment security is positively associated with empathic sensitivity and responsiveness. A separate meta-analysis (Li et al. 2021) likewise found a positive association between secure attachment and empathy across samples from infancy to adolescence.

However, Stern and Cassidy (2018) also noted that attachment security does not broadly predict empathic responses in all relevant tests over the first 2–3 years of life. Similarly, during early childhood (3–6 years) findings are mixed (i.e., not every anticipated link between attachment security and empathy is instantiated in data), although contradictory results (e.g., attachment security negatively correlated with measures of cognitive empathy and/or empathic responsiveness) were never reported. Interestingly, Stern and Cassidy did not find any studies testing links between attachment security and empathy during middle childhood, despite reports indicating that empathy tends to positively predict middle childhood prosocial behaviour (e.g., Kerns and Brumariu 2016). Also, infant or toddler attachment security continues to predict prosocial behaviour with peers in middle childhood (e.g., Gross et al. 2017; Booth-LaForce and Kerns 2009). Other studies have not found attachment to be related to empathy in childhood (e.g., Steele et al. 1999; Waters et al. 2010) or adolescence (e.g., Delhayé et al. 2013).

In an adult sample, Henschel et al. (2020) documented associations linking attachment style to both affective and cognitive empathy, as to emotion regulation (ER). More recently, Santana-Ferrándiz et al. (2025) systematic review concluded that secure attachment fosters adaptive internal working models in children, which in turn promote emotion regulation and empathy. Secure attachment predicts greater empathy from early

childhood onward and multiple studies indicate that emotion regulation mediates the attachment–empathy link in preschool and early middle childhood, with similar patterns in adolescents and adults (Panfile and Laible 2012; Davidov and Grusec 2006; Shaver et al. 2016; Troyer and Greitemeyer 2018). However, mediation research in older children remains limited (Murphy et al. 2015).

Our own literature search (2017–2026) likewise did not identify studies testing the relations between attachment security and empathy—with or without a measure of ER—using concurrent assessments of all variables in middle childhood samples. The present study aims to fill this gap in the literature.

Theory and current empirical evidence suggest that measures of attachment security are positively associated with measures of empathy, particularly cognitive empathy. We also examine relations between child emotion regulation (ER) and both attachment and empathy. Because affective empathy may be disruptive when it entails experiencing another's distress without an awareness of how to alleviate it, it could motivate the empath to avoid rather than approach the other in order to help. Consequently, we do not make directional predictions about the relation between attachment security and affective empathy, but we do expect to find positive and significant associations between attachment security and cognitive empathy. We further test whether individual differences in ER are associated with attachment security and cognitive empathy, and where significant associations emerge, we examine whether ER mediates or moderates the link between attachment security and empathy.

2 | Methods

2.1 | Participants

For this work, ethical approval by the Ministry of Education was obtained. Participants were recruited from schools in the suburbs of Lisbon, Portugal and informed consent was obtained from the parents. A total of 214 children (108 girls and 106 boys), between 8 and 12 years old ($M = 9.28$; $SD = 1.09$), 62.6% firstborn and 76.2% with siblings were recruited to the study. The school year varied between the 3rd and 6th year ($M = 3.09$; $SD = 1.05$) and children spent an average of 7.91 h ($SD = 1.25$) at school. Most of the parents (81.3%) were either married (62.1%) or cohabitating (19.2%); 11.7% were separated/divorced; 7.0% were single. Mothers' age range between 30 and 56 ($M = 42.15$; $SD = 4.94$), whereas fathers' range between 32 and 67 ($M = 44.13$; $SD = 5.27$). Education levels range between 5 (corresponding to basic education) and 21 (PhD) ($M = 15.65$; $SD = 3.19$ for mothers and $M = 13.84$; $SD = 3.51$ for fathers). Most of the parents work full-time (mothers 86.3% and fathers 88.6%); 5.5% of mothers and 5.9% fathers work part-time; 4.6% of the mothers and 1.4% of fathers were unemployed. Parents' questionnaires were answered by the primary parent (86.3% were mothers and 13.7% were fathers).

2.2 | Instruments

Affective and cognitive empathy were assessed using the Questionnaire to Assess Affective and Cognitive Empathy in Children (QACE; children's version; Zoll and Enz 2010). Children

completed this self-report questionnaire on a 5-point scale. The 22-item instrument assesses two dimensions: Affective Empathy (12 items), which refers to experiencing emotions in response to the conscious or unconscious perception of others' internal states (e.g., emotions, thoughts, attitudes); and Cognitive Empathy (10 items), which encompasses cognitive processes ranging from simple associative and learning mechanisms to explicitly adopting another's perspective. The Portuguese version demonstrates acceptable reliability ($\alpha = 0.85$ for Affective Empathy; $\alpha = 0.71$ for Cognitive Empathy; Veiga and Santos 2011) and reliability in the present study was also acceptable ($\alpha = 0.69$ for Affective Empathy; $\alpha = 0.78$ for Cognitive Empathy). A global score was computed computing the mean of all 22 items.

The Emotion Regulation Checklist (ERC; Shields and Cicchetti 1997) was completed by parents to evaluate children's emotional experiences and behaviours. Parents rated 24 items on a 4-point Likert scale. The ERC comprises two subscales: Emotion Regulation (8 items), which captures situationally appropriate affective displays and emotional self-awareness, reflecting children's ability to understand and control their emotions; and Emotional Lability/Negativity (15 items), which reflects inflexibility, mood lability and dysregulated negative affect. The ERC has shown good reliability in the original validation ($\alpha = 0.96$ for Lability/Negativity; $\alpha = 0.83$ for Emotion Regulation). In the present study, internal consistency was $\alpha = 0.69$ for Lability/Negativity, $\alpha = 0.63$ for Emotion Regulation and $\alpha = 0.75$ for the Global Emotion Regulation composite, computed as the total of the Emotion Regulation items and reverse-scored Lability/Negativity items (sum divided by 23). Lower scores indicate poorer emotion regulation.

Attachment security. The Security Scale (SS; Kerns et al. 2015) was completed by each child. This 21-item self-report measure assesses the extent to which the child perceives the parent (mother or father) as responsive and available. It comprises two subscales: Safe Haven (SH; 14 items) and Secure Base (SB; 7 items). Items are rated on a 4-point structured alternative format (Harter 1982) of the type 'Some kids ... but ... other kids', with higher scores indicating greater security. For each item, the child first selects which statement is more like them (e.g., 'Some kids wish their dad would help them more with their problems, but other kids think their dad helps them enough') and then indicates whether they are 'sort of like' or 'really like' that child. The questionnaire shows good internal consistency in the original validation (SH: mother $\alpha = 0.88$, father $\alpha = 0.90$; SB: mother $\alpha = 0.76$, father $\alpha = 0.74$) and in the Portuguese version (SH: mother $\alpha = 0.89$, father $\alpha = 0.91$; SB: mother $\alpha = 0.79$, father $\alpha = 0.83$; Fernandes et al. 2021). In the present study, Cronbach's alpha was 0.75 for SH-mother and 0.80 for SH-father and 0.68 for SB-mother and 0.70 for SB-father.

3 | Results

Preliminary analyses identify two multivariate outliers that were excluded from subsequent analyses. In general, children described themselves as empathic, both affectively (CEaff) and cognitively (CEcog) (see Table 1).

Correlations among the study variables are presented in Table 2. Affective empathy (CEaff) was positively associated with

TABLE 1 | Descriptive values for children empathy and emotion regulation, attachment relationships and adult empathy.

		M	SD
Children empathy	Affective	3.95	0.62
	Cognitive	3.90	0.64
	Global	3.93	0.56
Children emotion regulation	Lablity	1.84	0.30
	Emotion regulation	3.44	0.36
	Global emotion regulation	3.26	0.27
Attachment	Mother as secure base	3.33	0.53
	Mother as safe haven	3.25	0.49
	Mother as global attachment	3.29	0.47
	Father as secure base	3.23	0.57
	Father as safe haven	3.08	0.56
	Father as global attachment	3.16	0.51

cognitive empathy (CEcog; $r=0.59$, $p<0.001$). Older children reported higher cognitive empathy ($r=0.16$, $p<0.05$). Children's empathy was positively related to parental education. For mothers, CEaff ($r=0.17$, $p<0.05$), CEcog ($r=0.14$, $p<0.05$) and global empathy (CEglob; $r=0.18$, $p<0.01$) correlated positively with education; for fathers, CEaff ($r=0.17$, $p<0.01$), CEcog ($r=0.22$, $p<0.01$) and CEglob ($r=0.22$, $p<0.01$) showed the same pattern. No other significant associations or group differences were observed.

Parents rated their children as well regulated, with relatively low lablity (Lab) and higher emotion regulation (Er) and global emotion regulation (Ger) scores (see Table 1). Maternal education was significantly associated with lower lablity ($r_{Lab}=-0.20$, $p<0.01$) and higher Er ($r_{Er}=0.25$, $p<0.001$) and Ger ($r_{Ger}=0.26$, $p<0.001$). Firstborn children had significantly lower Er scores than later-born children ($t(210)=-2.11$, $p<0.05$; firstborns: $M=3.40$, $SD=0.37$; later-borns: $M=3.51$, $SD=0.34$). No other significant associations or differences were found.

Children described their attachment relationship with both mother and father as secure, with mother-child presenting significant higher values comparing to father-child relationships (Secure Base, $t(211)=2.73$, $p<0.01$, Safe Haven, $t(211)=4.95$, $p<0.001$; and Attachment Global score $t(211)=4.57$, $p<0.001$, see Table 1). Mother's and father's attachment scores were significantly correlated (SBS $r=0.55$, $p<0.001$, SHS $r=0.56$, $p<0.001$ and Global $r=0.62$, $p<0.001$) (see Table 2).

3.1 | Child's Empathy Association With Emotion Regulation and Attachment

As shown in Table 2, children's cognitive (CEcog) and global empathy (CEglob) scores were negatively associated with child's lablity ($r_{CEcog}=-0.17$, $p<0.01$ and $r_{CEglob}=-0.14$, $p<0.05$). CEcog was also positive associated with the global emotion regulation ($r_{CEcog}=0.17$, $p<0.05$). Attachment (both to mother and father) had a significant and positive relation with the child's empathy in all dimensions. Attachment security (both

TABLE 2 | Correlations between children's empathy, emotion regulation and attachment relationships.

		Child					Attachment				
		Empathy			Emotion		Mother		Father		Global
		Affective	Cognitive	Global	Lablity	ER	SB	SH	SB	SH	
Child	Empathy										
	Affective		0.59***	0.89**	-0.07	0.04	0.32***	0.34***	0.31***	0.25**	0.31***
	Cognitive			0.89***	-0.17**	0.08	0.29***	0.34***	0.34***	0.31***	0.36***
	Global				-0.14*	0.07	0.34***	0.38***	0.37***	0.31***	0.38***
	Lablity					-0.38***	-0.19**	-0.22***	-0.17**	-0.18**	-0.19**
Attachment	Emotion										
	ER							0.15*	0.13	0.14*	0.15*
	ER Global							-0.23***	0.22***	0.20**	0.21**
	SB							0.66***	0.55***	-0.47***	0.56**
	SH								0.47***	0.56***	0.57***
Father	Global										
	SB										0.62***
	SH										0.63***
	Global										0.90***
	Global										0.90***

Abbreviations: Att, attachment; E, empathy; ER, emotion regulation; SB, secure base; SH, safe haven.
* $p<0.05$. ** $p<0.01$. *** $p<0.001$.

mother–child and father–child) was positively and significantly related to the child's global emotion regulation score and negatively related to the child's emotional lability score. Emotion regulation was significantly associated with mother ($r = 0.15, p < 0.05$) and father ($r = 0.14, p < 0.05$) as safe haven, as with father attachment global score ($r = 0.15, p < 0.05$) (see Table 2).

3.2 | Child Empathy Study

Preliminary mediation analyses were conducted separately for cognitive and affective empathy. As neither yielded significant indirect effects, the global empathy score was retained for parsimony.

Using the global scores, three mediation models were conducted with PROCESS Model 4 (Hayes 2022), 5000 bootstrap samples. Child age was entered as a covariate. Children's global empathy was significantly associated with attachment to the mother, father and both parents ($\beta = 0.40\text{--}0.53, p < 0.001$). Although attachment was consistently associated with emotion regulation ($\beta = 0.11\text{--}0.15, p < 0.01$), emotion regulation was not significantly related to empathy in any model ($p > 0.33$). In all models, the indirect effects were nonsignificant, with 95% bootstrap confidence intervals including zero. These results indicate that emotion regulation did not mediate the association between global attachment and global empathy. Attachment showed a robust direct effect on empathy across all tested models (see Table 3).

Two hierarchical regression analyses were conducted to examine the children's affective, cognitive and global empathy from child age, global emotion regulation (GER) and attachment security (mother–child and father–child Safe Haven [SH] and Secure Base [SB] scores). In Block 1, models were run separately for

maternal and paternal attachment scores. For affective empathy, both maternal SB and SH were significantly associated, whereas only paternal SB was significant. For cognitive empathy, child age was also significantly associated; among attachment variables, only maternal SH and paternal SB were significant. For global empathy, maternal SH and paternal SB were the only attachment variables significantly associated. In Block 2, maternal and paternal attachment variables were entered simultaneously. In this step, affective empathy was significantly associated only with maternal SH; cognitive empathy was significantly associated with maternal SH and paternal SB; and the same pattern held for global empathy (see Table 4). These dimension-specific findings indicate that the associations between attachment and empathy operate through distinct paternal and maternal pathways depending on whether affective or cognitive dimensions are examined.

4 | Discussion

The primary aim of this study was to identify predictors of children's self-reported empathy. Our analyses showed that children's emotion regulation (ER) was positively associated with cognitive, but not affective, empathy. Specifically, children whom parents described as more emotionally labile (i.e., showing rapid mood fluctuations) reported lower levels of cognitive empathy (i.e., understanding others' emotions). Similar findings have been reported previously (e.g., Eisenberg et al. 1996). In younger samples, ER has been linked to both affective and cognitive empathy (e.g., Panfile and Laible 2012). When children can regulate their own emotions effectively, they may experience less negative arousal in empathy-eliciting situations and be better able to direct cognitive resources towards helping strategies that reduce others' distress and/or intervening on their behalf (Eisenberg et al. 2005).

TABLE 3 | Regression coefficients for the mediation models testing the associations with empathy.

	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI (LL, UL)	<i>R</i> ²
Model 1: Attachment to Mother						
Att → ER	0.13	0.04	3.23	< 0.001	[0.05, 0.21]	0.05
ER → E	0.11	0.14	0.81	0.42	[−0.16, 0.38]	—
Att → E (direct effect)	0.46	0.08	5.64	< 0.001	[0.30, 0.61]	0.17
Indirect effect	0.01	0.02	—	—	[−0.02, 0.05]	—
Model 2: Attachment to Father						
Att → ER	0.11	0.04	3.10	< 0.01	[0.04, 0.18]	0.05
ER → E	0.13	0.14	0.96	0.34	[−0.14, 0.40]	—
Att → E (direct effect)	0.40	0.07	5.72	< 0.001	[0.26, 0.54]	0.16
Indirect effect	0.01	0.02	—	—	[−0.01, 0.05]	—
Model 3: Global Attachment						
Att → ER	0.15	0.04	3.42	< 0.001	[0.06, 0.23]	0.06
ER → E	0.08	0.14	0.59	0.56	[−0.19, 0.35]	—
Att → E (direct effect)	0.53	0.08	6.71	< 0.001	[0.38, 0.69]	0.20
Indirect effect	0.01	0.02	—	—	[−0.03, 0.05]	—

Note: Indirect effects are based on 5000 bootstrap samples. Child age was entered as a covariate in all models. Abbreviations: Att, attachment; E, empathy; ER, emotion regulation.

TABLE 4 | Results of hierarchical regression analyses.

	Child's empathy					
	Affective		Cognitive		Global	
Block 1						
Age	0.05	0.07	0.13*	0.14*	0.10	0.11
Emotion regulation	0.02	0.04	0.10	0.11	0.07	0.08
Mother as secure base	0.17*	—	0.11	—	0.15	—
Mother as safe haven	0.22**	—	0.24**	—	0.26**	—
Father as secure base	—	0.24**	—	0.23**	—	0.27***
Father as safe haven	—	0.09	—	0.14	—	0.13
R^2	0.13	0.11	0.15	0.16	0.18	0.17
ΔR^2	0.12	0.09	0.10	0.11	0.14	0.13
ΔF	14.04***	10.60***	11.80***	13.20***	16.83***	15.49***
Block 2						
Age	0.05		0.12		0.10	
Emotion regulation	0.02		0.09		0.06	
Mother as secure base	0.10		0.02		0.07	
Mother as safe haven	0.19*		0.18*		0.21*	
Father as secure base	0.17		0.19*		0.20*	
Father as safe haven	0.01		0.06		0.03	
R^2	0.15		0.18		0.21	
ΔR^2	0.02	0.04	0.03	0.02	0.03	0.04
ΔF	2.11	5.27**	4.22*	2.94 ^a	4.00*	5.20**

^aMarginally significant.* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

While research in preschoolers (e.g., Panfile and Laible 2012) suggests that high affective empathy can lead to personal distress through the absorption of others' emotions, we found no such evidence in this middle childhood sample. Instead, affective and cognitive empathy were positively correlated and showed similar links to parent-child attachment. Notably, cognitive empathy—but not affective empathy—was negatively associated with parent-rated emotional lability, although this correlation was relatively modest in magnitude. This pattern tentatively suggests that by middle childhood, the link between emotional lability and empathy may partially reflect a child's difficulty in organising prosocial actions rather than a core deficit in internalising others' emotions (e.g., Henschel et al. 2020). This interpretation is supported by the significant, albeit small, negative correlations between emotional lability and child-rated attachment.

Our results suggest that attachment accounted for unique variance in children's empathy and we found no evidence that ER mediated this association. Attachment theory helps explain this pattern: responsive, sensitive caregiving provides children with a model for empathic responding, which they internalise over time as a script for responding to others' distress (Xu et al. 2022; Shaver et al. 2016; Troyer and Greitemeyer 2018). These experiences support positive internal working models of self and others—viewing oneself as able to help and others as worthy of care (Shaver et al. 2016).

By contrast, mediation by ER appears less consistent, with evidence primarily in other age ranges. Murphy et al. (2015) reported mediation in an adolescent sample, suggesting that ER may play a stronger mediating role when socioemotional capacities are more differentiated. In adults, attachment security has been linked to cognitive empathy through ER mechanisms such as reappraisal, suppression and rumination (Troyer and Greitemeyer 2018). Our findings did not support an indirect association between attachment and empathy through ER. The absence of significant indirect associations may suggest that, during middle childhood, attachment is more closely associated with empathy independently of ER, possibly due to the ongoing maturation of ER skills. Although longitudinal research is needed to clarify the developmental processes involved.

Conversely, one study suggests that the association between attachment security and empathy may be indirectly shaped by mechanisms such as theory of mind, social cognition and stress response systems, rather than being primarily mediated by ER (Gallistl et al. 2024). Although these mechanisms emerge in early childhood, they continue to develop and become more sophisticated during middle childhood, highlighting this period as particularly relevant for examining their potential mediating roles.

It is important to note that the absence of a statistically significant indirect effect in the present study does not necessarily imply the absence of developmental mechanisms linking attachment,

ER and empathy. Rather, several alternative explanations may account for the lack of evidence for mediation by ER, including measurement-related attenuation, the age range of participants and sample size considerations.

ER is conceptualised in different ways and many studies do not consider empathy's multidimensional nature. Cognitive empathy is often difficult to disentangle from related constructs such as theory of mind, perspective taking and broader social-cognitive skills. Because we relied exclusively on questionnaires, this reliance on single-source reporting may have introduced measurement-related attenuation. Specifically, some of our measures exhibited relatively modest psychometric properties, particularly for ER ($\alpha = 0.63$), Affective Empathy ($\alpha = 0.69$) and maternal SB ($\alpha = 0.68$). Within the context of mediation analyses, such reduced reliability is known to attenuate indirect effects and decrease statistical power, which may have led to an underestimation of subtle indirect pathways. Future work should adopt a multi-method approach and highly reliable psychometric instruments.

Regarding age, our sample was heterogeneous (spanning primary and middle school), which can reduce power to detect mediation if age-related developmental variation in empathy and ER is substantial (VanderWeele 2020).

Our sample may have been underpowered to detect small indirect effects, which typically require much larger sample sizes (e.g., $n \geq 500$) to reach statistical significance (VanderWeele 2020). Thus, the lack of mediation leaves open the question of whether these pathways are absent in this developmental stage or if they were simply undetected due to statistical and methodological constraints. Future studies should therefore increase sample size and focus on narrower age ranges to improve the likelihood of detecting mediation effects.

Finally, these findings align with theoretical models suggesting that secure attachment and ER are associated with empathy in parallel. In other words, rather than operating through a mediated process, attachment and ER are each independently linked to empathy, showing no evidence of an indirect association between them.

Our findings revealed that maternal Safe Haven and paternal Secure Base functions explained the greatest amount of variance in children's empathy. These results are consistent with the literature in preschool samples (Fernandes et al. 2021) and in middle childhood and adolescence (Kerns et al. 2015). Fathers may more often support exploration of the external environment, whereas mothers may be more focused on the child's internal world and provide comfort after aversive experiences (Veríssimo et al. 2011; Steele et al. 1996) reported differences in parental communication, with mothers more often reassuring and comforting early distress. In contrast, Grossmann et al. (2002) argued that fathers encourage play in increasingly mature ways, helping children remain motivated while considering the child's perspective and offering suggestions/explanations. In short, secure attachment with each parent may be grounded in somewhat different interactional domains and while both parents can act as a secure base and a safe haven, the relative proportion of these functions may differ by parent role. Importantly, the 'lesson' learned across

interactions with each caregiver is similar: the child is comfortable exploring when the caregiver is nearby or easily accessible and the caregiver will protect the child from harm when needed.

The theoretical and practical value of examining empathy multidimensionally becomes explicitly evident when interpreting these findings. Our dimension-specific analyses revealed nuanced patterns of associations between parental attachment and empathy dimensions that were less evident when empathy was examined as a global construct. When maternal and paternal attachment were examined together, maternal Safe Haven and paternal Secure Base predicted children's cognitive and overall empathy, supporting their complementary roles in socioemotional development. In contrast, only maternal Safe Haven predicted affective empathy. Consistent with Kim and Kochanska (2017), mother-child (but not father-child) attachment was linked to children's empathic responding to maternal distress. This pattern suggests that the mother-child relationship may be more closely tied to empathic arousal, potentially because mothers more often comfort children and talk with them about emotions—processes that are closely concurrently linked with the facilitation of affective empathy (Deneault et al. 2023).

Overall, these results point to potential nuances that current theoretical frameworks may need to consider in order to better account for the specific relational dynamics of middle childhood. To our knowledge, this appears to be the first study to explicitly test the replicability of findings spanning younger and older children concerning relations between empathy and attachment quality and we did not locate prior work examining these links specifically in middle childhood. The data suggest that attachment continues to play a role in social development from at least infancy through young adulthood. Finally, the findings attest to the robustness of attachment theory as an organising construct for social development.

Author Contributions

Eva Pires: conceptualization, writing – original draft, methodology, writing – review and editing, formal analysis. **António J. Santos:** supervision, writing – review and editing. **Marília Fernandes:** investigation, visualization, writing – review and editing, formal analysis, supervision. **Brian E. Vaughn:** supervision, writing – review and editing. **Carla Fernandes:** supervision. **Manuela Veríssimo:** supervision, conceptualization, project administration, funding acquisition, writing – review and editing.

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Ethics Statement

All procedures performed in studies involving human participants were in accordance with the ethical standards of the Ministry of Education on

May 9, 2025, under reference 0578000020 and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Consent

Informed consent was obtained from all individual adult participants included in the study; assent was obtained from children.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

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

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