

The Role of Parental Reflective Functioning for Theory of Mind Development in Internationally Adopted Children

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- This study was performed in line with the principles of the Declaration of Helsinki. The Leuven Adoption Study was approved by the Social and Societal Ethics Committee of the University of Leuven (KU Leuven) in 2008, 2013 and 2021. Written informed consent was obtained from the parents to participate in the study and use group-level data for publication.
- All authors contributed to the study conception and design. Processing and coding of the interviews was done by Liesbet Nijssens and Saskia Malcorps, data-analyses were performed by Saskia Malcorps. The first draft of the manuscript was written by Saskia Malcorps, and edited and reviewed by Patrick Luyten and Nicole Vliegen. All authors read and approved the final manuscript.

Short title: *Role of PRF for ToM in international adoptees*

Abstract

In biological families, parental reflective functioning (PRF), or the parents' capacity to envision their child as being motivated by internal mental states, is known to facilitate the development of the child's theory of mind (ToM). Very few studies have investigated the relation between PRF and ToM in adoptive families, and none have simultaneously investigated the role of pre- and post-adoptive PRF. The present study is the first to examine relations between pre-adoptive reflective functioning (RF), post-adoptive PRF and children's ToM acquisition in a sample of internationally adopted children and their adoptive parents (48 children; 14 girls and 34 boys). Specifically, we investigated whether the relation between pre-adoptive RF and ToM was mediated by PRF assessed when children were aged 3.5–4 years, and whether these relations were moderated by age at adoption, which served as a proxy for early adversity. Results indicated that none of the PRF dimensions mediated the relation between pre-adoptive RF and ToM. However, pre-adoptive RF and PRF both independently predicted ToM. Moreover, age at adoption moderated these associations, with both pre-adoptive RF and dimensions of PRF assessed at child age 3.5–4 years being related to ToM only in children who were adopted at an older age (≥ 18 months).

Keywords: Adoption, Theory of Mind, parental mentalizing, reflective functioning, early adversity

Highlights

- Theory of Mind (ToM) development of adopted children is often challenged by difficult early life events.
- Adoptive parents' reflective functioning (PRF), the capacity to envision the child as being motivated by mental states, might foster the development of ToM
- This study is the first to investigate the impact of both *pre-adoptive* and *post-adoptive* PRF in internationally adopted children's ToM acquisition
- *Pre-adoptive RF* and *post-adoptive interest in child mental states* was related to ToM, but only in children adopted at the age of 18 months or older
- *Post-adoptive non-mentalizing* of adoptive parents was related to weaker child ToM abilities, independent of age at adoption

The Role of Parental Reflective Functioning for Theory of Mind Development in Internationally Adopted Children

Mentalizing or reflective functioning (RF) refers to the capacity that enables individuals to perceive and interpret the behavior of oneself and others as meaningful and stemming from internal mental states such as needs, desires, feelings, and beliefs (Midgley et al., 2017). There is considerable evidence that mentalizing abilities in children are closely related to positive developmental outcomes such as behavioral control (e.g. effortful control, attention mechanisms), emotion regulation, and social functioning (Luyten et al., 2020). In contrast, impairments in the capacity for mentalizing have been associated with difficulties regulating emotions, impulsivity problems, and interpersonal difficulties (Fonagy & Luyten, 2016), and have been shown to play an important role in a wide array of mental health problems and disorders (Bora, 2021; Luyten & Fonagy, 2018; Robinson et al., 2019). Impairments in mentalizing are therefore considered to be an important transdiagnostic vulnerability factor (Luyten et al., 2020).

It is widely assumed that while the capacity for mentalizing has biological underpinnings (Luyten et al., 2020), its development also depends on the social learning environment in which a child is raised (Midgley et al., 2017) and more specifically on the sensitive and co-regulating interactions with caregivers in early life. As a consequence, the development of mentalizing can be undermined for children growing up in difficult circumstances, such as internationally adopted children who have been separated from biological parents and often spend their first years in multiple accommodations (foster homes, orphanages) with various caretakers whose capacities to provide emotionally attuned care may fluctuate or are rather unpredictable.

Research indeed suggests that internationally adopted children experience more difficulties in the acquisition of mentalizing compared with their non-adopted peers, especially when focusing on more complex social cognitive tasks (Hwa-Froelich et al., 2017; Tarullo et al., 2007; Tarullo et al., 2016). These impairments may in part explain the regulation and interpersonal difficulties (Fonagy & Luyten, 2016; Schwarzer et al., 2021) as well as the more general increased risk for psychological problems that have been documented in at least a subgroup of adoptees (Askeland et al., 2017). Given the importance of mentalizing abilities for socio-emotional development, an essential question is whether adoptive parents can foster the development of mentalizing skills in their adopted children. Therefore, the current study focused on the role of parental mentalizing or parental reflective functioning (PRF) which is the parent's capacity to envision their child as being motivated by internal mental states (Luyten, Nijssens, et al., 2017). PRF is known to facilitate the development of various socio-emotional abilities (Devine &

Hughes, 2018), particularly in children who have experienced early adversity (Ensink et al., 2014; Meins et al., 2013), such as children who have been adopted (Steele et al., 2007). Surprisingly, however, research regarding the impact of adoptive parents' PRF on the socio-emotional development of adopted children is scarce, and research focusing on the development of adopted children's mentalizing capacities is almost non-existent. To our knowledge, only one study has examined the relation between parental mentalizing and emotion understanding skills of internationally adopted children (Tarullo et al., 2016). That study found that parental mental-state talk, assessed when adoptees were 3 years old, predicted the children's emotion understanding at age 5.5, even when controlling for children's language abilities. In addition, this is the first study to simultaneously investigate the role of pre-adoptive and post-adoptive parental mentalizing in adopted children.

In what follows, we first describe the concepts of parental mentalizing and PRF and evidence on the associations between parental and child mentalizing. This is followed by a discussion of the development of mentalizing in adopted children, and the role of parental mentalizing in the socio-emotional development of adopted children. We conclude this introduction with the rationale and aims of the present study. Specifically, this paper examined the relations between adoptive parents' pre-adoptive reflective functioning, assessed before the arrival of their internationally adopted children, and PRF and the adopted children's mentalizing capacities (assessed using a battery of well-validated measures of Theory of Mind; ToM) when the children were 3.5–4 years old. We also investigated the role of age at adoption, parental gender, and child language abilities in these relations.

Parental Mentalizing and the Development of Child Mentalizing

Parental mentalizing is the caregiver's capacity to think about their child as having an inner world and to treat the child as a psychological agent with their own feelings, wishes, and desires (Slade, 2005). More specifically, this capacity entails that caregivers are aware that the child has its own mental states (feelings, thoughts, desires, wishes), are able to accurately interpret these internal states and recognize how these mental states may impact their own states of mind and behavior. Parental mentalizing is considered to be a specific expression of the more general ability to mentalize. Yet, while mentalizing about a specific child has proven to be related to general mentalizing (Arnott & Meins, 2007; Steele et al., 2009), we do not expect both concepts to completely overlap for at least three reasons. Parental mentalizing is (a) relationship-specific: reflecting on a child's mind may be very different than reflecting on the mind of one's partner or parents, (b) kinship-specific: research has shown that the capacity to reflect on one's own child may differ from the capacity to reflect on non-related children, (c) child-specific:

mentalizing is a bi-directional capacity, and therefore the ability to mentalize about a specific child will in part depend on that child's specific psychosocial features (e.g. temperament, trauma history, etc.). (Luyten, Nijssens, et al., 2017). The notion of parental mentalizing is an “umbrella” concept for several operationalizations of different mentalizing components, such as mind-mindedness, parental mental-state talk, and PRF (for a complete overview see Schiborr et al., 2013). The present study focuses on PRF, which represents the level of complexity in reflecting about oneself and one's child as demonstrated during an interview about the parent–child relationship (cf. the Reflective Functioning Scale as scored on the Parent Development Interview; Fonagy et al., 1998; Slade, 2005), or the level of parental interest, certainty, and negative interpretations of the child's mental states (cf. the Parental Reflective Functioning Questionnaire; Luyten, Mayes, et al. (2017)

Parental mentalizing has been shown to play an important role in the development of child mentalizing abilities (Luyten et al., 2020; Midgley et al., 2017). Recent meta-analyses (Aldrich et al., 2021; Devine & Hughes, 2018) have proven robust evidence for significant cross-sectional and prospective relations between parental mentalizing and child ToM (operationalized as emotion and false belief understanding, mental state language and perspective taking), even when individual differences in children's language skills were accounted for (Devine & Hughes, 2018). Associations were found to be similar to relations between parental mentalizing and child executive functions and language abilities (Aldrich et al., 2021). Studies focusing specifically on PRF have found small to moderate associations between PRF and child ToM (ranging from $r = 0.23$ to $r = 0.30$) in pre-latency children (Nijssens et al., 2021; Steele & Steele, 2008), and moderate to strong correlations (ranging from $r = 0.38$ to $r = 0.79$) between PRF and RF in adolescents (Benbassat & Priel, 2012; Costa-Cordella et al., 2021; Rosso et al., 2015).

Parents with high levels of mentalizing appear to engage in various behaviors that support the development of their children's mentalizing capacities. For example, during infancy, when children experience undifferentiated states of distress but have not yet developed the ability to discern, recognize, or regulate these states themselves, parents help to make sense of their children's feelings through “marked mirroring”. This is the process by which a caregiver reflects back the infant's affect in a play-acting and slightly exaggerated manner (Luyten et al., 2020), which provides infants with feedback about how they are feeling and what that feeling “looks like”. It is thought that this mirroring over time helps children to develop second-order representations of subjective experiences (Midgley et al., 2017). Moreover, parents with high levels of mentalizing are more inclined to create a climate for the child that is characterized by a focus on mental states and an understanding of the minds of self and others. They do this

implicitly as they continuously model mentalizing in their way of speaking, attuning, and responding to the behavior of their children and others. However, on a more explicit level, parents can bring their child's attention to understanding the reasons behind people's behavior, for instance by clearing up misunderstandings, having conversations about thoughts and feelings, and explaining other people's actions. It is assumed that these repeated experiences of co-regulation, meaning making, and perspective taking throughout development support children's capacity for mentalizing, as well as for affect regulation and behavioral control (Luyten, Nijssens, et al., 2017).

More research on parental and child mentalizing is needed as most studies have focused only on the relation between maternal mentalizing and child ToM, and thus fathers are typically underrepresented in these studies (Aldrich et al., 2021). Moreover, studies focusing on at-risk groups are relatively scarce and almost no studies have investigated the association between parental RF and child RF in adoptive families.

Parental Mentalizing in the Context of Adoption

Internationally adopted children have often endured various adversities in their early lives. While all international adoptees share a disruptive separation from their biological parents, as well as from their country of birth and culture, some children have spent their first life years in unfavorable living conditions in poor or overburdened families, in deprived institutional care, and/or with experiences of neglect and abuse. It is therefore not surprising that at least in a subgroup of international adopted children, higher levels of peer and behavioral problems, mental health disorders, insecure and disorganized attachment have been reported, and that adopted children and adolescents are overrepresented in mental health care (Askeland et al., 2017; Miller et al., 2000; van den Dries et al., 2009). With regard to the development of mentalizing specifically, internationally adopted children have often had less one-to-one time with nurturing caregivers which means that they missed out on opportunities to experience but also practice mentalizing and co-regulation (Tarullo et al., 2016), which can impair the acquisition of mentalizing. Experiences of abuse and neglect may further undermine their mentalizing, as for these children thinking about the intentions of others can be so confusing that they avoid mentalizing about self and others altogether (Tang et al., 2018).

Empirical evidence shows that internationally adopted children experience more mentalizing difficulties than nonadopted children. In studies examining more complex ToM abilities (e.g., false-belief understanding), internationally adopted children aged 4-11 years consistently performed worse than nonadopted children of the same age (Colvert et al., 2008; Hwa-Froelich et al., 2017; Tarullo et al., 2007; Tarullo et al., 2016). Studies of more basic

ToM tasks (e.g., emotion identification and emotion understanding tasks) show more conflicting results. Whereas Fries and Pollak (2004), Hwa-Froelich et al. (2014), and Camras et al. (2006) found differences between 4 to 5-year-old internationally adopted and nonadopted children in this regard, Tarullo et al. (2016) and Tarullo et al. (2007) did not find the same differences in 3 and 7-year-old adopted and non-adopted children, respectively.

Furthermore, these studies also suggest that there is marked heterogeneity in mentalizing skills within the population of internationally adopted children. Child and pre-adoption factors may explain these differences, as studies show that the duration of deprivation (often operationalized as duration in an institution), age at adoption, time in the adoptive family, siblings in the adoptive family, and the language ability of the child are important predictors of the development of mentalizing skills in adopted children (Camras et al., 2006; Colvert et al., 2008; Hwa-Froelich et al., 2017; Tarullo et al., 2016).

Only one study has examined the relation between adoptive parents' mentalizing and ToM development in adopted children (Tarullo et al., 2016). That study investigated the relations between parental mental state talk, child mental-state language, language ability, and emotion understanding at ages 3 and 5.5 years in a sample of internationally adopted and nonadopted children. Results demonstrated that after controlling for children's language ability at age 3 years, parental mental state talk uniquely predicted children's emotion understanding at age 5.5 years. Importantly, follow-up analyses revealed that this association was moderated by adoption status: although children's language ability was related to children's emotion understanding in both internationally adopted and nonadopted children, parental mental state talk was significantly related to emotion understanding only in the adopted children.

This finding is in accordance with a broad range of studies suggesting that parental mentalizing may play an important role in mitigating the effects of early adversity on children's social and emotional development (Borelli et al., 2019; Ensink et al., 2014; Meins et al., 2013). Although research on parental mentalizing in adoptive families is quite scarce, the studies that have been done suggest that parental mentalizing is associated with positive outcomes in adopted children. For instance, higher levels of PRF, as rated on an adaptation of the Parent Development Interview for adoptive parents, were associated with less negative child demeanor in a co-construction task (León et al., 2018) and less aggressive themes in attachment-related story stem tasks (Steele et al., 2007). Additionally, in the studies of Priel et al. (2000) and Fishburn et al. (2017), higher levels of maternal mentalizing about the adopted child were associated with significantly fewer child externalizing problems. Hence, given that the

number of studies is quite limited, and most studies are cross-sectional, more research regarding the role of parental mentalizing in the development of adopted children is clearly needed.

The Present Study

The current study focuses on the role of PRF in the development of mentalizing abilities in internationally adopted children. Whereas previous studies examined either the impact of prenatal RF (RF measured during pregnancy) or PRF as measured in the actual relationship with a child, no study to date has examined the influence of both concepts simultaneously. This study is therefore the first to investigate the influence of both pre-adoptive RF and post-adoptive PRF on internationally adopted children's mentalizing capacities.

The aims of this study were threefold. The first aim was to examine relations between pre-adoptive RF, PRF when children were aged 3.5–4 years, and the development of child mentalizing as assessed using a set of well-validated measures of ToM. Four features of ToM were examined: visual perspective taking (ToM-VPT), emotion recognition (ToM-ER), belief-desire reasoning (ToM-BDR), and false-belief understanding (ToM-FBU). We expected that PRF assessed when children were aged 3.5–4 years would mediate the relation between pre-adoptive RF and ToM development in children at age 3.5–4 years.

A second aim was to investigate the possible moderating impact of age at adoption in the associations between pre-adoptive RF, PRF, and ToM. Age at adoption is often used as a proxy for the early adversity experienced by children before adoption, and has been shown to be strongly negatively related to various developmental outcomes of adopted children (Julian, 2013). Various dichotomous cut-offs for age at adoption are used in research. We based our choice on a study by Merz and McCall (2010), who examined groups of children with different ages at adoption and found that children aged 18 months or older at adoption showed significantly more social and behavioral problems than children adopted when younger. To this end, we examined whether the relations between (a) pre-adoptive RF and ToM and (b) PRF and ToM differed for children adopted before the age of 18 months (hereafter referred to as *early adoptees*) and children adopted at or after the age of 18 months (referred to as *late adoptees*). Based on evidence reviewed above that PRF seems to be most beneficial for children who have experienced more adversity, we expected that the relations between pre-adoptive RF, post-adoptive PRF, and child ToM would be more pronounced in late adoptees than in early adoptees.

Finally, we examined whether the relations between pre-adoptive RF, PRF, and ToM remained significant when we accounted for the impact of the adopted children's language comprehension. Considering that factors

determining children's language development and mentalizing are largely similar (Hoff, 2006; Midgley et al., 2017; van Ijzendoorn et al., 1995), we expected that when we controlled for the child's language ability, most of the parent-child effects would disappear.

Methods

Participants

Participants were 48 adoptive families, each consisting of the mother, father, and adopted child. Inclusion criteria were (a) parents in a heterosexual relationship, (b) who had no biological children of their own, (c) had applied for the international adoption of a first child, and (d) had received official permission to adopt from the Belgian Central Authority for adoption. Exclusion criteria were (a) if the adopted child was older than 2.5 years at arrival and (b) if the parents decided to not raise the adopted child in the Dutch language. Owing to the age restriction, 10 of the 58 families that were initially screened were ineligible for inclusion.

Demographics of Parents

All adoptive parents had Belgian nationality and spoke Dutch as their first language. The parents were all married and the duration of their relationship ranged from 4.25 to 20.41 years ($M = 10.83$, $SD = 3.56$). The majority of parental couples reported infertility (72%) or chronic disease (e.g., endometriosis, severe heart failure; 12%) that rendered them unable to have a biological child. The remaining 16% of parents indicated that they mainly wanted to adopt in order to give a child a better future and not because of a "biological" problem.

The participants were a relatively older, highly educated, middle to high socioeconomic status (SES) group (see Table 1); this is understandable given that the adoptive parents (a) often had gone through several years of trying to conceive and/or infertility treatment (67% reported having undergone treatment for infertility with a mean (SD) duration of 33.97 (21.63) months) and (b) had to have the resources for international adoption. As part of the adoption process, all couples had already gone through an extensive psychosocial screening commissioned by a youth court, involving a home visit and a series of interviews with both parents conducted by social workers and psychologists.

[TABLE 1 HERE]

Demographics of Children

The children in the study were adopted from eight different countries: Ethiopia (27), South Africa (10), Kazakhstan (6), Nigeria (1), Sri Lanka (1), China (1), Burkina Faso (1), and Uganda (1). The children comprised 34

boys (70.8%) and 14 girls (29.2%). Their mean (SD) age at arrival was 13.43 (6.56) months, with a range between 4 and 30 months: 33 children were younger than 18 months at adoption ($M = 11.29$ months, $SD = 3.03$ months, range = 5.49 – 17.84 months), 15 children were 18 months or older at adoption ($M = 23.36$ M, $SD = 4.30$, range = 18.33 – 32.88 months). Parents reported that before their adoption the children had lived in a range of placements, with between one and four different accommodations.

Instruments

Adoption Expectations Interview

The Adoption Expectations Interview (AEI; Luyten et al., 2008) is a semi-structured interview that is largely based on the Pregnancy Interview developed by Slade et al. (2007). The AEI consists of 20 questions that aim to assess the expectations of prospective adoptive parents with regard to adoption and their future adopted child in particular, with a focus on the internal working models adoptive parents have of their future adopted child and their RF ability, as several probes aim at explicitly assessing this capacity (e.g., in a question asking about how friends and family reacted to their decision to adopt a child: “How did their reaction make you feel?”, “Why do you think they reacted that way?”). The interview invites parents to look forward (e.g., to the needs of the child in the period after arrival) and also to look back and reflect on their experiences since their initial desire to have a child (e.g. the decision to adopt, the extensive psychosocial screening process preceding adoption). See Malcorps et al. (2021) for a more elaborate description and the interview protocol.

Reflective Functioning Scale as Scored on the AEI

The Reflective Functioning Scale (Fonagy et al., 1998) is an extensive coding scale to evaluate an individual’s level of RF as demonstrated during a semi-structured interview regarding attachment experiences or expectations about upcoming parenthood during pregnancy (Fonagy et al., 1998; Slade, 2005). The RFS ranges from negative (score –1) to exceptional or full (score 9) RF; scores from –1 to 3 are considered to indicate negative to low RF, scores between 5 and 9 are considered to reflect average to high RF, and a score of 4 is referred to as borderline (Taubner et al., 2013). Coding the RFS follows a standardized procedure (Fonagy et al., 1998) that is based on the presence and sophistication of four domains of qualitative markers of RF in responses to every interview question, namely (a) awareness of the nature of mental states, (b) explicit efforts to tease out mental states underlying behavior, (c) recognizing developmental aspects of mental states, and (d) mental states in relation to the interviewer. On the basis of these markers, each of the separate questions in the interview is given an RF score, and in a next step

these individual scores are aggregated into a global RF score, using specific guidelines set out in the manual. In close collaboration with the original authors (Fonagy et al., 1998; Slade, 2005), an adaptation of the RFS was developed for use on the AEI. See Malcorps et al. (2021) for a detailed description of the AEI-RFS coding procedure. The AEI-RFS global score is determined on the basis of the eight demand questions of the interview. An initial examination (Malcorps et al., 2021) showed good reliability and construct validity, and suggested a unidimensional factor.

Parental Reflective Functioning Questionnaire

The Parental Reflective Functioning Questionnaire (PRFQ, Luyten, Mayes, et al., 2017) is an 18-item self-report questionnaire consisting of three factors: (a) the Prementalizing Modes (PM) subscale assesses a nonmentalizing stance of parents toward their child, consisting of severely biased and often malevolent assumptions about the internal world of their child. Higher scores on PM reflect higher levels of non- or negative mentalizing; (b) the Certainty of Mental States (CM) subscale focuses on parents' capacity to recognize the opacity of mental states. Low scores on CM reflect a hypomentalizing stance, which is characterized by a lack of certainty about the child's mind. Very high IC scores on CM may reflect a stance in which parents are overly certain about the mental states of their child, which may give rise to hypermentalizing and which may be experienced by the child as intrusive or overcontrolling (e.g., "I always know what my child wants") (Luyten et al., 2017); and (c) the Interest and Curiosity (IC) subscale assesses the presence or absence of active curiosity about and willingness to understand the mental states of the child. Low IC scores indicate a lack of interest in child's mind, whereas very high scores reflect an excessive interest in the child's mind. All items are scored on a 7-point Likert scale, ranging from 1 (*completely disagree*) to 7 (*completely agree*). Recent studies have supported the reliability and preliminary validity of the PRFQ (De Roo et al., 2019; Luyten, Mayes, et al., 2017). Regarding internal consistency in this sample, Cronbach's alphas of PM, CM, and IC were .65, .83 and .69, respectively.

Theory of Mind

The ToM battery includes different tasks about perspective taking (VPT), emotion recognition (ER), false-belief understanding (FBU), and belief-desire reasoning (BDR). The tasks within the battery have been described in detail elsewhere (Nijssens et al., 2021). The Perspective-Taking segment consists of two tasks that assess the child's ability to take the visual perspective of the experimenter: the "Mouse task" and the "Cat and ice-cream task" (Flavell et al., 1968). The Emotion Recognition segment assesses the child's ability to recognize expressions of

basic emotions (happy, sad, angry, or scared) when (a) describing how a person (of the same gender as the child) is feeling in a consecutive series of four pictures, and (b) by pointing toward a particular facial expression on a matrix with four gender-matched pictures (Denham, 1986). The False Belief segment consists of (a) two unexpected-content false-belief tasks: the “Smarties task” (Hogrefe et al., 1986) and the “Coke and milk task” (Harris et al., 1989), and (b) two change-of-location false-belief tasks: the “Sally-Anne task” and the “Frog-chocolate task” (Wimmer & Perner, 1983). The Belief-Desire segment assesses the child’s ability to predict the feelings of a subject when a desire was met (or not). This was measured using six different stories (Wellman & Woolley, 1990), in which a protagonist is looking for an object they really desire, and ends up finding it or finding another object. In each task, we used control questions to make sure the child understood the question correctly. For this study, we calculated the proportion of correct answers for each of the ToM dimensions, VPT, ER, FBU, and BDR (min = 0, max = 1), as well as a ToM-total score, which was the mean of the four proportional scores (min = 0, max = 1).

Language Comprehension

The Sentence Comprehension subscale of the Dutch Language Test for All Children (LTAC, Verhoeven & Vermeer, 2001) was used to assess the child’s language ability. This 42-item subscale assesses the comprehension of quantity-indicating words (11 items), spatial words (11 items), personal identifiers (10 items), and conjunctions (10 items). In this test, a research assistant reads a sentence out loud (e.g., for spatial words: “He looks in her book”) while the child is presented with three images, only one of which matches the offered sentence. The child has to indicate which image matches the sentence. This test can be used for children between the ages of 4 and 9, and can be administered to children whose first or second language is Dutch.

Procedure

This study used data from the Leuven Adoption Study (LAS), a multi-wave, multi-method, and multi-informant study of the development of internationally adopted children in Flanders (Belgium). Recruitment for the LAS was done through adoption agencies, social media, and meetings for future adoptive parents. Couples who were interested in the study first received a leaflet giving detailed information about the study. If they wanted to participate, they met with a research assistant who provided further detailed information about the study. After the parents provided written informed consent, a first home visit was scheduled when the prospective parents were still on the waiting list of a specific adoption agency. During this visit (Time 1; T1) the AEI was conducted individually with each parent by a research assistant. The duration of each interview was on average approximately 1.5 hours. All

interviews were transcribed verbatim and rated by researchers SM and LN using the AEI-RFS. When the children were 3.5–4 years old (Time 2; T2), ToM and language ability testing was done. At T2, parents also completed a series of questionnaires, of which only the PRFQ was used for this study.

All research assistants were trained in conducting the AEI and the ToM testing at dedicated training meetings and were provided with personal feedback on their performance by the main study researchers. SM and LN were both trained in rating the RFS on the Parent Development Interview (PDI) or Adult Attachment Interview.

Statistical Analyses

Before we tested the main hypotheses of this study, we ran preliminary analyses to determine the means and *SDs* for pre-adoptive RF (AEI-RFS), the PRF dimensions (PRF-PM, PRF-CM, and PRF-IC), the ToM dimensions (ToM-PT, ToM-FBU, ToM-ER, and ToM-BDR), and the ToM-total score. Paired-sample *t*-tests were run to examine possible differences in AEI-RFS and PRF scores between mothers and fathers. Similarly, we ran independent-sample *t*-tests to check for possible differences in ToM scores between boys and girls.

Next, we calculated Pearson correlations to examine the bivariate relations between the main study variables (AEI-RFS, PRF, ToM, child age at adoption). To determine which confounding variables needed to be controlled for in further mediation analyses, we calculated correlations between AEI-RFS, PRF, ToM, and child language comprehension, and the overall correlations were split out for mothers and fathers separately to investigate whether there was an impact of parent gender.

To further explore the relations between pre-adoptive RF, PRF, ToM, and child age at adoption, we utilized conditional process modeling to test for moderated mediation (Preacher et al., 2007). The Hayes' PROCESS macro for SPSS was used for all moderated mediation analyses, which uses a bootstrap strategy to determine indirect mediation effects, as well as conditional (moderated) indirect effects ($n = 5000$). More specifically, we tested the model depicted in Figure 1, in which we examined whether (a) PRF mediated the relation between pre-adoptive RF and ToM and (b) child age at adoption moderated the relations between PRF and ToM (b-path) and pre-adoptive RF and ToM (c-path). This proposed model is in accordance with the template of Model 15 of the PROCESS macro. We did these analyses for each of the PRF dimensions separately. To facilitate interpretation of the results, the variables AEI-RFS, PRF-PM, PRF-CM, and PRF-IC were centered around the sample grand mean.

[FIGURE 1 HERE]

To establish a more parsimonious model, we trimmed nonsignificant interaction terms from the model. If

the interaction between PRF and child age at adoption was not significant, we tested a model corresponding to Model 5 of the PROCESS macro; if the interaction between AEI-RFS and age at adoption was not significant, we tested a model corresponding to Model 14. If both interactions were not significant, we tested a simple mediation model corresponding to Model 4 of the macro. Only the final models are presented in this article. To determine whether there was a significant mediation or moderated mediation effect, we examined whether the confidence interval (CI) of the indirect effect for mediation and the index of moderated mediation, respectively, included zero. Finally, we consecutively included parent gender and child language abilities as covariates in the models.

Results

Descriptive Results

Regarding pre-adoptive RF at T1, the general mean of the AEI-RFS-scores was 5.51 ($SD = 1.10$), which represents an “ordinary” level of RF (Fonagy et al., 1998) (see Table 2). Results of paired-sample t -tests showed that mothers scored slightly but significantly higher than fathers on the AEI-RFS. For PRF measured at T2, there were no significant differences between mothers and fathers in PRF-Certainty of Mental states (CM) (Table 2). However, mothers had significantly lower scores for PRF-Prementalizing Modes (PM) and higher scores for PRF-Interest and Curiosity (IC) than fathers. Although there were no significant differences between mothers and fathers in the distribution of PRF-CM and PRF-IC scores, Levene’s test for equality of variances showed that the variance in PRF-PM scores was significantly lower for mothers, $F(1,90) = 6.676, p = 0.011$, indicating that the range of PRF-PM scores of mothers was significantly smaller than that of fathers. At T2, boys and girls did not differ in their scores on the different ToM dimensions or in ToM-total score (see data supplement Table 1).

[TABLE 2 HERE]

Regarding possible confounding variables, Pearson correlations showed that adopted children’s language comprehension was positively associated with ToM-total and pre-adoptive RF, and negatively associated with PRF-PM (Table 3). A post-hoc analysis in which we split out correlations for parent gender further revealed that associations between the main variables differed substantially between mothers and fathers (see data supplement Table 2). Based on these results, we included child language abilities and parent gender as covariates in further mediation analyses.

Relations Between Pre-adoptive RF, Parental RF, and ToM

Associations between the main study variables (AEI-RFS, PRF, and ToM) are presented in Table 3. First,

against expectations, pre-adoptive RF showed a significant positive association only with ToM-Emotion Recognition ($r = 0.222, p = 0.039$), and was not significantly associated with ToM-total or any of the other ToM dimensions.

[TABLE 3 HERE]

Second, regarding the PRF dimensions, as expected, PRF-PM was negatively associated with ToM-total ($r = -0.421, p < 0.001$) and the specific ToM dimensions Visual Perspective Taking, Emotion Recognition, and Belief Desire Reasoning. PRF-CM was not related to ToM-total. PRF-CM showed only an unexpected negative association with ToM-False Belief Understanding ($r = -0.270, p = 0.013$), meaning that higher parental certainty about the child's mental states was associated with lower child false belief understanding. Again, against expectations, PRF-IC was not associated with ToM-total or any of the ToM dimensions.

Against expectations, pre-adoptive RF and PRF measured when adopted children were aged 3.5–4 years were not related. The AEI-RFS was not significantly related to PRF-PM, PRF-CM or PRF-IC.

Finally, in line with expectations, children's age at adoption was negatively related to ToM-total ($r = -0.312, p = 0.003$), meaning that children who were older at adoption demonstrated lower ToM scores at age 3.5–4 years. Moreover, age at adoption was positively related to PRF-PM ($r = 0.333, p = 0.002$) but not to PRF-CM, PRF-IC, or pre-adoptive RF.

Moderated Mediation Analyses

Results of the moderated mediation analyses are presented in Table 4, and conditional effects of AEI-RFS and PRF on ToM are presented in Figure 2. Results of Model 1 demonstrated that PRF-PM did not mediate the relation between AEI-RFS and ToM-total (indirect effect: $B = 0.013, SE = 0.008, 95\% CI [-0.001; 0.031]$). There was, however, a significant interaction effect between AEI-RFS and child age at adoption, and a significant negative effect of PRF-PM on ToM-total. As Figure 2A illustrates, there was a significant positive relation between AEI-RFS and ToM-total in the late adoptee group, but not in the early adoptee group. Hence, while low levels of PRF, as assessed with the PRF-PM subscale, had a negative impact on ToM development in both age groups, higher levels of pre-adoptive RF had a positive impact on ToM development only in late adoptees.

[FIGURE 2 HERE]

[TABLE 4 HERE]

PRF-CM also did not mediate the relation between AEI-RFS and ToM-total. However, Model 2 shows that,

besides the significant interaction between AEI-RFS and age at adoption, there was also a trend toward an interaction between PRF-CM and age at adoption. Figure 2B illustrates that in the early adoptee group there was a trend for a positive association between PRF-CM and ToM-total, but this trend was not significant ($p = 0.08$). In the late adoptee group there was no relation between PRC-CM and ToM-total.

Results of Model 3 show that PRF-IC did not mediate the relation between AEI-RFS and ToM-total. However, there was a trend toward a significant interaction between PRF-IC and age at adoption. Figure 2C shows that there was a significant positive relation between PRF-IC and ToM-total only in the late adoptee group. This indicates that for children adopted at a later age, higher levels of parental IC are beneficial for ToM development.

Finally, the above models yielded similar results when we included parental gender as a covariate. The only apparent difference was that the trend for an interaction between PRF-IC and child age at adoption in Model 3 disappeared after the inclusion of parent gender ($p = 0.22$). Moreover, as expected, when we included child language comprehension as a covariate in the models, almost all the associations between pre-adoptive RF, PRF, and ToM disappeared. The only association that remained significant was the relation between PRF-PM and ToM-total ($B = -0.07$, $SE = 0.04$, $t = -2.01$, $p = 0.048$).

Discussion

In biological families, PRF, the parents' ability to envision a child's mind, facilitates the development of children's mentalizing abilities (Devine & Hughes, 2018). PRF also appears to be an important buffer for the effects of early adversity, which is typical for many internationally adopted children. Despite this, there have been very few studies that have examined the relation between PRF and ToM in adoptive families. Therefore, the current study set out to investigate the impact of pre-adoptive RF and post-adoptive PRF of adoptive parents on the acquisition of ToM abilities in internationally adopted children. The moderating impact of age at adoption in these associations was also examined.

Overall, results showed that both pre-adoptive RF and post-adoptive PRF were positively related to the ToM abilities of our group of internationally adopted children. Contrary to expectations, none of the PRF dimensions mediated the relation between pre-adoptive RF and ToM, but pre-adoptive RF and PRF appeared to independently predict ToM. Age at adoption seemed to play an important moderating role in the relations between pre-adoptive RF and ToM, and between PRF and ToM.

First, there was a clear negative relation between parental PRF-Prementalizing Modes (PM) and emerging

ToM abilities in adopted children, and this relation was independent of age at adoption. This association indicates that in both age groups, a nonmentalizing, negative parental stance regarding the child's mind is related to weaker child ToM abilities. These results are in line with a study of Nijssens et al. (2021), who demonstrated that PRF-PM was prospectively associated with decreased ToM abilities in normally developing 3-, 4-, and 5-year-old children. However, as PRF and ToM in the current study were measured at the same time point, we should be careful in interpreting the direction of this relation. We can imagine that parents who more frequently demonstrate a negative or hostile interpretation of their child's behavior may be less likely to inspire a curious, positive stance in the child toward understanding themselves and others. However, it is also possible that children who have greater difficulties with ToM demonstrate more odd and difficult-to-understand relational behavior, which could put pressure on parents' mentalizing capacities and give rise to more nonmentalizing, negative attributions toward the child's behavior (Midgley et al., 2018). The latter hypothesis is supported by evidence that child behavioral difficulties challenge parents' mentalizing capacity (Fishburn et al., 2017).

A second important finding was that, in children who were younger than 18 months on arrival, PRF-Certainty of Mental States (CM) showed a trend toward a positive association with the children's ToM abilities, meaning that better ToM abilities of children go along with more parental certainty about what the child is thinking and feeling. Again, we should be careful in interpreting the direction of this association. Children who exhibit higher levels of ToM are possibly easier for their parents to "read", and as a result the parents can be more certain about what their child is thinking and feeling. However, it could also be that parents who have a more certain idea of what is going on in their child's mind could be more supportive of their child's development of understanding of themselves and others. Yet, given that this study only found a trend for a relationship between PRF-Certainty and ToM in early adopted children, it is clear that more research is needed to substantiate these findings.

A third important finding was the positive association between both pre-adoptive RF and ToM and between PRC-Interest and Curiosity (IC) and ToM of late adoptees. In children who have experienced adversity for longer, the parents' general ability to reflect on themselves and others, as well as their interest and curiosity regarding what goes on in the child's mind, appears to have an important positive influence on the development of the children's ToM skills. In contrast, in the early adoptees, the relations between pre-adoptive RF and ToM, and between PRF-IC and ToM, were nonsignificant. Thus, it seems that a highly reflective and interested attitude of the adoptive parent regarding what the child thinks and feels appears to have a specific positive influence on the development of

mentalizing skills in children who have experienced adversity for longer.

These results are in line with other studies that found that PRF has a specific protective function for children who have experienced early adversity. For example, Tarullo et al. (2016) showed that parental mental state talk at age 3 was predictive of emotion-understanding abilities of children at age 5.5 in a group of internationally adopted children, but not in a group of nonadopted children. Research by Meins et al. (2013) also showed that mind-mindedness at age 12 months predicted fewer behavioral difficulties at age 44 months over and above parental sensitivity, but only in low-SES families. In high-SES families the same relation was not found, and only parental sensitivity was significant. Meins et al. (2013) argued in this context that while a general parental sensitive attitude is beneficial for the socio-emotional development of all children, the ability of parents to additionally adopt a mentalizing stance seems to be preventive for children exposed to psychosocial risks in their early lives. More specifically, because of their exposure to adversity or trauma, these children may experience greater challenges in establishing close relationships, are more difficult to understand, and pose more challenging behavior. When parents maintain the ability to reflect on the thoughts and feelings governing their children's behavior during these difficult moments, it enables them to better understand their children, tolerate the behavior or interpersonal difficulties, and respond to it appropriately instead of just writing it off as problematic (Meins et al., 2013; Midgley et al., 2018).

It is important to note that these effects remained significant when we controlled for parent gender. However, this was not the case when we controlled for children's language comprehension. In line with our expectations, most parent-child effects disappeared when we controlled for the children's language abilities. Given the large overlap in contextual factors between the development of language and RF capacities in children (Garfield et al., 2001), these results were not surprising. Research suggests that the acquisition of both capacities is at least partially dependent on the quality of the social living and learning environment. More specifically, a "mentalizing environment" characterized by joint attention, parental responsiveness, parental mental-state talk, and secure attachment appears to facilitate the development of both language and mentalizing skills (Hoff, 2006; Luyten, Nijssens, et al., 2017; Midgley et al., 2017; van Ijzendoorn et al., 1995). This can also be seen in the results of the present study, as both pre-adoptive RF and PRF were associated with the language ability of the child. However, importantly, even when controlling for the children's language abilities, PRF-PM remained a significant predictor of ToM. This again indicates that parental nonmentalizing can have serious negative effects on child development.

A final finding of this study was that RF assessed before adoption and PRF after the child had arrived were

not significantly related. Indeed, pre-adoptive RF, as measured using the AEI-RFS, was not related to parental certainty (PRF-CM) or parental interest (PRF-IC) regarding the child's mental states at 3.5–4 years old for either early or late adoptees. The moderated mediation analyses only indicated a significant negative association between pre-adoptive RF and parental prementalizing (PRF-PM), meaning that parents who demonstrated a greater ability to reflect about the adoption process and the future child, before the arrival of the child, were less likely to make nonmentalizing, hostile attributions toward their child at the age of 3.5–4 years.

These results were surprising and rather puzzling. Although the two RF measures were not associated with each other, they were both related to child ToM. A first possible explanation is that there was little statistical variability in the pre-adoptive RF and PRF scores, making it difficult to find significant associations. The sample of this study consisted of carefully screened adoptive parents, who showed fairly similar and relatively high scores for pre-adoptive RF and PRF. This lack of variability was particularly pronounced in the adoptive mothers in this study: no adoptive mother showed an AEI-RFS score lower than the “borderline score” of 4, and the variance for PRF-PM was significantly lower than that of adoptive fathers. As a result, the correlations between maternal AEI-RFS and PRF were close to zero (see data supplement Table 2).

A second possible explanation is that the AEI-RFS and PRFQ measure different mentalizing concepts. To investigate this hypothesis, more research will be needed on the relations between the PRFQ and the RFS as measured on a parent–child relationship interview. The few studies that have been done have yielded inconsistent results: Pajulo et al. (2015) reported strong associations between prenatal RF measured with the PI-RFS and a prenatal version of the PRFQ, and a recent study by Anis et al. (2020) found limited but significant relations between the PDI-RFS and the PRFQ. In contrast, Cooke (2015) and Schechter et al. (2016) found no significant associations between the PRFQ and PDI-RFS and WMCI-RFS. Small sample sizes and different measurement methods for both the RFS and the PRFQ further complicate the interpretation and generalizability of these results.

Finally, PRF is a very specific parent–child capacity, namely, the parent's ability to (continue to) mentalize about one specific child, which is not necessarily related to a more general RF capacity measured years before. More longitudinal research is needed to elucidate the relationship between RF in general and PRF, and to investigate to what extent PRF is stable over time and is influenced by child and interaction factors.

Clinical Implications

This study has two important clinical implications. A first implication concerns the role of mentalizing in pre- and

post-adoption support. In many countries prospective adoptive parents have to complete a pre-adoption preparation and screening procedure aimed at reducing later placement breakdowns. These preparation programs often already provide parents with an introduction into attachment theory, the impact of trauma on children's physical and emotional development, and awareness of the potential impact of racism. Psychoeducation about the potential role of parental mentalizing could provide a valuable addition to these programs. At least three studies have shown that a brief psycho-educational intervention may promote mentalizing and decrease parenting stress in adoptive parents (Adkins et al., 2018; Adkins et al., 2021; Bammens et al., 2015).

Regarding pre-adoption screening, the present study suggests that higher levels of pre-adoptive RF might be protective in the longer term as they were associated with less parental prementalizing toward the child years after arrival, and with better child ToM abilities. However, more research on the stability of pre-adoptive RF and the relations between pre-adoptive RF and adopted children's socio-emotional development is needed. If future research would substantiate the protective impact of pre-adoptive RF, it might be indicated to screen prospective adoptive parents for clear impairments in their parental mentalizing capacities, such as severe difficulties in reflecting on their own or other persons' inner worlds (even when explicitly asked) or clear indications of very rigid and negative interpretations of the minds of others. Parents with clear impairments in parental mentalizing might be less suited for adoption or alternatively might benefit from interventions aimed at increasing parental mentalizing.

Regarding post-adoption support, this study suggests that a reflective and interested parental attitude is important for the development of children's ToM abilities, particularly for children who have experienced longer periods of adversity. As ample research has shown that PRF is affected by stress (Nolte et al., 2013), and particularly stress related to parenthood or to the child (Håkansson et al., 2019), an important focus of post-adoption support should be to scaffold parental mentalizing and reduce the occurrence of mentalizing breakdowns. Over the past decade, several mentalizing-focused treatment programs for adoptive and foster parents have been developed, such as Family Minds (Adkins et al., 2018), Adopting Minds (Midgley et al., 2018) and the Reflective Fostering Programme (Redfern et al., 2018).

A second implication of this study is the clear need for further research into the development of mentalizing skills of adopted children, particularly children who were adopted at an older age. To date, most research on mentalizing in samples of international adoptees has been done with children between 3 and 7 years old (Hwa-Froelich et al., 2017; Tarullo et al., 2007; Tarullo et al., 2016). Our knowledge about the further development of

these skills is almost nonexistent. However, as mentalizing deficits play an important role in the development and persistence of psychological problems, and as adoptees are particularly vulnerable for the development of psychopathology in later life, studying the development of mentalizing throughout middle childhood and adolescence should be an important research and clinical focus. However, this ambition is complicated by a lack of instruments to assess mentalizing during middle childhood. Many of the existing instruments are useful for detecting serious mentalizing deficits, but because of ceiling effects they are less able to measure the gradations between mediocre, good, and strong mentalizing.

Strengths and Limitations

This study has a number of strengths. As described above, the majority of current adoption research regarding PRF consists of cross-sectional studies. Hence, a first strength of this study is its longitudinal nature, and the fact that we were able to investigate relations between pre-adoptive characteristics of adoptive parents and the development of adopted children years later. The methodological triangulation of this study is another strong point: in particular, we used an interview and the RFS coding scale to assess pre-adoptive RF, a self-report questionnaire for PRF, and a multi-dimensional test battery for ToM. Third, whereas developmental research for a long time has focused on the mother-child relationship, in the current study we administered and analyzed interviews and questionnaires from both mothers and fathers.

The study also has some limitations. A first important limitation concerns the sample size of the LAS. Considering possible power issues, the current study only discussed the most robust findings and results from bootstrap analyses. Additionally, although the current study provides interesting insights in the impact of pre-adoptive RF and post-adoptive PRF on ToM and the moderating impact of age at adoption, the study was underpowered to run more complex models that would also allow us to compare the same moderated mediation models for mothers and fathers separately. However, as research indicates the differential impact of mothers and fathers on child development (Benbassat & Priel, 2012), it seems highly valuable to be able to study the separate impact of maternal and paternal RF on ToM development in early- and late-adopted children.

Furthermore, for this study we included age at adoption as an indicator or proxy of the early adversity experienced by the adopted children. It would be interesting for future studies to investigate in greater depth which aspects of adversity drove the more negative developmental outcomes found in the group of late adoptees. Previous research has suggested that factors such as time spent in residential care, lack of time spent with the biological

mother, and (nutritional, physical, and emotional) neglect may be of importance in this respect (Julian, 2013).

In addition, ToM performance of the adopted children could be influenced by their exposure to the Dutch language at the moment of testing. While we could not control for the level of exposure to language spoken by the child's environment in the current study, future studies should use direct measures of child-directed communication (e.g. Language Environment Analysis Software as used in Weisleder & Fernald, 2017) or measures of parental mental state talk during parent-child interactions (e.g. Tompkins et al., 2018) to investigate this impact on child ToM.

A final limitation was that the period between T1 and T2 could differ greatly between participants as a result of the unpredictable timing of the adoption process. For T1, parents were interviewed if they had obtained legal permission to adopt a child and were on the waiting list of a specific adoption agency. However, the waiting time until the arrival of their adopted child varied considerably among the families. As a result, time until T2 ranged from 1.44 to 5.02 years.

Conclusion

Pre-adoptive RF and post-adoptive PRF are independently positively associated with the acquisition of ToM by internationally adopted children. In line with evidence on the protective role of PRF for children who have experienced severe adversity, pre-adoptive RF and parental interest toward their child's mental states appear to be mainly beneficial for children who were adopted at an older age. In contrast, negative or absent mentalizing appears to have an overall negative impact on the development of ToM by adopted children, independent of age at arrival.

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Table 1*Demographic Data for Fathers and Mothers*

	Fathers	Mothers
Age (<i>M</i> [<i>SD</i>]), years	34.29 (3.80)	33.10 (3.32)
Age range, years	27–46	27–42
Highest obtained education		
High school	29.17%	12.50%
Higher education	70.83%	87.50%
- Bachelor's degree	35.72%	47.92%
- Master's degree	35.11%	39.58%

Table 2

Scores of Pre-adoptive RF (T1) and PRF (T2) for Mothers and Fathers

	Fathers	Mothers		
<i>PRF-variables</i>	<i>M (SD)</i>	<i>M(SD)</i>	<i>t-value</i>	<i>p-value</i>
AEI-RFS (T1)	5.40 (1.17)	5.91 (1.10)	2.659	0.011
PRF-PM (T2)	1.68 (0.66)	1.44 (0.44)	-2.594	0.013
PRF-CM (T2)	4.03 (1.13)	4.30 (1.11)	1.541	0.131
PRF-IC (T2)	5.30 (0.75)	5.83 (0.67)	3.93	<0.001

Note. AEI-RFS = Reflective Functioning Scale scored on the Adoption Expectations Interview; PRF = parental reflective functioning; PM = Prementalizing Modes; CM = Certainty about Mental States; IC = Interest and Curiosity about Mental States.

Table 3

Correlations Between the Main Study Variables

	1	2	3	4	5	6	7	8	9	10	11
1. AEI-RFS	-	-0.207 ⁺	-0.027	0.159	0.058	0.222 [*]	-0.014	-0.131	0.052	-0.001	0.232 [*]
2. PRF-PM		-	-0.100	-0.402 ^{**}	-0.421 ^{**}	-0.354 ^{**}	-0.363 ^{**}	-0.190 ⁺	-0.224 [*]	0.333 ^{**}	-0.330 ^{**}
3. PRF-CM			-	0.046	0.067	0.017	0.194 ⁺	-0.270 [*]	0.130	0.073	0.218 ⁺
4. PRF-IC				-	0.115	0.053	0.136	-0.034	0.120	0.004	0.172
5. ToM-total					-	0.764 ^{**}	0.703 ^{**}	0.470 ^{**}	0.786 ^{**}	-0.312 ^{**}	0.528 ^{**}
6. ToM-ER						-	0.285 ^{**}	0.331 ^{**}	0.506 ^{**}	-0.357 ^{**}	0.360 ^{**}
7. ToM-VPT							-	0.053	0.432 ^{**}	-0.171	0.426 ^{**}
8. ToM-FBU								-	0.143	-0.092	-0.143
9. ToM-BDR									-	-0.226 [*]	0.632 ^{**}
10. Child age at adoption										-	-0.199 ⁺
11. Language Comprehension											-

Note. Correlation is significant at the 0.01 level (**), 0.05 level (*), 0.10 level (+). ToM = Theory of Mind; ER = Emotion Recognition; VPT = Visual

Perspective Taking; FBU = False-Belief Understanding; BDR = Belief-Desire Reasoning; AEI-RFS = Reflective Functioning as scored on the Adoption

Expectations Interview; PRF = Parental Reflective Functioning; PM = Prementalizing Modes; CM = Certainty about Mental States; IC = Interest and Curiosity about Mental States.

Table 4

Moderated Mediation Analyses

	Model 1: M = PRF-PM			Model 2: M = PRF-CM			Model 3: M = PRF-IC		
$X \rightarrow M$	B (SE)	p-value		B (SE)	p-value		B (SE)	p-value	
	AEI-RFS	-0.113 (0.06)	0.06	AEI-RFS	-0.026 (0.106)	0.807	AEI-RFS	0.110 (0.076)	0.150
$X + M \rightarrow Y$									
	AEI-RFS	-0.029 (0.024)	0.220	AEI-RFS	-0.028 (0.025)	0.259	AEI-RFS	-0.023 (0.248)	0.351
	PRF-PM	-0.119 (0.038)	0.003	PRF-CM	0.052 (0.028)	0.064	PRF-IC	-0.008 (0.040)	0.851
	AAA	-0.110 (0.046)	0.018	AAA	-0.148 (0.046)	0.002	AAA	-0.153 (0.046)	0.001
	RFS × AAA	0.102 (0.043)	0.019	RFS × AAA	0.124 (0.044)	0.007	RFS × AAA	0.115 (0.044)	0.010
	PM × AAA	-	-	CM × AAA	-0.078 (0.044)	0.079	IC × AAA	0.103 (0.060)	0.088
<i>Conditional effect of X → Y</i>	B (SE)	p-value		B (SE)	p-value		B (SE)	p-value	
	<18 months	-0.029 (0.024)	0.220	<18 m	-0.027 (0.025)	0.259	<18 m	-0.023 (0.025)	0.351
	≥18 months	0.073 (0.036)	0.046	≥18m	0.096 (0.037)	0.011	≥18 m	0.092 (0.036)	0.013
<i>Cond. effect of M → Y</i>	B (SE)	p-value		B (SE)	p-value		B (SE)	p-value	
	<18 months	-	-	<18 m	0.052 (0.028)	0.064	<18 m	-0.008 (0.040)	0.851
	≥18 months	-	-	≥18 m	-0.026 (0.034)	0.445	≥18 m	0.095 (0.044)	0.035

Note. M = Mediator; SE = standard error; CI = 95% confidence interval, AAA = Age at Adoption; AEI-RFS = Reflective Functioning scored on the Adoption Expectations Interview; PRF = Parental Reflective Functioning; PM = Prementalizing Modes; CM = Certainty about Mental States; IC = Interest and Curiosity about Mental States.

Figure 1

Moderated Mediation Model (PROCESS model 15)

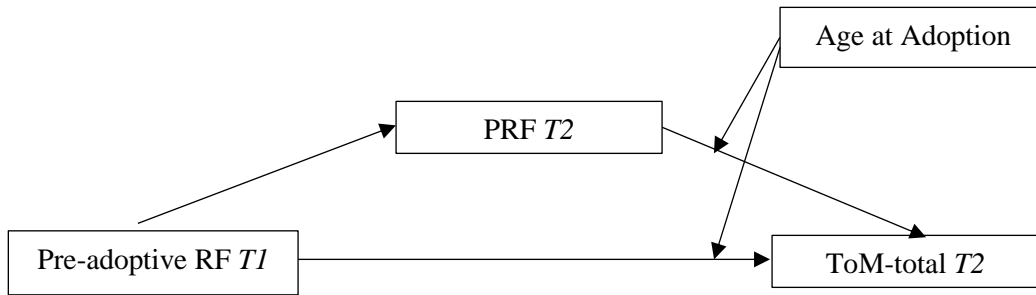
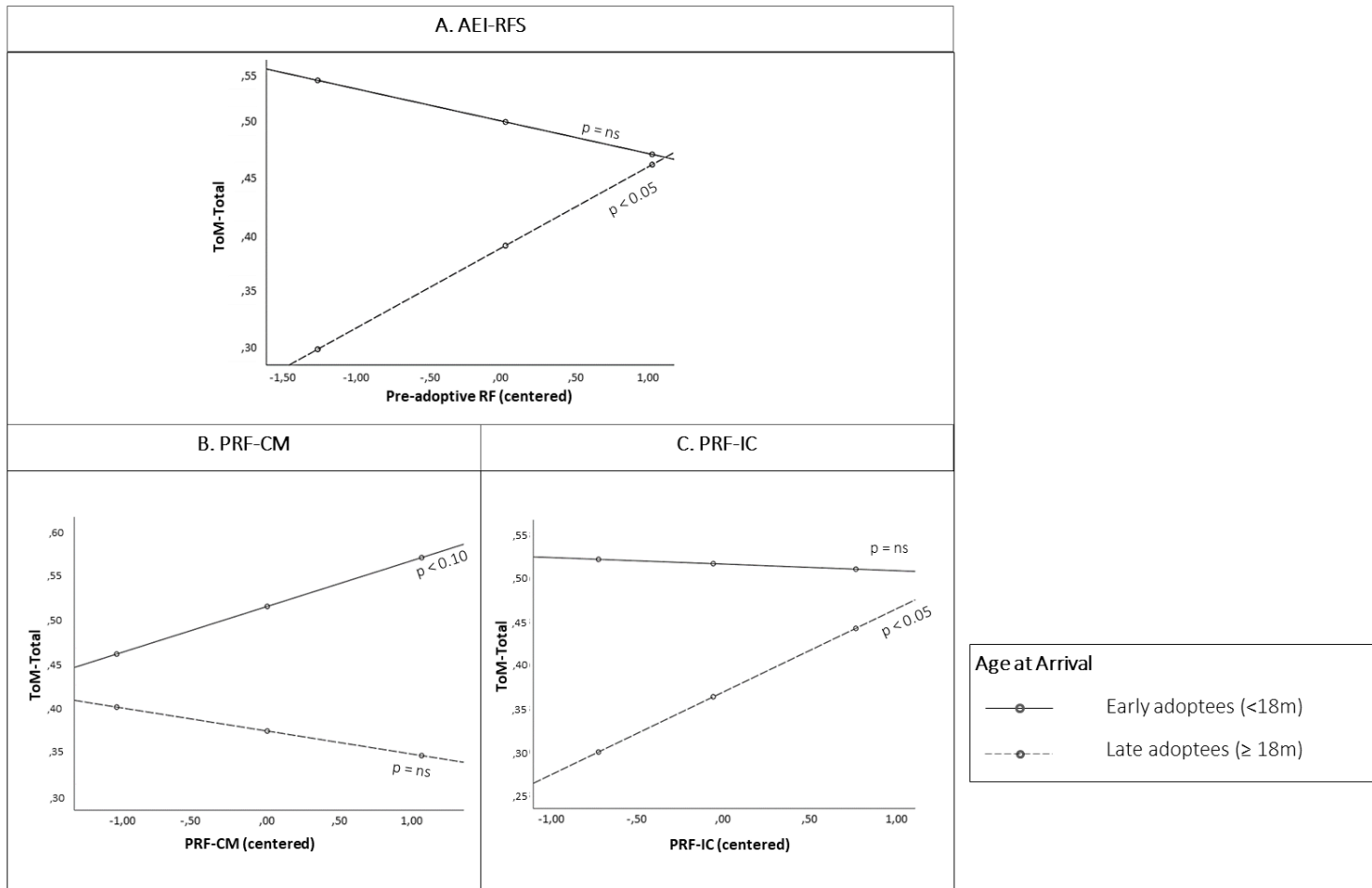


Figure 2

Conditional Effects of Pre-Adoptive RF(AEI-RFS), PRF-CM, and PRF-IC on ToM-total (for Early and Late Adoptees)



Note. ns = *p*-value is nonsignificant, AEI-RFS = Reflective Functioning scored on the Adoption Expectations Interview; PRF = Parental Reflective Functioning; CM = Certainty about Mental States; IC = Interest and Curiosity about Mental States.