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## Development after international adoption

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# Development after international adoption

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# **Development after international adoption**

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# 1 General introduction

## DEVELOPMENT AFTER ADOPTION

Institutional care is associated with deprivation and subsequent developmental problems, such as cognitive deficits (e.g., Nelson, Furtado, Fox, & Zeanah, 2009, for a meta-analysis see Van IJzendoorn, Luijk, & Juffer, 2008) and delayed physical growth (D.E. Johnson & Gunnar, 2010; Miller, Chan, Comfort, & Tirella, 2005). Several meta-analyses have shown that many children continue to show developmental delays and difficulties after their adoption, for example with respect to physical growth, school achievement, and behavior problems (Juffer & Van IJzendoorn, 2005; Van IJzendoorn, Bakermans-Kranenburg, & Juffer, 2007; Van IJzendoorn, Juffer, & Klein-Poelhuis, 2005), although impressive catch-up after adoption has also been reported in these developmental domains (Van IJzendoorn & Juffer, 2006).

Much less is known about possible differences in the delays and catch-up of children adopted from foster care compared to children adopted from institutional care. Staying in foster care before international adoption takes place is a relatively new phenomenon (K.A. Johnson, 2004; Zeanah et al., 2003) and many adoption studies do not differentiate between former foster and post-institutionalized adopted children. However, foster homes may offer children a pre-adoption rearing arrangement of higher quality compared to institutional care (Nelson et al., 2009; Stovall & Dozier, 2000; Van Londen, Juffer, & Van IJzendoorn, 2007), resulting in fewer or smaller developmental problems both before and after the adoption. One of the few studies that compared the development of these two groups of adoptees found a more normative physical growth and better cognitive outcomes for (Guatemalan) children adopted from foster care compared to children adopted from institutional care (Miller et al., 2005). However, both groups of children had comparable motor and language skills and social-emotional competencies. In addition, the delayed physical growth of the former foster children and the finding that longer foster care placements resulted in larger developmental delays, suggests that pre-adoption foster care may not always be optimal either (Miller et al., 2005). In the current thesis, children adopted from foster care and institutional care in China are compared on several salient developmental domains - attachment, cognitive and motor development, physical growth, stress regulation, and social behavior - to examine whether pre-adoption foster care is beneficial (or: less detrimental) for children's development and whether type of pre-adoption care influences children's adaptation to their new life in the adoptive family.

To date, both in the Netherlands and worldwide, China is the main country of origin for adoption (Selman, 2009a). One of the reasons many Chinese children became available for adoption was the implementation of the one-child policy in China and the subsequent abandonment of mostly healthy infant girls (K.A. Johnson, 2004), and more recently of children with special needs (Selman, 2009b). Until now, few studies have focused exclusively on children from China (but see for example Miller & Hendrie, 2000; Tan, Marfo, & Dedrick, 2007), as international adoption from China is a relatively new development (Selman, 2009a). It is however important to study specific groups of adoptees because the quality of pre-adoption care appears to vary greatly between countries and over time (Gunnar, Bruce, & Grotevant, 2000; K.A. Johnson, 2004; Miller, 2005), which hinders the generalizability of developmental outcomes to adoptees from other countries (see also Pomerleau et al., 2005).

#### CHINA'S ONE-CHILD POLICY AND ITS CONSEQUENCES

With more than 1.3 billion inhabitants China is the most populous country worldwide (National Population and Family Planning Commission in China, 2009) and home to almost 20% of the world population. In 1979 China implemented the one-child policy to slow population growth and prevent social and economic problems such as poverty and famine (Ebenstein, 2010). As the name suggests, the one-child policy forbids families to have more than one child, although currently this strict version of the rule only applies to a minority of the population. In many areas more lenient policies have been implemented, such as rules based on birth spacing, which allow families to have a second child five years after the birth of their first child (Hesketh, Li, & Zhu, 2005). But also the one-son-or-two-child policy is widespread, allowing parents to have two children, but only when their first child is a girl (K.A. Johnson, 2004). Chinese parents (used to) have a strong preference for a son, because sons take care of their elderly parents, whereas girls marry out and move to their husband's family. In addition, sons are seen as strong laborers, they carry on the family name, and continue the patrilineal family line (K.A. Johnson, 2004). There is some evidence that this strong preference for boys is shifting nowadays (Hesketh et al., 2005).

Families who violated birth-planning restrictions were sometimes punished, for example by handing out substantial fines or confiscating personal belongings (Hesketh et al., 2005; K.A. Johnson, 2004, Roessingh, 2009). In addition, when "unauthorized" pregnancies were detected, forced terminations and sterilizations have occurred (Greenhalgh, 1994; K.A. Johnson, 2004), although the stringency with which birth-planning restrictions and punishments were adhered to varied per district and over time (Hesketh et al., 2005; K.A. Johnson, 2004).

Even though the one-child policy has successfully restricted population growth, it also has several negative and unintended consequences, such as the anticipated problems with China's care for the elderly in the near future (Ebenstein & Sharygin, 2009), and the current skewed gender distribution (Hesketh et al., 2005; Zhu, Li, & Hesketh, 2009). In the cohorts born between 1980 and 2000, an

estimated surplus of 22 million boys was to be born relative to the number of girls (Ebenhart & Sharygin, 2009), while another study estimated an excess of 32.7 million males in 2005 (Zhu et al., 2009). These numbers raise questions about what happened to China's "missing girls" (Ebenstein, 2010). Among others, the proportionally low number of girls seems to be the result of non-registration of infant girls, but sex-selective abortions and "gendercide" (infanticide of infant girls) are also mentioned as explanations (Ebenhart & Sharygin, 2009; K.A. Johnson, 2004). Since these practices are illegal, official figures are not available (Ebenhart & Sharygin, 2009). For families who cannot afford to raise their daughter and deal with subsequent penalties, another escape route from birth-planning authorities is to abandon their infant girl. Exact figures on child abandonment are hard to obtain, but increases in child abandonment have been found to go hand in hand with stricter enforcements of birth-planning regulations (K.A. Johnson, 2004). Birth parents do not abandon their children lightheartedly and often leave their child at places where they know the child will be discovered almost immediately (K.A. Johnson, 2004; Zhang, 2006). Although many Chinese parents have tried to arrange domestic adoptions for their children, for example by abandoning them on the doorstep of a childless couple (Zhang, 2006), numerous abandoned children have been raised in institutions (K.A. Johnson, 2004).

In 1995 the BBC aired a documentary on Chinese institutions, titled "*The dying rooms: China's darkest secret*", in which the high mortality rates, inadequate staffing and insufficient financial support were denounced worldwide. In China the poor quality of institutional care was mostly unknown to the public, as the implementation of the one-child policy was so politically sensitive that the true magnitude of the problem was hidden (K.A. Johnson, 2004). At the time the documentary was released, China's attempts to improve the quality of institutional care were just getting off the ground (K.A. Johnson, 2004). In 1992 China had officially opened the borders for international adoption to relieve the overcrowded institutions, while accepting the inevitable consequence that the caregiving conditions in the institutions would become more widely known (K.A. Johnson, 2004; Selman, 2009a). Although the negative publicity following the documentary temporarily backfired on the early attempts to improve institutional care, these efforts gradually restarted and increased, leading to an improved quality of institutional care, especially in institutions arranging international adoptions and benefiting from international adoptions fees (K.A. Johnson, 2004).

In 1998, only a couple of years after China opened the borders for international adoption, China became the main country of origin for adoption to the Netherlands, responsible for a quarter of the international adoptees (Ministry of Justice, 2000). The number of children adopted from China continued to rise from that year on with a peak of 800 adoptions in 2004 (Figure 1), which was more than 60% of the total number of adoptees arriving that year (Ministry of Justice, 2009). In the Netherlands, three adoption organizations are licensed to arrange adoptions from China: 'Meiling', 'Stichting Kind en Toekomst' and 'Wereldkinderen', and all three organizations participated in our study. When

our data collection started in the fall of 2005 the number of adoptions from China had just begun to decrease drastically (see Figure 1), maybe partly as a result of the increase of domestic adoption in China (Selman, 2009b).

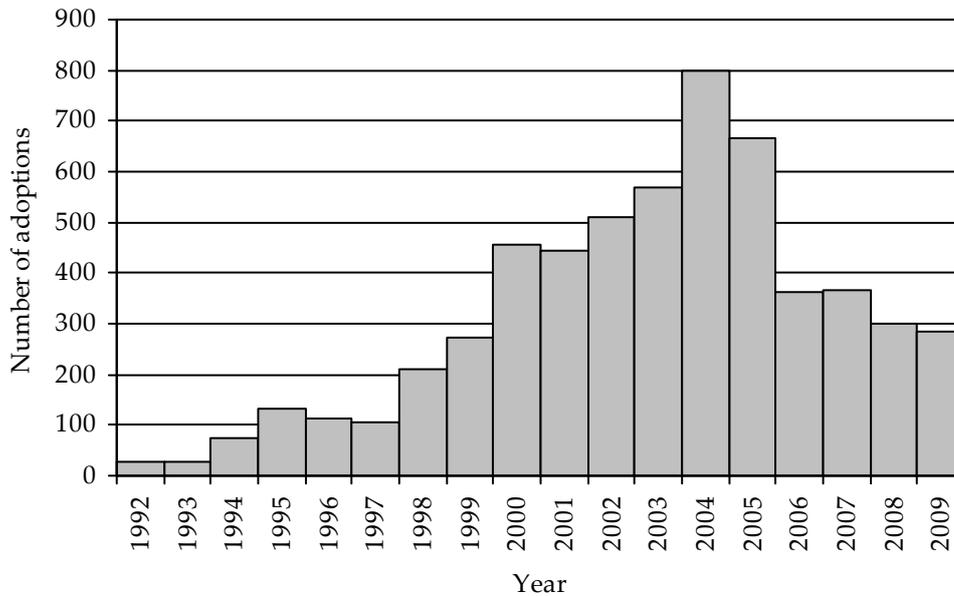


Figure 1. Number of children adopted from China into the Netherlands from 1992 to 2009.

#### EFFECTS OF INSTITUTIONAL CARE

Of all studies examining the effects of institutional care, one study is specially worth mentioning, namely the Bucharest Early Intervention Project (BEIP; Zeanah et al., 2003). The BEIP study is a unique study, developed to examine the effects of institutional care on the development of young children and to investigate whether these effects can be reversed by placements in foster care. All Romanian institutions included in the study had a regimented daily schedule, a high child-to-caregiver ratio and a management led by medical personnel. The uniqueness of the BEIP study lies in the *random* assignment of institutionalized children to either foster care or continued institutional care, which eliminated the possibility that primarily healthier or developmentally more advanced children were selected for foster care placement. In total, 136 institutionalized children who had lived in institutions for at least half of their life were included (age: 5 - 31 months), of whom 69 were placed in foster families (Zeanah et al., 2003). The BEIP study is highly relevant to our study as it also examined the potential beneficial effects of foster care placements compared to institutional care. However, unlike the children in our study, all foster children in the BEIP study experienced institutional care *before* their placement in foster families.

The main conclusion of the BEIP study is that institutional care is detrimental for child development, while foster care placements effectively reduce the negative effects of early institutional care and result in significant developmental gains (Nelson et al., 2009). Compared to the institutionalized children, the foster children showed more secure and fewer atypical attachments (Smyke, Zeanah, Fox, Nelson, & Guntrie, 2010) and displayed fewer reactive attachment disorders (Nelson et al., 2009); they showed better cognitive outcomes (Nelson et al., 2007), fewer emotional disorders (Nelson et al., 2009), and displayed more positive emotions (Ghera et al., 2009). For several domains, such as attachment, cognition and language development, timing of the foster care placement appeared to be essential, with earlier placements leading to larger developmental gains (Nelson et al., 2007, 2009; Smyke et al., 2010), although the age cutoffs varied. For attachment security and cognitive development, children placed before 24 months of age showed more substantial improvement than children placed after their second birthday (Nelson et al., 2007; Smyke et al., 2010), while for language acquisition the deflection point was at 15 months (Nelson et al., 2009). For attachment (dis-)organization no specific age cutoff was found within the studied cutoff range of 18 to 28 months: All cutoffs resulted in more organized attachments for earlier placed children compared to later placed children (Smyke et al., 2010). The higher effectiveness of earlier placements points to the presence of a sensitive period during infant development. When children are deprived of relevant stimulation during a period when they are most receptive to these experiences, their subsequent development can be compromised and their catch-up less complete (Nelson et al., 2009; Rutter et al., 2004).

Although the BEIP study, as well as other studies (e.g., Dobrova-Krol, Van IJzendoorn, Bakermans-Kranenburg, & Juffer, 2010) and meta-analyses (e.g., Van IJzendoorn et al., 2008) all point to adverse child development during and after institutional placements, the debate about the possible consequences of institutional care has not ended yet. Recently, Whetten and colleagues (2009) received extensive media coverage for their study on institutionalized children, claiming that "Institutions are not so bad" (Grady, 2009). Whetten and colleagues reported greater intellectual functioning, better memory, fewer behavioral and emotional problems, and comparable physical growth in 1,357 institutionalized children in 5 'less wealthy nations' (e.g., Ethiopia) compared to 1,480 community children in the same countries, and concluded that institutional care is not associated with poorer wellbeing than community care.

However, in a critical review of the Whetten et al. study Bakermans-Kranenburg and Van IJzendoorn (2009) drew attention to several aspects of the study, such as the quasi-experimental design and the poor living conditions in the included countries, which may have decreased the differences between the institutionalized and the community children in the study. In addition, Bakermans-Kranenburg and Van IJzendoorn (2009) note that the Whetten et al. study is incomparable with other studies on institutional care in two ways: 1) Whetten et al. included institutions with stable caregivers, while it is highly questionable whether stable and continuous caregiving is a common feature of institutional care (see e.g.,

Dobrova-Krol, Van IJzendoorn, Bakermans-Kranenburg, Cyr, & Juffer, 2008; Groark, Muhamedrahimov, Palmov, Nikiforova, & McCall, 2005); 2) The children in the Whetten et al. sample were relatively old - 6 to 12-year old - and one third of them had lived in institutional care for less than four years, whereas institutional care has been found to be especially detrimental in the first year(s) of children's life (see also Kaufman, Dozier, & Schaffer, 2009).

### AIMS OF THE STUDY

The general aim of this study is to examine the development of children after international adoption, both empirically and meta-analytically. In our meta-analysis we studied children's attachment relationships with the adoptive parents. A central assumption in attachment theory is that children develop an attachment relationship during the first year of life, based on their daily interactions with caregivers (Bowlby, 1982). Whether children develop secure or insecure attachment relationships depends on the quality of care they receive: secure children appear to have sensitive, nurturing caregivers whereas insecure children usually have less sensitive caregivers (Ainsworth, Blehar, Waters, & Wall, 1978; De Wolff & Van IJzendoorn, 1997). Institutions can be classified into three levels based on their quality of care: (1) institutions characterized by global deprivation of health, nutrition, stimulation, and relationship needs; (2) institutions with adequate health and nutrition, but deprivation of stimulation and relationship needs; and (3) institutions that meet all needs except for stable relationships with consistent caregivers (Gunnar, Bruce, & Grotevant, 2000). This absence of stable and responsive caregivers is hypothesized to lead to a compromised attachment development, which has been confirmed in several studies in which high rates of insecure attachment were found in institutionalized children (Smyke et al., 2010; Vorria et al., 2003; Zeanah, Smyke, Koga, Carlson, & the BEIP group, 2005).

A transition to a more stable and responsive adoptive family environment may contribute to an increase in attachment security, but empirical research on attachment in adopted children is equivocal, with some studies reporting similar attachment security for adopted and non-adopted children (e.g., Joseph, 2002), whereas other studies report less attachment security in adopted children (e.g., O'Connor, Marvin, Rutter, Olrick, & Britner, 2003). To combine the outcomes of all available studies that focused on the attachment relationships of adopted children a meta-analysis was conducted. In this meta-analysis we contrasted the findings of different sets of studies (e.g., children adopted before 12 months of age versus children adopted after their first birthday) to determine relevant factors involved in the formation of the attachment relationships.

The empirical part of this thesis systematically examined and compared the development of former foster and post-institutionalized children in a short-term longitudinal design, in order to assess the hypothesized beneficial effects of pre-adoption foster care compared to pre-adoption institutional care. In addition, we compared both groups of children with respect to their adaptation to the new life in their adoptive family. To our knowledge, this is the first time that possible

differences between pre-adoption foster care and pre-adoption institutional care have been studied in a longitudinal design. In this study, 92 families who adopted an infant girl from China, aged between 11 and 16 months on arrival in the Netherlands, were visited at home and visited the university, two and six months after adoptive placement. In addition, the adoptive parent completed questionnaires about their family and the pre-adoption experiences of their adopted child (for example, months in institutional and/or foster care before the adoption) and their child's behavior (for example, indiscriminate friendliness). To study the development of the children over time, the assessments at the two and six-month visits were identical. Based on their pre-adoption care experiences, 50 children were classified as post-institutionalized children and 42 children were classified as former foster children.

#### OUTLINE OF THE THESIS

Chapter 2 of this thesis provides an overview of studies focusing on the attachment relationships of children with their adoptive parents and meta-analytically combines the outcomes of these studies. Chapter 3 addresses the question whether the physical growth, stress regulation, and cognitive and motor development differs between children adopted from foster care and children adopted from institutional care in China (and how these outcomes correspond to those of non-adopted children), and examines the adopted children's development over time. Chapter 4 reports on the social-emotional development of the adopted children and focuses on the question whether the former foster and post-institutionalized children differ from each other and from non-adopted children in attachment security and attachment disorganization, in their behavior towards their new parents (child responsiveness), and in their behavior towards strangers (indiscriminate friendliness). In Chapter 4 the role of the parental sensitivity is taken into account when studying the development of the children over time. In Chapter 5 the results of the studies are discussed and integrated, and implications for future research are presented.

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## 2. Fostering security? A meta-analysis of attachment in adopted children.

*L. van den Dries, F. Juffer, M. H. van IJzendoorn,  
& M. J. Bakermans-Kranenburg  
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### ABSTRACT

Adopted children are hypothesized to be at risk of insecure attachment relationships because of their background of institutional care, maltreatment and neglect. We conducted two series of meta-analyses, one using only observational assessments of attachment and one using both observational and self-report assessments. Observational assessments showed that children who were adopted before 12 months of age were as securely attached as their non-adopted peers, whereas children adopted after their first birthday showed less attachment security than non-adopted children ( $d = 0.80$ ,  $CI = 0.49 \sim 1.12$ ). Regarding the overall effect for attachment security, adoptees were comparable to foster children. Adopted children showed more disorganized attachments compared to their non-adopted peers (trimmed  $d = 0.36$ ,  $CI = 0.04 \sim 0.68$ ), but again were comparable to foster children (trimmed  $d = 0.35$ ,  $CI = 0.02 \sim 0.67$ ). Compared to institutionalized children, adoptees were less often disorganized attached. When self-report measures of attachment were included no difference was found between adoptees and their non-adopted counterparts (trimmed  $d = 0.12$ ,  $CI = -0.02 \sim 0.26$ , 39 studies,  $N = 2,912$  adopted children). Compared to institutionalized children, (early) adoption proves to be an effective intervention in the domain of attachment.

### INTRODUCTION

Are adopted children less often securely attached to their adoptive parents than children reared by their biological parents? In a series of meta-analyses we examined adopted children's attachment relationships with their adoptive parents. Previous meta-analyses on the development of adoptees documented catch-up after adoption in various domains, for example in cognitive development (Van IJzendoorn, Juffer, & Klein Poelhuis, 2005) and physical growth (Van IJzendoorn, Bakermans-Kranenburg, & Juffer, 2007), but less so for learning problems (Van IJzendoorn et al., 2005) and clinical referrals (Juffer & Van IJzendoorn, 2005). The question to be addressed here is whether adopted children also show catch-up or delays in the domain of attachment relationships after the transition to their new families. As adopted children's characteristics and experiences show some

similarities to those of foster children, we compared the outcomes for adopted children not only with children from biological families but also with outcomes for foster children.

Bowlby (1982, p. 371) stated about the nature of attachment relationships: "To say of a child that he (...) has an attachment to someone means that he is strongly disposed to seek proximity to and contact with a specific figure and to do so in certain situations, notably when he is frightened, tired or ill." Although the tendency to form attachment relationships is innate and universal, individual differences can be observed in the quality of attachment. Based on the attachment strategies children use when they face stressful situations, their attachment relationships can be classified as secure, insecure (avoidant or ambivalent) or insecure-disorganized. Secure children seek contact with their attachment figure when they are upset and are easily comforted. Insecure children, on the other hand, show signs of avoidance or resistance (Ainsworth, Blehar, Waters, & Wall, 1978). Disorganized attachment is considered the most insecure type of attachment, with disorganized children showing a breakdown of a consistent attachment strategy when dealing with a stressful situation (Main & Hesse, 1990).

Developing a secure attachment relationship or close bond with a parent or primary caregiver has long-term benefits for children, because of the impact on children's later adaptation, for instance through the development of emotion regulation (Cassidy & Shaver, 1999). Secure infants develop basic trust in their parents and they feel confident about their own ability to influence the world around them. This basic trust allows children to function autonomously and with confidence in their (social) problem solving abilities (Sroufe, Egeland, Carlson, & Collins, 2005; Weinfield, Sroufe, Egeland, & Carlson, 1999). Insecurely attached children are at risk for a more problematic development. For example, insecure attachment, in particular insecure disorganized attachment, has been associated with the development of externalizing behavior problems (e.g., Lyons-Ruth, Easterbrooks, & Cibelli, 1997) and subsequent child psychopathology (for a meta-analysis see Van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999).

#### *Adoption and the comparison with foster children*

Every year, large numbers of children are placed in adoptive homes. In 2004 almost 45,000 children were adopted internationally worldwide (Selman, 2006). The number of domestic adoptions is difficult to estimate, as not all of these adoptions are officially registered (Placek, 2007). In the USA, 1.6 million children live with adoptive parents (Jones, 2008) and between 2 to 4 percent of the families include an adopted child. Annually about 20,000 children are adopted internationally in the USA (Brooks, Simmel, Wind, & Barth, 2005; Nickman et al., 2005) and 50,000 children are domestically adopted from the public system, whereas the practice of relinquishing an infant for domestic adoption is estimated at about 1% of babies born to never-married women (Jones, 2008). In Western-European countries, with the exception of the United Kingdom and Germany, there are relatively few domestic adoptions compared to the number of international adoptions (Selman,

2006), while adoptions from foster care are rare, again with the United Kingdom as an exception (Warman & Roberts, 2003).

In the USA there were 510,000 children in foster care in 2006 (Adoption and Foster Care Analysis and Reporting System, 2008). Because foster children experience comparable disruptions of early parent-child relationships as adopted children, we also compared the outcomes of adopted children with the outcomes of foster children. The background of adopted children shows some similarities with the background of children placed in foster homes. Both groups have experienced separation from their birth parents, and are placed in new families where they are cared for by foster or adoptive parents who usually show little (physical) resemblance to them. In addition, many adopted and foster children have experienced unfavorable conditions before placement. The majority of internationally adopted children have experienced neglect and maltreatment in institutional care before adoption (Miller, 2005; Tirella et al., 2008). In the same vein, many foster children have been the victim of neglect and/or repeated abuse before they enter the foster care system, as was confirmed in several large scale studies (Chernoff, Combs-Orme, Risley-Curtiss, & Heisler, 1994; Department for Children, Schools and Families, 2008; Lewit, 1993; Takayama, Wolfe, & Coulter, 1998), although not all children have experienced the same level of adversity before foster placement (e.g., Quinton, Rushton, Dance, & Mayes, 1998). Domestic adoptees may even resemble foster children more, as some domestic adoptees are former foster children (Testa, 2004). Nevertheless, there are also several marked differences between adopted and foster children. One of these differences is the permanency of the placement. Whereas the placements of adopted children are permanent, placements of foster children are often temporary. Adopted and foster children may also be placed out of their homes for different reasons. International adoptees are usually placed for cultural reasons, extreme poverty or family policy (e.g., the one-child policy in China; Johnson, 2004), while foster children for example are placed because of caretaker incapacity or absence, child protective reasons, or parental incarceration (Chernoff et al., 1994; Hayward & DePanfilis, 2007; Lewit, 1993). In addition, whereas adoption is a clear-cut situation in which children have been removed from their birth parents and, except in open adoption arrangement, have no contact with the birth parents, there is a high diversity of foster care arrangements, many implying contact and visits with the biological parent (Leathers, 2003; Sanchirico & Jablonka, 2000).

#### *Attachment in adopted children*

In some studies adopted children have been reported to show reactive attachment disorders (Zeanah, 2000; Zeanah et al., 2004) and indiscriminate friendly behavior (Chisholm, Carter, Ames, & Morison, 1995; Tizard & Rees, 1975). More insecure and disorganized attachments (Marcovitch et al., 1997) and non-optimal parent-child relationships (Fletcher, 1995) have been found in adoptees as well. There are several reasons to expect less attachment security in adopted children, as these children have all experienced separation from, and loss of their birth parents and other caregivers. According to attachment theory, these experiences of loss and

separation may negatively influence the development of subsequent attachment relationships (Bowlby, 1982). In addition, many internationally adopted children have been in institutional care and have experienced deprivation, neglect and maltreatment. Children living in institutions often lack opportunities to develop selective attachment relationships, due to the limited amount and poor quality of contact with their caregivers (Gunnar, Bruce, & Grotevant, 2000; Howe, 2005; Palacios & Sánchez-Sandoval, 2005; Vorria et al., 2003). The debate about the effects of early deprivation on child development dates back more than half a century ago, when the World Health Organization initiated a study conducted by child psychiatrist John Bowlby. In a now famous report, Bowlby (1952) concluded that children suffered from the effects of institutional care, even when their physical needs (food, clothes, etc.) were met adequately. The children were deprived of parental care and missed out opportunities to develop stable and continuous attachment relationships. According to Bowlby, early deprivation leads to compromised child development and sets the stage for various mental health problems in children. As viable alternatives for institutional care Bowlby (1952, p.109) recommended adoption and foster care, because they provide children with 'substitute' parents.

As adoption implies separations, loss, and the development of attachment relationships to new parents, attachment theory (Bowlby, 1982) provides an appropriate theoretical framework for our study. In addition, adoption also implies risks (e.g., deprivation before placement) as well as protection (e.g., receiving nurturing care and stimulation from alternative parent figures) and therefore the perspective of risk and protective factors is also important. According to this theoretical perspective, an accumulation of risk factors leads to less optimal child development, whereas protective factors may buffer the negative effects of the risks, resulting in resilience in children (Rutter, 1990; Werner, 2000).

Recent neurobiological studies of institutional care suggest that these high stress environments influence brain development and attachment behaviors and may cause persistent cognitive and socio-emotional delays (Miller, 2005; Rutter, 2005, 2006; Rutter et al., 2004). Studies showing altered patterns of cortisol (Gunnar, Morison, Chisholm, & Schuder, 2001), neurocognitive impairment (Chugani et al., 2001), and changes in the production of neuropeptides (Fries, Ziegler, Kurian, Jacoris, & Pollak, 2005) after institutional care point to a critical role for early experience in the development of the brain systems underlying basic aspects of human social behavior and stress regulation. According to Gunnar and Kertes (2005) adverse experiences may affect the structure and function of the brain in three general ways. First, severe malnutrition and maltreatment can injure neural tissue; second, a lack of stimulation can affect the basic wiring plan of the brain and brain chemistry; and third, morphological and neurochemical adaptations to a non-optimal (institutional) environment may produce maladaptive responses to the post-institutional environment that limit (later) healthy behavioral and emotional development (Gunnar & Kertes, 2005, p. 49).

Two studies confirmed the disadvantageous effects of institutional care on attachment, with institutionalized children showing high rates of insecure

attachment and especially high rates of disorganized attachment (Vorria et al., 2003; Zeanah, Smyke, Koga, Carlson, & the BEIP Core Group, 2005). Although domestically adopted children do not always experience institutional care, the neglect and maltreatment they have often faced in their birth families may also have a detrimental effect (Kaniuk, Steele, & Hodges, 2004). In particular maltreatment is a documented precursor of disorganized attachment (Carlson, Cicchetti, Barnett, & Braunwald, 1989; Crittenden & Ainsworth, 1989; George, 1996; Van IJzendoorn et al., 1999), while experiences of parental neglect are reported to be a precursor of insecure (ambivalent) attachments (Egeland & Sroufe, 1981; Finzi, Ram, Har-Even, Shnit, & Weizman, 2001; Youngblade & Belsky, 1990).

Almost all children develop an affective bond with their caregiver, even maltreated children (Cicchetti & Barnett, 1991) or children struggling with autism (Rutgers, Van IJzendoorn, Bakermans-Kranenburg, & Swinkels, 2007). Based on the caregiver's reactions to their signals, children develop expectations (so-called internal working models) of how they will be treated by their attachment figures (Bowlby, 1982; Bretherton & Munholland, 1999). Children whose attachment signals are met by sensitive caregivers develop an internal working model of a safe and responsive world. In contrast, children who are responded to in an insensitive way may picture the world as an unpredictable place and they may not feel worthy of love. Children's internal working models are suggested to influence the development of new relationships, by shaping children's expectations and behavior (Bowlby, 1982; Sroufe et al., 2005). But Bowlby also hypothesized that 'working' models can change as a consequence of changing experiences, in particular in the first five years of life, and that corrective attachment experiences may compensate for early adversity (Bowlby, 1988). When transitions to responsive care are experienced, internal working models and attachment relationships may change correspondingly (Bowlby, 1973, 1988; Sroufe et al., 2005). Whether this process of accommodation also takes place after the placement of children with (sensitive) adoptive parents is a central question in the current set of meta-analyses. Research on attachment in adopted children shows equivocal outcomes. In some studies attachment of adopted children does not differ from the security of non-adopted children (e.g., Joseph, 2002) whereas other studies find fewer secure attachments in adopted children (e.g., O'Connor, Marvin, Rutter, Olrick, & Britner, 2003). With the current meta-analysis we attempted to answer the question whether adopted children show less attachment security than non-adopted children. We also tested whether adopted children show more disorganized attachment than non-adopted children.

#### *Potential factors influencing attachment relationships in adoptive families*

In this meta-analysis the influence of various moderators has been investigated, namely, age at placement, duration of placement, continent of origin, domestic or international placement, and transracial or same-race placement. From the perspective of risk and protective factors some moderators may imply risks (e.g., an older age at placement) or protection (e.g., a longer stay in the adoptive

home). In particular, age at placement may be crucial for the development of a new relationship with the adoptive parent. When children receive warm and sensitive care, they generally develop basic trust in their caregivers during their first year of life (Bowlby, 1982). Several studies indeed found that children who were adopted in the first months of their lives, usually develop normative attachment relationships (e.g., Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2008), whereas children who were placed at later ages seem to be at greater risk for developing unfavorable attachment relationships (Marcovitch et al., 1997; Vorria et al., 2006).

The length of time the children have spent in their new family may also be a significant moderator. Children who have lived with their new parents for a longer period of time, and thus have spent more time in the care of a stable and usually nurturing parent, may have had more time to recover from prior adverse experiences. In a similar vein, Juffer and Van IJzendoorn (2005) meta-analytically found that children who had spent more than 12 years in their adoptive family showed a larger catch-up in terms of behavior problems than children who had lived in their adoptive homes for a shorter period of time.

In addition, continent of origin may be a relevant risk factor to take into account when explaining differences in adaptation. Children who originate from Eastern European countries, for example Romania, often have experienced severe deprivation (Castle et al., 1999; Miller, 2005; Morison, Ames, & Chisholm, 1995; Smyke et al., 2007), and may therefore show more problems with attachment than children adopted from other continents. Similar results were found in previous meta-analytic work: children who experienced more severe deprivation showed more behavior problems and lower cognitive competence than children from less deprived backgrounds (Juffer & Van IJzendoorn, 2005; Van IJzendoorn et al., 2005).

Finally, type of placement may be an important risk factor. In some domains, for example problem behavior and mental health referrals, differences have been reported between international and domestic adoptees (Juffer & Van IJzendoorn, 2005), with international adoptees showing fewer behavior problems and mental health referrals. However, for other developmental domains, such as self-esteem, no differences have been found between international and domestic adoptees, or between same-race or transracial adoptees (Juffer & Van IJzendoorn, 2007; Van IJzendoorn et al., 2005). With regard to attachment we did not expect to find differences between the above mentioned groups, because early experiences of separation and loss, and/or neglect and maltreatment are assumed to be present in the majority of the adopted children.

Based on the literature presented above, we hypothesized that adopted children would show fewer secure and more disorganized attachments compared to children living with their biological parents. We expected that these differences would be larger in children who are adopted after their first birthday than in children adopted in their first year of life. We also hypothesized that children who have lived with their new parents for a longer period of time will show a more favorable relationship with the parent. Finally, we expected children who are

born in Eastern European countries to show less secure and more disorganized attachment than children adopted from other continents.

## METHOD

### *Literature search*

To identify relevant studies three different search methods were used. First, we searched for relevant literature in the following electronic sources: PsycInfo (Psychological Literature), ERIC (Education Resource Information Center), Web of Science and PUBMED (U.S. National Library of Medicine). Throughout this search we used the keywords adopt\* or foster\* (an asterisk indicates that the search contained but was not limited to that word or word fragment) in combination with the terms attachment, parent-child relationship, bonding, and related terms such as security, mother-child relationship, Strange Situation and AQS. Second, we searched the reference lists of all collected studies to identify more relevant studies. Third, experts were asked to provide pertinent studies.

Studies were included if they reported on the attachment relationship, parent-child relationship or bond between the adopted or foster children and their adoptive/foster parents (hereafter: adopted children and adoptive parents). Both studies using observational assessments and self-report or parent-report measures were included. In order to examine the attachment relationships of the adoptees across their lifespan, no restriction was placed on the age at assessment. In the case of a study with more than one assessment (e.g., Juffer & Rosenboom, 1997), only the data from the first valid assessment was included to guarantee that every adoptee was included only once in a meta-analysis. Studies measuring attachment relationships were excluded if: (1) the adopted sample was a clinical sample (e.g., Rosenthal et al., 1975); (2) the relationship between the adoptee and someone else than the caregiver was measured (e.g., Jensen, 2004); (3) the information in the study was not sufficient to compute an effect size (e.g., Judge, 2004); (4) attachment style was measured (e.g., Borders, Penny, & Portnoy, 2000) or (5) no comparison group was available (e.g., Brown, 2000; Hodges, Steele, Hillman, Henderson, & Kaniuk, 2005). The presence of a comparison group in the study was not required when studies reported on the distribution of attachment classification based on the (adapted) Strange Situation Procedure (see below), the Attachment Q-sort (Veríssimo & Salvaterra, 2006), or applied instruments for which a comparison group of another study could be used (e.g., Millham, 2003). We excluded studies measuring attachment style (e.g., Borders et al., 2000), since our study focuses on the attachment relationships of the adoptees with their adoptive parents, instead of on their romantic or intimate attachment relationships in general.

Attachment relationships can be measured using various instruments. The Strange Situation Procedure (SSP; Ainsworth et al., 1978) is an observational laboratory procedure used to assess infant attachment behavior. The SSP consists of eight 3-minute episodes during which two separations from, and reunions with, the parent occur. The attachment of the children in the SSP is classified

based on the (in-)secure patterns of attachment behavior and the presence of disorganized attachment behavior. Some studies use an adapted SSP, with coding systems such as the Cassidy-Marvin system, the Main-Cassidy system, and Crittenden's Preschool Assessment of Attachment (PAA). As the traditional Ainsworth classifications can only be used in children up to 18 months of age, Cassidy and Marvin (1992) developed a classification system for preschool-age children. Crittenden (1992) did the same with her classification system and Main and Cassidy (1988) developed a classifications system for kindergarten-age children. These approaches use a procedure comparable to the Strange Situation Procedure, namely one or two separations and reunions (Solomon & George, 1999). The Attachment Q-Sort (AQS; Waters & Deane, 1985) is another observational measure used to assess attachment security. The AQS consists of 90 items, each describing specific behavioral characteristics of the child with an emphasis on secure-base behavior. After several hours of observation an observer sorts all cards into nine piles of 10 cards each, depending on how well the description fits the child. By comparing the child's profile with the behavioral profile of a prototypically secure child, a score for attachment security can be derived. The SSP and AQS are widely used and meta-analytically validated observational instruments for assessing attachment in infants and toddlers/preschoolers (Solomon & George, 1999; Van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). The Cassidy-Marvin system, the Main-Cassidy system and Crittenden's PAA all have been found to be valid assessment instruments (Moss, Bureau, Cyr, Mongeau, & St-Laurent, 2004; Main & Cassidy, 1988; Teti & Gelfand, 1997), although some questions about the concordance among the systems have been raised as well (Crittenden, Claussen, & Kozłowska, 2007; Solomon & George, 1999). As part of our meta-analyses, we will therefore test whether including these measures will affect the results.

As the observational attachment measures have the best credentials in terms of validation, we were particularly interested in the outcomes of studies using the (adapted) SSP or the AQS: in our analyses they constitute the 'core set' of studies. To compare the effect sizes in this core set of studies on adopted children with studies on foster children, a separate set of meta-analyses for foster children was conducted, including again only studies that used the (adapted) SSP or the AQS. However, as attachment relationships of adopted children have also been assessed using questionnaires or projective measures we repeated the meta-analysis on adopted children using all types of measures in order to see if results converged (see Table 1 for all included studies and measures). One example of such a questionnaire is the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987). The IPPA consists of 28 items concerning the behavioral and affective/cognitive dimension of an adolescent's attachment relationships with their parents (Armsden & Greenberg, 1987). The IPPA was used in several studies with adopted children, e.g., the studies of Fischman (1996) and McGinn (2001).

For studies using the (adapted) SSP the distribution of (in-)security in the adopted group was compared to the normative distribution of ABC-classifications

reported in the meta-analysis of Van IJzendoorn, Goldberg, Kroonenberg and Frenkl (1992;  $k = 21$ ,  $N = 1,584$ ). Studies reporting on ABCD-classifications were compared with the normative distribution reported in the meta-analysis of Van IJzendoorn et al. (1999) for the distributions of (in-)security and (dis-)organization ( $k = 15$ ,  $N = 2,104$ ). The mean security score of the AQS ( $M = .32$ ,  $k = 28$ ,  $N = 2,516$ ) from the meta-analysis of Van IJzendoorn et al. (2004) was used as a comparison for the studies using the AQS. The normative attachment scores presented in these meta-analyses were based on large samples and can therefore be seen as more reliable than the attachment scores of the often small-scale control groups presented in the studies themselves.

In our series of meta-analyses we drew on 39 adoption and 11 foster studies (reported in 39 publications), with 21 studies using the (adapted) SSP, seven studies using the AQS, six studies using the Parental Bonding Instrument (PBI; Parker, Tupling, & Brown, 1979), four studies using the IPPA (Armsden & Greenberg, 1987), six studies using a shortened version of the AQS (Chisholm et al., 1995) and six studies using other measures, such as the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985).

Of the 11 foster studies (see Table 2), five studies examined prenatally drugs-exposed foster children. To examine whether this affected the outcomes of the studies, we used prenatal drug exposure as a moderator in preliminary analyses. Because no difference was found between the two sets of studies,  $Q(1) = 0.002$ ,  $p > .05$ , the studies with the prenatally exposed children were included in the meta-analyses on foster children.

#### *Data extraction*

We conducted several moderator analyses. Given that moderator analysis is only relevant when the different subsets comprise of more than three studies each (Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2003), subsets that consisted of fewer than four studies were not included in the contrast analyses. We coded the following study characteristics: publication outlet, year of publication (<1995, 1995-1999, >2000 or in press) and continent of study (for example, North America or Europe). With regard to publication outlet, we tested the contrast between studies published in refereed journals and non-refereed publications (book, chapter article and presentation). As 13 of our studies were dissertations, we created a separate group for this type of publication.

We coded the sample sizes of the adoption and control groups, age at placement (before or after 12 months of age), age at assessment (0-4 years, 4-12 years, >12 years), time spent in the new family (0-1 years, 1-2 years, 2-12 years, >12 years), continent of origin (Asia, North America, Europe, other continents or several continents), and type of placement (international or domestic, and same-race or transracial). We also examined the influence of age at assessment. As we expected that age at placement would be an important variable for potential catch-up or delay, no specific expectations for age at assessment were formulated. For example, children who were assessed at age 4.5 could have been placed at different ages, e.g., 6 months versus 24 months of age. We expected

Table 1. Attachment relationships of adoptees vs. non-adopted comparisons

Source	Na-Nc	Age at arrival, m	Age at study, y	Country of study	Measure (informant)	Core set (in)secure	Core set disorganized
Bartel, 2006 <sup>a</sup>	123-9	≥ 12	0-4	USA	Shortened version AQS (P)	No	No
Caspers et al., 2007	106-9	≥ 12	0-4	USA	Shortened version AQS (P)	No	No
Chisholm, 1998 <sup>b,c</sup>	126-584	< 12	> 18	USA	AAI (O)	No	No
Farina et al., 2004 <sup>a</sup>	26-2,104	< 12	4-12	Canada	SSP, Crittenden (O)	Yes	Yes
Feeney et al., 2007	43-2,104	≥ 12	4-12	Canada	SSP, Crittenden (O)	Yes	Yes
Fischman, 1996	29-8	≥ 12	0-4	USA	Shortened version AQS (P)	No	No
Fletcher, 1997	144-131	< 12	> 18	Australia	PBI – Care (S)	No	No
Irhammer et al., 2004 <sup>b</sup>	173-69	n.r.	> 18	USA	IPPA (S)	No	No
Joseph, 2002	100-100	n.r.	> 18	USA	PBI – Care (S)	No	No
Juffer et al., 2005 <sup>b,c</sup>	40-584	≥ 12	> 18	Sweden	AAI (O)	No	No
Juffer et al., 1997 <sup>b</sup>	30-30	≥ 12	> 18	USA	IPPA – Trust (S)	No	No
Lis, 2000 <sup>b</sup>	78-2,104	< 12	0-4	Netherlands	SSP (O)	Yes	Yes
Marcovitch et al., 1997 <sup>b,c</sup>	30-2,104	< 12	0-4	Netherlands	SSP (O)	Yes	No
McGinn, 2001	8-1,584	≥ 12	0-4	Poland	Separation-Reunion (O)	No	No
Millham, 2003 <sup>a</sup>	8-1,584	≥ 12	0-4	Poland	Separation-Reunion (O)	No	No
Müller et al., 2002 <sup>b</sup>	44-2,104	≥ 12	0-4	Canada	SSP, Cassidy-Marvin (O)	Yes	Yes
O'Connor et al., 2003 <sup>b,c</sup>	30-30	< 12	12-18	USA	IPPA – Attachment (S)	No	No
	16-8	< 12	0-4	USA	Shortened version AQS (P)	No	No
	15-8	< 12	4-12	USA	Shortened version AQS (P)	No	No
	330-70	< 12	n.r.	USA	IPPA – Attachment (S)	No	No
	43-2,104	< 12	4-12	UK	SSP, Cassidy-Marvin (O)	Yes	Yes
	49-2,104	< 12	4-12	UK	SSP, Cassidy-Marvin (O)	Yes	Yes
	39-2,104	≥ 12	4-12	UK	SSP, Cassidy-Marvin (O)	Yes	Yes

Table1 (continued)

Source	Na-Nc	Age at arrival, m	Age at study, y	Country of study	Measure (informant)	Core set (in)secure	Core set disorganized
Ongari, 2006 <sup>b,c</sup>	6-2,104	< 12	0-4	Italy	SSP, Cassidy-Marvin (O)	Yes	Yes
Pace et al., 2006 <sup>b</sup>	11-2,104	≥ 12	4-12	Italy	SSP, Main-Cassidy (O)	Yes	No
Paperny, 2004 <sup>b</sup>	34-487	< 12	n.r.	Canada	Adult Attachment Projective (S)	No	No
Passmore et al., 2005	50-50	< 12	n.r.	Australia	PBI - Care (S)	No	No
	50-50	< 12	n.r.	Australia	PBI - Care (S)	No	No
Rosnati et al., 1997	88-129	n.r.	12-18	Italy	Communication Scales (S)	No	No
Sabbagh, 1995 <sup>b,c</sup>	21-2,104	< 12	0-4	Canada	SSP (O)	Yes	Yes
Singer et al., 1985 <sup>b</sup> inter	19-1,584	< 12	0-4	USA	SSP (O)	Yes	No
intra	27-1,584	< 12	0-4	USA	SSP (O)	Yes	No
Slobodnik, 1997	86-86	< 12	> 18	USA	PBI - Care (S)	No	No
Snider, 1997	66-79	< 12	> 18	USA	PBI - Care (S)	No	No
Tessier et al., 2005	538- n.r.	≥ 12	0-4	Canada	Shortened version AQS (P)	No	No
Tessier et al., 2006 <sup>b,c</sup>	64-2,104	< 12	0-4	Canada	SSP (O)	Yes	Yes
Van Londen et al., 2007 <sup>b,c</sup>	55-2,104	< 12	0-4	Netherlands	SSP (O)	Yes	Yes
Verissimo et al., 2006 <sup>b</sup>	106-2,516	< 12	0-4	Portugal	AQS (O)	Yes	No
Vorria et al., 2006 <sup>b</sup>	61-2,516	≥ 12	4-12	Greece	AQS (O)	Yes	No

Note. Na: number of adoptees; Nc: number of non-adopted controls; n.r.: data were not reported; Age at arrival, m: Age at arrival in months; Age at study, y: Age at study in years; (O): Observer Report; (P): Parent Report; (S): Self Report; AQS: Attachment Q-sort; AAI: Adult Attachment Interview; SSP: Strange Situation Procedure; PBI: Parental Bonding Instrument; IPPA: Inventory of Parent and Peer Attachment. <sup>a</sup> The children in this study were compared with the comparisons in an other study; <sup>b</sup> The children were compared with a normative distribution or normative score; <sup>c</sup> Observational studies used in the secondary analyses.

Table 2. Attachment relationships of foster children vs. non-fostered comparisons

Source	Nf-Nc	Age at arrival, m	Age at study, y	Country of study	Measure (informant)	Core set (in)secure	Core set disorganized
Chew, 1998 <sup>b</sup>	7-2,516	≥ 12	0-4	USA	AQS (O)	Yes	No
	24-2,516	≥ 12	0-4	USA	AQS (O)	Yes	No
Cole, 2005 <sup>a</sup>	46-2,104	< 12	0-4	USA	SSP (O)	Yes	Yes
Dozier, 2001 <sup>a</sup>	50-2,104	< 12	0-4	USA	SSP (O)	Yes	Yes
Lamb et al., 1985	6-6	< 12	0-4	USA	Adapted SSP (O)	Yes	No
Oosterman, 2007;	61-2,516	≥ 12	4-12	Netherlands	AQS (O)	Yes	No
Oosterman et al., 2007							
Ponciano, 2002 <sup>b</sup>	49-2,516	< 12	0-4	USA	AQS (O)	Yes	No
	27-2,516	≥ 12	0-4	USA	AQS (O)	Yes	No
Rodning et al., 1992 <sup>a</sup>	11-2,104	< 12	0-4	USA	SSP (O)	Yes	Yes
	7-2,104	< 12	0-4	USA	SSP (O)	Yes	Yes
Swanson et al., 2000 <sup>b</sup>	12-2,104	< 12	0-4	USA	SSP (O)	Yes	Yes

Note. Nf: number of foster children; Nc: number of non-fostered controls; n.r.: data were not reported; Age at arrival, m: Age at arrival in months; Age at study, y: Age at study in years; (O): Observer Report; AQS: Attachment Q-sort; SSP: Strange Situation Procedure.<sup>a</sup> The children were compared with a normative distribution or normative score.

that the influence of age at placement would overrule the influence of age at assessment. In the same vein, we expected that the time spent in the new family would overrule the influence of age at assessment. Number of placements prior to adoption, social economic status of the adoptive parents as well as prevalence of pre-adoption adversity could not be used as moderators, because these variables were often not reported in the pertinent studies. Studies were coded as one of the categories of a moderator when at least 75% of the sample could be grouped into that category. Studies in which less than 75% of the sample could be included in one category of the moderator were coded as 'mixed'.

Furthermore, we examined in the samples with domestically adopted children whether more than 75% of the children were reported to have been adopted from foster care. We concluded that there were no studies that met this criterion (for example, only 5 out of the 106 children in the study of Veríssimo and Salvaterra (2006) and none of the children in the study of Vorria et al. (2003) were adopted from foster care).

For studies that used the (adapted) SSP and provided information about the number of children classified as disorganized (e.g., Dozier, Stovall, Albus, & Bates, 2001; Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2005), controlling (e.g., Marcovitch et al., 1997) or disorganized/controlling and insecure-other/ Cannot Classify (e.g., O'Connor et al., 2003) two effect sizes were derived, one for attachment security and one for attachment disorganization.

#### *Meta-analytic procedures*

We conducted five meta-analyses, four for the core set of studies with observational measures of attachment and one for the entire set of adoption studies. For the core set we conducted separate meta-analyses for adoptive and foster studies, both for attachment security and attachment disorganization. Some study outcomes could be directly inserted into Borenstein, Rothstein, and Cohen's (2000) Comprehensive Meta-Analysis (CMA) program. Other outcomes had to be re-computed or transformed before they could be inserted into CMA. For the studies in which the (adapted) SSP was used, we employed Wilson Effect Size Calculator (Lipsey & Wilson, 2001) to compare the distributions of the adoption samples with the normative distribution. Eventually for all studies Cohen's *d* was computed. According to Cohen's criteria, *ds* of 0.20, 0.50, and 0.80 represent small, moderate, and large effect sizes, respectively (Cohen, 1988). Because we hypothesized that adopted children would show less secure and more disorganized attachment (see Introduction) than the comparison group, the effect sizes of studies presenting outcomes in this direction were given a positive sign. A negative sign was given to the outcomes of studies where the adopted children showed more secure or less disorganized attachment. To examine whether outlying effects sizes were present, all effect sizes were transformed into Fisher's *Z* which were standardized. The study of Golombok, Cook, Bish, and Murray (1995) had an outlying effect size ( $d = -2.28$ ) which exceeded the preset limit of  $z < -3.29$  (Tabachnick & Fidell, 2007). To avoid an excessive influence this study was not included in the meta-analysis.

The effect sizes within one subset of a moderator can be homogeneous or heterogeneous. This homogeneity was tested with the *Q* statistic (Lipsey & Wilson, 2001). When the effect sizes were homogeneous, the fixed effect parameters were used. Random effect parameters were used when the effect sizes within one subset were heterogeneous. To test the influence of moderators, the *Q* statistic for between-group differences was calculated (Borenstein et al., 2000). This statistic indicates significant differences between the subgroups of a moderator. When one or more of the subsets were heterogeneous, random effect models were used. Fixed models were used when all subsets were homogeneous. When moderators could not be tested due to the small size of the subsets, the overlap of the 85% Confidence Intervals (CI) of the subsets was examined (Bakermans-Kranenburg et al., 2003; Goldstein & Healy, 1995). This provides a global test of the contrasts between combined effects of subsets grouped by moderators.

A publication bias may arise when non-significant findings remain unpublished. The results of these possibly missing studies can be estimated using Duval and Tweedie's 'trim and fill' method (Duval & Tweedie, 2000a,b). In this method a scatter plot (called a funnel plot) is created in which the effect sizes of the studies are plotted against the sample size or standard error. If the plot is shaped like a funnel no publication bias is present. However, due to the reduced chance for smaller and non-significant studies to be published, studies from the bottom left hand corner may be missing (the 'file-drawer' problem; Mullen, 1989). With the trim and fill method these missing studies are filled in and an (adjusted) effect size is calculated. We also examined the stability of the results. In this 'jackknife' procedure it is analyzed whether the overall effect size changes significantly when the combined effect sizes are calculated after the successive removal of one effect size (Borenstein et al., 2000). For each meta-analysis we also calculated the number of studies with a non-significant result that would be required to bring the combined effect size of a meta-analysis to a non-significant level (fail-safe number; Mullen, 1989).

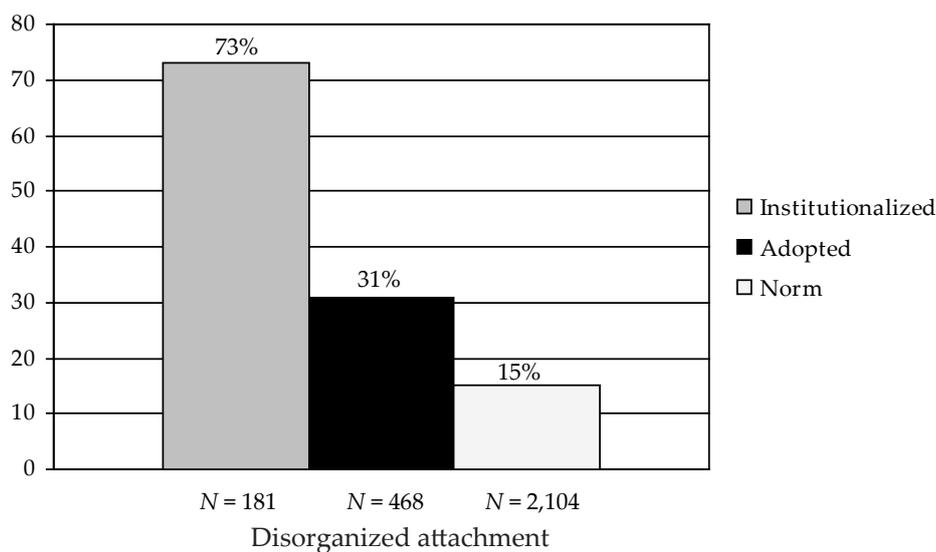
## RESULTS

First, a secondary analysis was conducted to compare the distributions of attachment classifications of adopted children with the normative distribution of non-adopted children. Secondly, the outcomes of the meta-analyses are presented. We start with the analyses of the adopted children concerning attachment security and attachment disorganization in the core set of studies (based on observational assessments), after which the comparison with the foster children is reported. We conclude with a broad-band meta-analytic approach of all adoption studies, using all types of measurements.

### *Secondary analyses*

In order to compare the distributions of attachment classifications of adoptees with attachment distributions of normative, non-adopted children, the combined attachment distribution of the adopted sample was calculated. We collected all

studies that used the SSP and reported on the ABCD-classification of adoptees ( $k = 11$  studies). For an overview of these studies, see Table 1. The distribution of attachment classification in normative samples is 62% secure, 15% avoidant, 9% ambivalent, and 15% disorganized (Van IJzendoorn et al., 1999;  $N = 2,104$ ). The analyses revealed that the adopted children showed a significantly different distribution,  $\chi^2(3, N = 2,572) = 106.41, p < .05$ . Adopted children showed fewer secure attachments, 47% secure, and more disorganized attachments, 31% disorganized, than non-adopted children ( $k = 11, n = 468$  adopted children). It should be noted, however, that the adoptees compared favorably to children in institutional care regarding disorganized attachment and secure attachment (see Introduction; 73% disorganized and 11% secure, 2 studies,  $N = 181$ ; Vorria et al., 2003; Zeanah et al., 2005) (see Figure 1). Based on these secondary analyses, which suggested that adoptees were more often disorganized and showed fewer secure attachments than their non-adopted counterparts, we examined the attachment relationships of adoptees in more depth in several meta-analyses.



Results are reported for adoptees ( $k = 11$ ), institutionalized children ( $k = 2$ , Vorria et al., 2003; Zeanah et al., 2005), and normative data ( $k = 15$ ) from Van IJzendoorn et al. (1999). All percentages differ significantly from each other at  $p < .01$ .

Figure 1. Percentages of disorganized attachment classifications based on the Strange Situation Procedure.

*Attachment security and disorganization of adoptees in the core set of studies*  
*Attachment security.* The core set consisted of 17 adoption studies measuring attachment security using the SSP or the AQS (reported in 13 publications; Table 1). Instead of using the classical SSP (Ainsworth et al., 1978), we also included studies that used the adapted SSP (see Method), such as the Cassidy-Marvin

system, the Main-Cassidy system, and Crittenden's PAA. Before including these studies in the meta-analyses, we tested if including these measurements influenced the effect size of the total core set. The removal of the study using the Main-Cassidy system and the exclusion of the two studies using Crittenden's PAA, both individually resulted in a (minimal) change of 0.01 for both the normal and the adjusted effect size. As sufficient studies using the classical SSP and the Cassidy-Marvin system were present, we used a moderator-analysis to test for differences between the effect sizes of both types of measurements. No significant differences were found ( $Q(1) = 3.17, p > .05$ ). In the total set of adoption studies a modest but significant effect size was found ( $d = 0.34, CI = 0.11 \sim 0.57, n = 722$  adoptees) in a heterogeneous set of 17 studies (see Table 3). The funnel plot showed a publication bias. With the trim-and-fill procedure, five studies were trimmed and replaced, resulting in a non-significant adjusted effect of  $d = 0.20$  ( $CI = -0.02 \sim 0.43$ ). This suggests that adopted children are as securely attached to their parents as non-adopted controls. The fail-safe number was  $k = 57$ . The jackknife procedure yielded a similar point estimate and the same CIs.

Because of the heterogeneity of the set of studies, several moderators were tested. As only two adoption studies in the core set used the AQS, the contrast between AQS and SSP was not tested. However, the 85% CIs around the point estimate of both subsets did overlap, suggesting that no differences between the effect sizes of the subsets were present.

The difference between the effect sizes of the children adopted before and after 12 months of age was significant,  $Q(1) = 15.68, p < .01$  (see Figure 2). Children who were adopted before 12 months of age showed secure attachments as often as non-adopted children ( $d = 0.08, CI = -0.09 \sim 0.25, n = 524$  adoptees) in a homogeneous set of 12 studies. However, children adopted after 12 months of age showed significantly less attachment security than non-adopted children in a homogeneous set of 5 studies,  $d = 0.80$  ( $CI = 0.49 \sim 1.12, n = 198$  adoptees).

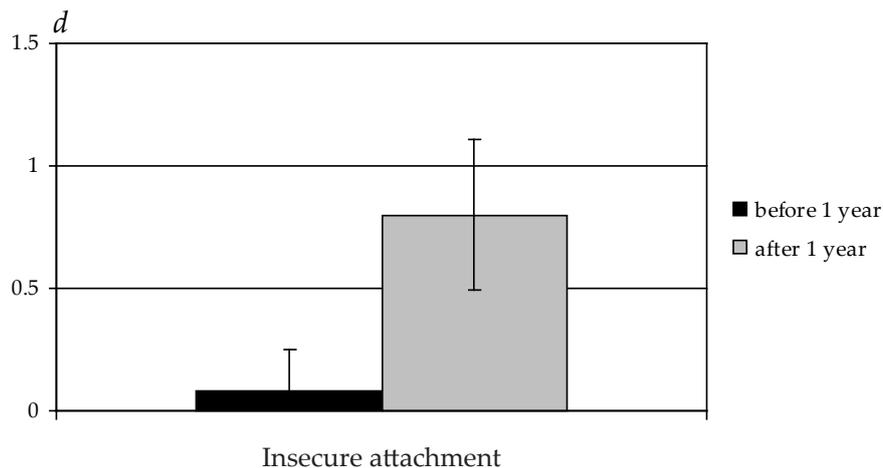


Figure 2. Risk of insecure attachment for adoptees placed before or after their first birthday ( $k = 17$ ).

Table 3. Meta-analytic results<sup>a</sup> of core set studies comparing the security of attachment of adoptees with non-adopted controls

	<i>k</i>	<i>d</i>	<i>N<sub>a</sub></i>	95% <i>CI</i>	<i>Q</i>	<i>Q for Contrast</i>	<i>p</i>
Total set	17	0.34**	772	0.11 ~ 0.57	33.39**		
<u>Sample Characteristics</u>							
Measurement						n.a.	
SSP /adapted SSP	15	0.31***	555	0.14 ~ 0.48	14.77		
AQS <sup>b</sup>	2	0.19	167	-0.40 ~ 0.78	16.29***		
Age arrival						15.68	.00
< 12 months	12	0.08	524	-0.09 ~ 0.25	16.90		
> 12 months	5	0.80***	198	0.49 ~ 1.12	0.81		
Age assessment						2.68	.10
0-4 year	10	0.18	450	-0.08 ~ 0.45	18.71*		
4-12 year <sup>c</sup>	7	0.55***	272	0.29 ~ 0.81	6.90		
Time in family						1.06	.59
0-12 months	6	0.13	220	-0.12 ~ 0.38	5.89		
13-24 months	4	0.53**	135	0.16 ~ 0.89	1.60		
25-74 months	7	0.34	367	-0.02 ~ 0.69	22.92**		
Placement						0.48	.49
Domestic	4	0.19	243	-0.26 ~ 0.64	16.59**		
International	11	0.32**	462	0.13 ~ 0.50	13.77		
Not reported <sup>d</sup>	1	0.90	11	-0.62 ~ 2.43			
Mixed <sup>d</sup>	1	0.73	6	-1.68 ~ 3.14			
Continent of origin						0.95	.62
Europe	9	0.42*	432	0.35 ~ 0.82	7.27		
Asia	4	0.12	227	-0.13 ~ 0.36	4.34		
North America <sup>b</sup>	2	0.37	46	-0.26 ~ 1.00	0.42		
Not reported <sup>d</sup>	2	0.86	17	-0.43 ~ 2.14	0.01		
Transracial placement						0.59	.44
Yes	5	0.15	296	-0.09 ~ 0.38	5.27		
No	10	0.40*	459	0.09 ~ 0.70	26.18**		
Not reported <sup>d</sup>	2	0.86	17	-0.43 ~ 2.14	0.01		

Note. *N<sub>a</sub>*: Number of adoptees; n.a.: not applicable; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

<sup>a</sup> For trimmed effect sizes see Results section; <sup>b</sup> Subsets with fewer than 4 studies were excluded from the contrast; <sup>c</sup> The oldest children in the core set were 7 years of age (placed in the subset '4-12 year', see Method); <sup>d</sup> Excluded from the contrast.

Continent of origin was not a significant moderator,  $Q(1) = 0.95, p > .05$  when all the European children were grouped together. However, when the Eastern European adoptees were analyzed separately, continent of origin was a significant moderator,  $Q(1) = 5.73, p < .05$ . Asian adoptees showed the same level of attachment security as non-adopted children ( $d = 0.12, CI = -0.13 \sim 0.36, n = 227$  adoptees) in a homogeneous set of 4 studies, while Eastern European adoptees showed less attachment security than non-adopted children ( $d = 0.58, CI = 0.29 \sim 0.87, n = 216$  adoptees) in a homogeneous set of 6 studies. The set of studies with children adopted from other European countries or from North America was too small to be included in the analyses. The other moderators, such as age at assessment, time in family, same-or transracial placement, international or domestic placement, publication outlet and year of publication were not significant.<sup>1</sup>

*Attachment disorganization.* We examined whether adopted children were more often classified as disorganized in the SSP than their non-adopted controls. Eleven studies reporting on the number of disorganized children were included (reported in 8 publications, see Table 1).

A significant positive effect size for disorganized attachment was found,  $d = 0.46 (CI = 0.14 \sim 0.77, n = 468$  adoptees) in a heterogeneous set of outcomes. The funnel plot showed some publication bias. With the trim-and-fill procedure 2 studies were trimmed and replaced, resulting in a significant adjusted effects of  $d = 0.36 (CI = 0.04 \sim 0.68)$ . This means that more adopted children showed disorganized attachment compared to their non-adopted counterparts. No significant moderators or non-overlapping CIs were found. The fail-safe number was  $k = 42$ . The point estimate and CIs computed with the jackknife procedure remained the same.<sup>1</sup>

#### *Comparison with foster children*

Eleven foster studies (reported in 8 publications; Table 2) measured attachment security using the SSP or the AQS. In this homogeneous set of 11 studies a non-significant effect size was found ( $d = 0.07, CI = -0.16 \sim 0.30, n = 300$  foster children). A publication bias was indicated in the funnel plot. With the trim-and-fill procedure three studies were trimmed and replaced, resulting in a non-significant adjusted effect of  $d = -.06 (CI = -0.27 \sim 0.15)$ . This means that the foster children are as securely attached to their foster parents as children reared in their biological family. This converges with the non-significant overall effect size found for the group of adoptees.

Five studies reported on the number of disorganized foster children (reported in 4 publications, see Table 2). For these studies an effect size comparable with that of the adopted children was found,  $d = 0.41 (CI = 0.07 \sim 0.74, n = 126$  foster children) in a homogenous set of outcomes. A publication bias was shown in the funnel plot. With the trim-and-fill procedure 2 studies were trimmed and replaced, resulting in a significant adjusted effect of  $d = 0.35 (CI = 0.02 \sim 0.67)$ . This

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<sup>1</sup> Tables with data not presented in the article may be requested from the authors.

means that, again comparable with adoptees, the foster children showed more disorganized attachment compared to children reared by their biological parents. The fail-safe number was rather small,  $k = 5$ . The combined effect size computed with the jackknife procedure became non-significant when the studies of Dozier et al. (2001) or Cole (2005) were removed, with adjusted effect sizes of respectively 0.30 ( $CI = -0.10 \sim 0.71$ ) and 0.38 ( $CI = -0.02 \sim 0.78$ ). The 85% CI intervals for both attachment security and disorganization in studies with adoptees versus foster children did overlap, indicating that adopted children have comparable rates of insecure and disorganized attachment as foster children.

*Attachment relationships of adoptees: broad-band approach*

In the meta-analysis focusing on all types of measurements, 39 studies (reported in 31 publications, see Table 1) measuring the attachment relationship of adoptees were included. The comparison of the adoptees with the non-adopted controls showed a small but significant effect size ( $d = 0.24$ ,  $CI = 0.10 \sim 0.37$ ,  $N = 2,912$  adoptees) in favor of the comparisons. However, the funnel plot showed a publication bias. With the trim-and-fill procedure eight studies were trimmed and replaced, resulting in a non-significant adjusted effect of  $d = 0.12$  ( $CI = -0.02 \sim 0.26$ ). The fail-safe number was  $k = 230$ . The point estimate and CIs computed with the jackknife procedure remained the same. To account for the heterogeneity of the studies in the subset, various moderators were tested. However, no significant moderators were found.<sup>2</sup>

## DISCUSSION

Because of the untoward early life experiences that many adopted children endured we expected fewer secure attachments and more attachment disorganization in adopted children compared to non-adopted children. Overall, the (trimmed) results of our meta-analyses of a core set of studies with observational attachment measures showed that adopted children were as securely attached as their non-adopted counterparts. However, children who were adopted after their first birthday showed significantly less attachment security than non-adopted children and this effect size was large. As hypothesized, we found more disorganized attachments among adopted children in the core set of studies. When studies using self-report measures, such as questionnaires and interviews, were added to the meta-analysis the effects were no longer significant. According to this broad-band meta-analytic approach adoptees had similar attachment relationships with their adoptive parents as their non-adopted counterparts. The broad-band meta-analysis did not reveal any influence of age at arrival. These results suggest that self-report measures may not be as sensitive as observational measures in revealing a clinically meaningful age effect.

<sup>2</sup> See Footnote 1

*Attachment disorganization*

As expected, based on the presence of risk factors before the adoption, adopted children showed more disorganized attachment than non-adopted children. This finding may be explained by the children's experiences of maltreatment and neglect before their placement in an adoptive family. The findings for attachment disorganization were independent of age at placement: Both early and later placed adoptees showed more disorganized attachments. This outcome converges with Dozier and Rutter's (2008) suggestion, that children are particularly vulnerable for caregiving experiences during their first year of life. Experiences of maltreatment, deprivation and neglect during the infant's first weeks or months may have long-lasting consequences for the development of the organization of attachment. Thus, not only adoptees placed after their first birthday, but also adoptees who have experienced adverse conditions only during their first months of life may be more prone to develop disorganized attachments. Besides institutionalized children, the best comparison group of biological parent-child dyads may be maltreated children whose attachment is assessed around their first birthday.

Researchers studied maltreated children as young as 13 months of age and found high rates of disorganized attachment: 82% to 93% (Carlson, Cicchetti, Barnett, & Braunwald, 1989; Cicchetti, Rogosch, & Toth, 2006). The overrepresentation of disorganized attachments in maltreated children converges with the high rates of disorganized attachments in institutionalized children (Vorria et al., 2003; Zeanah et al., 2005). Contrasting the findings on disorganized attachment of maltreated and institutionalized children (73% to 93%) with our meta-analytic findings for adopted children (31% disorganized attachment) suggests that adopted children show an impressive although incomplete catch-up after their placement (31% vs. 15% in normative groups).

*Moderators of attachment security and disorganization*

Few of the potential moderators appeared to make a significant difference for attachment security and disorganization. Study characteristics such as publication outlet, year of publication, and continent of study were not associated with any of the effect sizes. We did find that Eastern European children were less often securely attached than Asian adoptees. As Eastern European children are suggested to have experienced the most severe deprivation (e.g., Miller, 2005; Rutter et al., 2004), which may negatively influence the development of new attachment relationships after placement, this outcome was expected. Unfortunately, we were not able to study the influence of continent of origin in combination with the influence of age at placement and thereby disentangle the influences of both moderators, as all Asian children were placed before their first birthday.

Although for example Rosenthal, Groze, Curiel, and Westcott (1991) and Singer, Brodzinsky, Ramsay, Steir, and Waters (1985) reported fewer positive parent-child relationships in transracial adoptees compared to same-race adoptees, we did not replicate these results. Attachment findings were independent of type of placement - domestic or international - and same-race or transracial placements. However, as Rosenthal et al. (1991) primarily attributed the differences to differing

characteristics at adoptive placement, and Singer et al.'s (1985) study was based on a small sample size ( $n = 19$  transracially adopted infants), the results of the meta-analysis are not unexpected. The fact that parents and children do not share the same race or the same country of origin may not be essential for the development of new attachment relationships. The (changed) environment provided by the parents is probably of more significance. In the same vein, similarities between same-race and transracial adoptees have been found in a meta-analysis on self-esteem (Juffer & Van IJzendoorn, 2007).

Age at assessment and time in the family were not significant moderators either. We had hypothesized that children would need some time before they could profit from the new family environment. However, as all but one of the studies examining children who had lived in their adoptive family for less than a year reported on children who had lived with their new family for at least eight months, these results are not that surprising. Eight months may be sufficient time to develop a secure attachment relationship with the new parents. Moreover, with the exception of one study, all studies examining children who had lived in their adoptive family for less than a year reported on early placed children, who are expected to develop secure attachment relationships as often as non-adopted children. In the same vein, Stovall-McClough and Dozier (2004) reported that early placed foster children already began to show secure attachment behaviors within the first two months of their placement.

As expected, age at placement was a significant moderator for attachment security in adoptees, with early placed adoptees showing secure attachments as often as non-adopted children. Children who are placed before their first birthday may have experienced deprivation for shorter periods of time than later placed adoptees, resulting in a more normative development of attachment relationships (Bowlby, 1982). Alternatively, it may be easier for early placed children to become securely attached because they are placed with new parents and receive sensitive care in a stage when attachment is still developing (Ainsworth et al., 1978; Bowlby, 1982). It may be easier to prevent insecure attachment than to change insecure attachment.

#### *Comparison with foster children*

To compare adoptees with foster children we conducted additional meta-analyses for foster children's attachment security and disorganization. The effect sizes for attachment security of the adopted and foster children were comparable, as were the effect sizes for attachment disorganization (adoptees,  $d = 0.36$ ; foster children,  $d = 0.35$ ). As mentioned above, the high rate of disorganized attachment of the adopted children may be explained by the influence of the adverse circumstances these children experienced before their placement. The same might be true for the foster children, as many of them have also experienced maltreatment and/or neglect before placement (e.g., Chernoff et al., 1994).

### *Limitations*

Although publication bias was present in all sets of studies, most effect sizes remained significant after correction for such a bias through the trim-and-fill procedure. The effect size for the total set of studies on attachment relationships was small before trimming ( $d = 0.24$ ), and lost its significance after trimming. Similarly, in the core set, the effect size for attachment security in the adoptive group was not significant after trimming. The fact that studies had to be trimmed and filled may point to a file-drawer problem (Mullen, 1989), suggesting that non-significant results in this field are not published as much as significant outcomes. Rosenthal (1991, p. 106) suggested that a fail-safe number of  $5k+10$  ( $k$  = number of studies included) is a general criterion for robustness. This criterion was not achieved for any of the sets, suggesting that the outcomes of our meta-analyses must be interpreted with some caution.

Foster care arrangements may differ in the USA and Europe (for example offering adoption from foster care or not; Jones, 2008; Warman & Roberts, 2003). One of the limitations of our meta-analyses is that only one of the foster care studies was conducted outside of the USA (Oosterman, 2007). With the jackknife procedure (see Method) the meta-analytic outcomes were similar when this specific foster care study was removed from the analyses.

Because a relatively limited number of studies were available for our meta-analysis, we could only examine broad categories - for example, continents of origin instead of separate countries - and within the broad categories contrasting study outcomes may remain hidden until more primary studies become available. A risk factor like deprivation or pre-placement adversity is an important predictor of child development. Unfortunately, this moderator could not be included in the meta-analyses since in many studies insufficient information about the care background of the children was reported. Moreover, important details of the children's caregiving history could not be taken into account because they were unknown in many studies (e.g., number of placements). Similarly, we could not include adoptive parents' sensitivity or parenting behavior, or their attachment representation.

In our meta-analyses we have compared children adopted before and after one year of age. It would be interesting to distinguish more subgroups, for example children adopted between one and two years of age, and children adopted after two years of age. Unfortunately, the set of observational studies including children adopted after their first birthday was too small to conduct this analysis.

### *Clinical implications*

Interventions in adoptive families may be needed to support parents' sensitivity and enhance adopted children's attachment security (Juffer et al., 2008). A meta-analysis of intervention studies showed that interventions that successfully increase parental sensitivity are also successful in enhancing attachment security. Furthermore, a dose-response relation was revealed: interventions with larger effects on sensitivity resulted in larger effects on attachment security (Bakermans-Kranenburg et al., 2003). An intervention aimed at promoting adoptive parents'

sensitivity not only resulted in increased maternal sensitivity but also in a reduced number of disorganized attachments (Juffer et al., 2005). However, the children in this study were placed at a very early age ( $M = 10$  weeks) and we do not know whether these findings can be generalized to (somewhat) older placed children. Comparably, Stovall and Dozier (2000), using detailed diaries to study the development of attachment in foster children, concluded that foster parents of late placed foster children not only need to be sensitive to promote secure attachments, but also need to provide 'therapeutic caregiving' by challenging the foster children's alienating behavior. Promising intervention studies in foster families targeting children's attachment behavior as well as their bio-behavioral stress regulation point to positive effects on attachment security and neurobiological adaptation (Dozier, 2003; Dozier, Albus, Fisher, & Sepulveda, 2002; Dozier, Higley, Albus, & Nutter, 2002; Fisher, Gunnar, Dozier, Bruce, & Pears, 2006). Further research on the influence of parenting behavior on children's attachment behavior after the adoptive placement may reveal new insights into how adopted children become securely attached. In addition, intervention studies with adoptive families may show how insecure attachment strategies can be changed, how long this process usually takes and which behavioral and neurobiological mechanisms can be held responsible for recovery.

## CONCLUSION

In conclusion, this meta-analysis suggests that adopted children can overcome early adversity and risks and form secure attachments as often as their normative counterparts. The same was true of foster children. These outcomes lend support to Bowlby's (1952, 1988) hypothesis that corrective attachment experiences may enhance attachment security. But this catch-up is not without limits: Children who are adopted after their first birthday are less capable of developing secure attachments. Moreover, the adoptees show disorganized attachments more often than their normative peers, and again we found comparable outcomes in foster children. Adopted children are however considerably less often disorganized than institutionalized children (Vorria et al., 2003; Zeanah et al., 2005). Therefore, adoption may be seen as an effective intervention (Juffer & Van IJzendoorn, 2006), offering children who lack the care of their birth parents the chance to develop more secure attachment relationships.

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### 3. Infants' physical and cognitive development after international adoption from foster care or institutions in China

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#### ABSTRACT

*Objective:* To compare the physical, cognitive, and motor development of infants adopted from foster care with infants adopted from institutions. *Method:* Forty-two formerly fostered and 50 post-institutionalized girls adopted from China, aged between 11 and 16 months on arrival, were visited 2 and 6 months after adoption. Children's height, weight, and head circumference were measured. Stress regulation was assessed by diurnal salivary cortisol levels, and cognitive and motor development were assessed using the Bayley Scales of Infant Development - second edition. *Results:* At both assessments, the (modest) physical growth delays were similar for formerly fostered and post-institutionalized children. For weight and head circumference (but not for height) a catch-up over time was found, with a significant interaction between time and age at arrival, showing a more rapid catch-up for earlier adopted children. The daily cortisol curves of the formerly fostered and post-institutionalized children were similar and did not change over time. At both assessments, the former foster children outperformed the post-institutionalized children on mental and motor skills. Both groups showed a similar catch-up for mental development. For motor development, no catch-up was found. *Conclusions:* The influence of pre-adoption foster versus institutional rearing seems more pronounced for cognitive and motor development than for physical development and hormonal stress regulation. Our outcomes suggest that pre-adoption foster care is less detrimental to children's cognitive and motor development than institutional rearing.

#### INTRODUCTION

Do internationally adopted children from institutional care show larger developmental delays than children adopted from foster care, and do they catch up at a different pace after adoption? In this short-term longitudinal study, we compared the physical, cognitive, and motor development of formerly fostered and post-institutionalized Chinese adoptees (aged 11-16 months at adoption), 2 and 6 months after adoptive placement.

Adopted children frequently display developmental delays as a consequence of being raised in institutions where they are often understimulated.<sup>1</sup> Pre-adoption

foster care may offer a more normative family-type rearing arrangement. For example, better cognitive skills have been found in foster children compared with institutionalized children,<sup>2</sup> and more normative auxological outcomes were reported for children adopted from foster care compared with post-institutionalized adopted children.<sup>3</sup> Although studies have examined the catch-up of adopted children in general, hardly any study has examined the development of foster and institutionalized children separately, shortly after adoption.

Research has focused on post-institutionalized Romanian children<sup>4</sup> but less is known about Chinese adoptees, although there are exceptions.<sup>5</sup> Because many international adoptions are from China nowadays, it is the largest sending country worldwide,<sup>6</sup> it is imperative to study this group, because children from different countries may vary in their initial development and catch-up after adoption due to variations in pre-adoption contexts.<sup>7,8</sup> For example, Chinese adoptees exhibit relatively low disability rates,<sup>9</sup> and they may have suffered less prenatal adversity, such as maternal alcohol abuse,<sup>7,10</sup> because most of them have been abandoned as a result of the one-child policy.<sup>11</sup>

In general, children show an impressive catch-up after adoption,<sup>1</sup> though for some developmental domains (e.g., height) the most complete catch-up is documented for children adopted before their first birthday.<sup>1,12</sup> Less or absent catch-up of later adopted children may indicate sensitive periods in development after which recovery becomes more difficult.<sup>2,4</sup>

#### *Growth*

Delayed physical growth is the most common medical problem in post-institutionalized adoptees. It is an indicator of poor nutritional intake and lack of psychosocial stimulation, and it has been associated with developmental delays.<sup>7</sup> A study on Guatemalan adoptees has shown that pre-adoption foster care was less detrimental for children's auxological outcomes than pre-adoption institutional care.<sup>3</sup>

Several studies have confirmed the presence of growth delays in Chinese adoptees, both for height, weight, and head circumference.<sup>5,8,10,13,14</sup> In the first 6 months after arrival, Chinese adoptees were reported to show catch-up growth for all three measures,<sup>8,10</sup> although normal growth rates - indicating no "additional" catch-up - 6, 12, and 24 months after adoptive placement have also been found.<sup>5</sup> Information on differential catch-up growth of foster and post-institutionalized children was not reported in these studies. Only one study compared adopted children who had received "some foster care" with post-institutionalized children. Foster children had a larger head circumference but similar weight and height.<sup>10</sup>

#### *Stress regulation*

The Hypothalamic-Pituitary-Adrenal axis (HPA-axis), of which cortisol is the end product, has two primary functions: it maintains the circadian cortisol rhythm, characterized by high morning and low evening levels, and it is involved in stress responses.<sup>15</sup> At birth, the HPA-axis is highly unregulated, and it matures

throughout childhood.<sup>15,16</sup> Early adversity can hamper the maintenance of the normal daily cortisol rhythm.<sup>15,17</sup> When sensitive care is lacking children may come to experience chronic stress, which may eventually lead to dysregulation of the HPA-axis. Several studies have focused on cortisol in institutionalized and post-institutionalized children from Eastern Europe. In an Ukrainian sample institutionalized and family-reared children showed similar patterns of diurnal cortisol production with decreases over the day,<sup>18</sup> but other studies found blunted morning cortisol levels and an absence of a systematic decrease over the day in institutionalized children.<sup>19</sup> Blunted cortisol levels may be a consequence of chronic activation of the HPA-axis which in turn leads to downregulation of the HPA-system.<sup>20</sup>

Two months after adoption, institutionalized children have been reported to show smaller decreases in cortisol level during the day compared with non-adopted family-reared children, whereas 8 months after adoption, this difference had disappeared.<sup>21</sup> In another study, 6 and a half year after adoption, post-institutionalized children displayed a fairly normal diurnal rhythm, but children who had experienced longer institutionalization showed slightly higher cortisol levels during the day.<sup>17</sup> In addition, several years after adoption, post-institutionalized children who had experienced extremely deprived care had significant growth delays, which in turn predicted high morning cortisol levels and a large decrease during the day.<sup>22</sup> Although it may be expected that post-institutionalized adopted children show a more deviant diurnal cortisol curve than children adopted from foster care, this has not been studied yet. In addition, the cortisol curves of adopted children may differ from those of non-adopted children<sup>21,23</sup> (as foster children differ from non-foster children<sup>23</sup>).

#### *Cognitive and motor development*

Virtually all international adoptees show cognitive and motor delays. Studies on formerly fostered and post-institutionalized children from various countries have shown slightly different outcomes, with two studies showing better cognitive and motor skills for foster children,<sup>10,24</sup> one study showing better motor skills,<sup>25</sup> and one study showing better cognitive skills<sup>3</sup> for foster children. Regarding catch-up, one small-scale study found that within 6 months after adoption (age at adoption: 5-36 months; six countries of origin), former foster children ( $n = 7$ ) were found to maintain their developmental rate, whereas post-institutionalized children ( $n = 18$ ) showed catch-up in cognitive and motor development.<sup>24</sup> Chinese adoptees have also been reported to show cognitive and motor delays at arrival and a partial catch-up within the first 6 months after arrival.<sup>5,8,10</sup> Whether catch-up differed for children adopted from foster care or from institutions in China was not reported.

#### *Hypotheses*

We examined the possible delays of the adopted children by comparing their scores with the norm scores of non-adopted children regarding physical growth and cognitive and motor development, and by comparing their cortisol curves

with those of non-adopted children. We hypothesized that (a) infants from institutions present larger delays in physical growth than children from foster care, with both groups showing catch-up in growth after adoption. (b) Infants from foster care show a more normal diurnal cortisol curve than children from institutions; after 6 months of exposure to adoptive family life the curves of the two groups may be more similar. Additionally, as the cortisol curves of adopted children may differ from those of non-adopted children raised in their biological families, we examined possible differences between the cortisol curves of adopted and non-adopted children. (c) Infants from institutions display more delayed cognitive and motor skills than children from foster care, and both groups show catch-up in cognitive and motor development after adoption.

## METHOD

### *Participants and procedure*

All three Dutch agencies mediating adoptions from China contacted all parents adopting an infant girl between 11 and 16 months of age on arrival in the Netherlands and handed out information packages about the study. We selected girls to prevent a skewed gender distribution (89% of Chinese adoptees were female when the data collection started<sup>26</sup>). In total, 198 families received an information package, of which 152 families responded (77%). Of these 152 families, 100 families agreed to participate (66%), 52 families did not want to participate (34%; most families mentioned that the laboratory was too far away, they found participating too time-consuming/ exhaustive for their child). Eight families dropped out (five families found participation too exhaustive, one family considered the distance to the laboratory too large, one parent fell sick, and one child unexpectedly had to undergo surgery).

All children were involved in assessments 2 months after the child's arrival (Time 1) and again 4 months later (Time 2: 6 months after adoption). The parents completed questionnaires on background variables (e.g., parental education) and the background of the child (e.g., time in institutional/foster care). Parental age and education of the institutionalized and foster children did not differ. Based on their rearing background in China, the 92 children were classified as institutionalized or foster children. The 50 institutionalized children had lived in an institution for most of their pre-adoption life and experienced other types of care for a maximum of 1 month. The 42 foster children had experienced foster care - sometimes combined with another type of family care - ( $n = 16$ ), or a combination of foster and institutional care ( $n = 26$ ). The foster children had on average experienced 3.65 months of institutional care (range = 0 - 14) and 9.31 months of foster care (range = 1.44 - 14.85). To control for this variation, all analyses were repeated only including the foster children who had experienced foster care only ( $n = 16$ ). As results were similar, we present the analyses of the foster group (including the mixed group) versus the institutionalized group. In 66 families, the adopted infant was the first child, 13 families already had an adopted child, and 13 families had birth children. Most children were reared

in two-parent families ( $n = 90$ ), with highly educated parents (scale: 1 [primary school only] to 5 [university]; mothers:  $M = 3.79$ ,  $SD = 0.92$ ; fathers:  $M = 4.09$ ,  $SD = 0.89$ ). At arrival, the children were on average 13.03 months ( $SD = 1.35$ , range = 10.84 - 16.53). The assessments were on average 2.21 ( $SD = 0.19$ ; Time 1) and 6.30 months ( $SD = 0.26$ ; Time 2) after arrival. No significant differences were found between children from institutions and foster care.

#### Measures

*Physical growth.* At Time 1 and Time 2 data on weight, height, and head circumference were obtained by the parents following instructions of the examiner, and converted into z-scores using Anthro statistical software.<sup>27</sup> Missing values were imputed based on the regression line, which predicted the physical measures at Time 2 based on the assessments at Time 1 (range = 0 - 6 missing). When children with missing values were excluded from the analyses, or when missing values were substituted with mean growth delays, results were similar. Two outliers ( $|z| > 3.29$ ) were winsorized.

*Stress regulation.* Stress regulation was assessed by measuring salivary cortisol. To capture children's diurnal cortisol rhythm, the parents used cellulose-cotton tip sorbettes (Salimetric) and collected three saliva samples during an ordinary day. The samples were collected half an hour after the child woke up ( $M = 8:15$  a.m.), before lunch ( $M = 13:00$  p.m.), and in the evening, half an hour before the child went to bed ( $M = 19:15$  p.m.). Sampling times were similar for institutionalized and foster children, and for Time 1 and Time 2. Families were informed that their children were not supposed to eat, drink, or brush their teeth half an hour before collection. Parents registered time of awakening, time of sampling, and medication intake.

Assays were performed at the University of Trier. Cortisol was assayed using a time-resolved fluorescence immunoassay. The intra-assay coefficient of variation of this immunoassay was between 4.0% and 6.7%, and the corresponding inter-assay coefficients of variation were between 7.1% and 9.0%. Cortisol samples with values  $\leq 0.1$  nmol/L and  $\geq 100$  nmol/L were coded as missing because of impossible values. All values were  $\log_{10}$  transformed to normalize the skewed distribution.

To compare the daily curve of the adoptees with a non-adopted group, we selected 15 non-adopted Dutch children in the same age range (mean age 21.93 months,  $SD = 1.67$ ) from a study on day care (M.G. Groeneveld, et al, unpublished data, 2009). For these children, four cortisol samples were collected during an ordinary day at home. Materials, protocols, analyses, and assay procedures (University of Trier) were identical to those used in the adoption sample. Mean collection times were 7:38 a.m. ( $SD = 35$  minutes), 11:01 a.m. ( $SD = 13$  minutes), 15:17 p.m. ( $SD = 26$  minutes), and 18:00 p.m. ( $SD = 22$  minutes). We intrapolated the cortisol values of the comparison group to estimate their cortisol values at the collection times of the adopted children. The ( $\log$  transformed) mean intrapolated morning, afternoon, and evening

Table 1. Correlations between time 1 and time 2 child outcomes for post-institutionalized ( $n = 50$ ) and formerly fostered children ( $n = 42$ )

Time 1	Time 2									
	Institutionalized			Foster care						
	Height	Weight	Head	MDI	PDI	Height	Weight	Head	MDI	PDI
Height	.80***	.73***	.45***	.25	.15	.83***	.69***	.43**	-.10	.12
Weight	.69***	.85***	.39**	.19	.12	.61***	.91***	.50***	-.00	.07
Head	.19	.33*	.62***	.16	-.05	.29	.35*	.70***	-.11	-.09
MDI	.14	-.01	-.12	.70***	.70***	.09	-.10	-.13	.54***	.28
PDI	.21	.01	-.01	.65***	.75***	.11	-.01	-.10	.40**	.49**

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ ; Head: Head Circumference; MDI: Mental Development Index; PDI: Psychomotor Development Index.

values of the non-adopted children were 0.89 ( $SD = 0.29$ ), 0.39 ( $SD = 0.13$ ), and -0.11 ( $SD = 0.44$ ), respectively.

*Bayley scales of infant development.* To examine cognitive and motor development, the Dutch Bayley Scales of Infant Development - second edition<sup>28</sup> - was administered by a qualified examiner or a research assistant (trained by the examiner). The Bayley Scales of Infant Development was administered at home to ensure optimal test conditions, because children feel more at ease in a familiar environment and do not have to undertake a potentially tiring trip to the university. Cognitive development was assessed using the non-verbal Bayley Scales of Infant Development.<sup>29</sup> All children received a score for cognitive development (Mental Developmental Index) and psychomotor development (Psychomotor Developmental Index) by converting their raw scores into standard scores ( $M = 100$ ,  $SD = 15$ , range = 55-145). Children with raw scores that placed their standard scores below 55 were assigned a score of 54 (for a comparable practice see Nelson et al, 2007<sup>2</sup>). Correlations between Psychomotor Developmental Index and Mental Developmental Index scores were .57 ( $p < .001$ ) for Time 1 and .62 for Time 2 ( $p < .001$ ).

#### *Data-analysis*

To test whether the growth and development of the adopted infants differed from the norm group, one-group *t*-tests were used. With repeated measures analysis of (co)variances, we examined catch-up and investigated whether outcomes differed for the institutionalized and foster children. Age at adoption was included as a covariate, as age at adoption proved to be an important predictor in adoption research.<sup>1,4,25</sup> When the contribution of age at adoption was not significant, it was removed from the final analyses. Correlations were computed between child outcomes and for the associations between Time 1 and Time 2 (Table 1). Two-tailed tests were used in all analyses.

## RESULTS

### *Growth*

On average, the adopted children showed modest growth delays. For height, weight, and head circumference, the mean *z*-scores at Time 1 were -0.75 ( $SD = 1.04$ ), -0.42 ( $SD = 0.86$ ), and -.50 ( $SD = 0.85$ ), respectively, and at Time 2 -0.69 ( $SD = 1.04$ ), -0.26 ( $SD = 0.92$ ), and -0.24 ( $SD = 0.95$ ), respectively. All mean *z*-scores were significantly below zero (*t*-values ranging from -6.91 to -2.45,  $p < .05$ ) with no significant differences between foster and institutionalized children. The correlations between the auxological measures were all significant (Time 1: range = .27 - .74; Time 2: range = .33 - .68).

For weight and head circumference, we found main effects for time and significant interaction effects between time and age at adoption, suggesting more pronounced catch-up for earlier adopted children than for later adopted children,  $F(1,89) = 5.50$ ,  $p < .05$ , partial  $\eta^2 = .06$  and  $F(1,89) = 5.93$ ,  $p < .05$ , partial  $\eta^2 = .06$ ,

respectively. No differences were found between the foster and institutionalized children. Regarding height, we did not find an increase in z-scores over time, nor a difference between the groups or an interaction effect.

*Stress regulation: Diurnal cortisol curve*

In total, 53 children had complete sets of three cortisol samples at Time 1 (27 institutionalized, 26 foster children) and 44 children had complete sets at Time 2 (21 institutionalized, 23 foster children). Seventeen institutionalized and 14 foster children had complete data for both assessments. There were no significant differences between the morning, afternoon, and evening values of children with and without complete cortisol sets ( $t$ -values ranging from -1.49 to 1.83, n.s.). The cortisol values of the children with two complete sets of values were not significantly different from the children who had only one complete set of values ( $t$ -values: -0.66 to 1.55, n.s.).

Figure 1 shows the cortisol curves of the institutionalized, foster, and non-adopted children. The cortisol values of the non-adopted children did not differ from those of the adopted children ( $t$ -values: -0.45 to 0.77, n.s.), with one exception. Compared with the non-adopted children, the former foster children had significantly higher afternoon cortisol values at the first assessment (non-adopted children,  $M = 0.39$ ,  $SD = 0.13$ ; foster children:  $M = 0.56$ ,  $SD = 0.17$ ,  $t(39) = 3.33$ ,  $p < .01$ ).

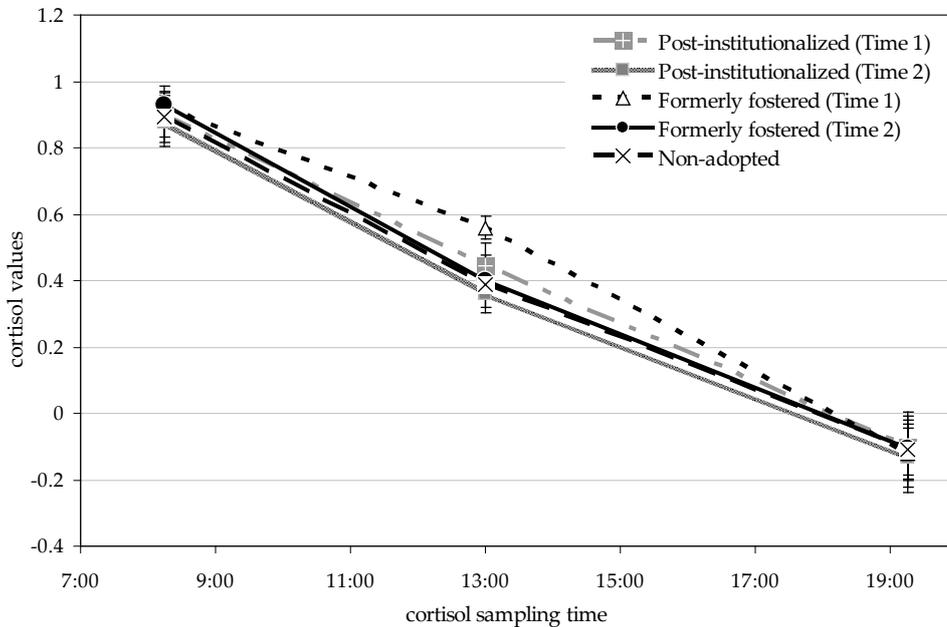


Figure 1. Diurnal cortisol levels (log transformed) of the adopted and non-adopted children.

For all six cortisol values (morning, afternoon, and evening values, at Time 1 and Time 2) no differences were found between the foster and institutionalized children ( $t$ -values ranging from -1.51 to 0.16, n.s.). The foster and institutionalized children did not show a change in their cortisol values from Time 1 to Time 2 ( $t$ -values: -0.18 to 1.87, n.s.).

At both Time 1 and Time 2 significant decreases in cortisol level were found across the day,  $F(1,78, 90.65) = 173.72, p < .01$ , partial  $\eta^2 = .77$ , and  $F(2,84) = 119.87, p < .01$ , partial  $\eta^2 = .74$ , respectively, but no difference between the two groups of adoptees and no interaction between group and time were found. The daily curve of the adopted children did not differ from the curves of the non-adopted children,  $F(4,107) = 0.36$ , n.s..

#### *Cognitive and motor development*

*Cognitive development.* A repeated measures analysis of variance showed that at both assessments the foster children had significantly better cognitive skills than the institutionalized children,  $F(1,89) = 6.76, p < .05$ , partial  $\eta^2 = .07$  (Time 1: institution:  $M = 74.04, SD = 18.41$ , foster:  $M = 84.40, SD = 17.62$ ; Time 2: institution:  $M = 84.38, SD = 20.01$ , foster:  $M = 92.26, SD = 17.83$ ), although both groups had below average scores at both Time 1 and Time 2 ( $t$ -values ranging from -9.97 to -2.82,  $p < .01$ ). The adopted children showed catch-up between the two assessments,  $F(1,89) = 29.77, p < .001$ , partial  $\eta^2 = .25$ , which was similar for both groups.

*Motor development.* A repeated measures analysis of variance showed that, at both assessments, the foster children had significantly better motor skills than the institutionalized children,  $F(1,90) = 5.39, p < .05$ , partial  $\eta^2 = .06$  (Time 1: institution:  $M = 85.16, SD = 18.84$ , foster:  $M = 93.05, SD = 17.94$ ; Time 2: institution:  $M = 84.58, SD = 14.58$ , foster:  $M = 90.88, SD = 12.58$ ). Both groups showed a delayed development compared to the reference group ( $t$ -values: -7.48 to -2.51,  $p < .05$ ). The adopted children did not show a catch-up between Time 1 and Time 2, as their motor skills developed in a similar pace as those of the norm group.

## DISCUSSION

In a group of 92 infant girls adopted from China, we found small to moderate delays in physical growth and cognitive and motor development at 2 months post-adoption, and catch-up 6 months after adoption for cognitive development, as well as for weight and head circumference, which was more pronounced for earlier adopted children. The daily cortisol curves of adopted and non-adopted children did not differ from each other, except for the foster children who showed higher afternoon values at Time 1. Contrary to our hypotheses, we found remarkably few significant differences in the development of the formerly fostered and post-institutionalized children. For example, no differences were found for physical growth and stress regulation. We did, however, find better cognitive and motor skills among foster children than among institutionalized children at both assessments.

### *Growth*

The similar modest growth delays of institutionalized and foster children in our study may reflect fairly adequate diets in institutions nowadays, due to improving resources,<sup>7</sup> especially for those institutions handling international adoptions.<sup>11</sup> Our findings are consistent with the relatively good general health found in recently adopted Chinese children.<sup>30</sup>

For weight and head circumference, we found an interaction between time and age at adoption, suggesting a more pronounced catch-up for earlier adopted children. This converges with the larger catch-up that has been found for earlier placed adoptees in physical growth<sup>12</sup> and other domains, such as cognition and school performance.<sup>12</sup> The interaction is remarkable as the age range at adoption was relatively small (11-16 months). The catch-up rate may partly depend on the timing of placement in a beneficial environment, with earlier adopted children being more flexible and benefiting more rapidly, which may indicate sensitive periods during when recovery is easier,<sup>2,4</sup> but replication of this finding is necessary.

Weight recovered faster than height, which is congruent with evidence that weight is more dependent on recent food intake,<sup>7</sup> while for catch-up in height bone growth is necessary. This may take longer and requires “normal” growth hormone secretion, which can be suppressed in post-institutionalized children (D.E. Johnson, et al, unpublished data, 2009). Although catch-up for head circumference is usually less complete than for weight and height,<sup>12</sup> we already found some catch-up during this 6-month period.

### *Stress regulation*

Contrary to expectations, the daily cortisol curves of the institutionalized, foster, and non-adopted children did not differ. This may reflect fairly adequate rearing arrangements for (at least some) institutionalized children. This hypothesis is supported by the modest growth delays of the institutionalized children, but not by their delayed cognitive and motor development. Perhaps the stress regulation system is more robust than the systems underlying cognitive and motor development. When comparing post-institutionalized and non-adopted children, comparable diurnal curves have already been found shortly after placement.<sup>21</sup> Moreover, institutionalized children in Ukraine showed a similar diurnal cortisol production as family-reared children.<sup>18</sup> We found slightly higher afternoon cortisol levels for the foster children at Time 1, compared with the non-adopted children. We speculate that this more dysregulated curve may have resulted from stress or grief experienced by the foster children after the separation from their foster parents.<sup>23</sup> However, replication of this finding is needed.

### *Cognitive and motor development*

Consistent with previous studies, the adopted infants showed cognitive and motor delays.<sup>5,10</sup> Although they showed catch-up in cognitive development, this catch-up was not (yet) complete. Motor development was also below average at Time 2. This concurs with Cohen et al<sup>5</sup> who found complete catch-up for mental

and motor development not earlier than 2 years after adoption. Interestingly, we found no catch-up in motor development, which may be due to the infants' relatively well-developed motor skills at Time 1, leaving less room for the extra development implied in catch-up. The complexity of motor skills in children's second year of life (e.g., walking) may also be relevant. As children need time to practice and master these complicated skills, this may prevent children from showing catch-up growth directly after adoption. Finally, simple motor skills are controlled by the cerebellum, a part of the brain which is most susceptible to environmental influences.<sup>31</sup> In institutionalized children understimulation of the cerebellum before adoption may hinder normal development (and catch-up) of this brain region. It should be mentioned that we might have found catch-up in motor development if the first measurement had taken place directly after arrival.

Our hypothesis regarding better cognitive and motor skills in foster children compared to institutionalized children was supported, probably because of the more optimal rearing background of the foster children,<sup>2</sup> opposed to a relative lack of stimulation experienced by institutionalized children. Nevertheless, the below average development of the foster children at Time 1 suggests suboptimal rearing arrangements also in foster families.<sup>3</sup>

Institutions may be classified into three levels based on their quality of care<sup>32</sup>: (1) institutions characterized by global deprivation of health care, nutrition, stimulation, and relationship needs; (2) institutions with adequate health care and nutrition, but deprivation of stimulation and relationship needs; and (3) institutions that meet all needs except for stable relationships with consistent caregivers. Our results with regard to physical growth and cognitive and motor development suggest that the institutions where the children in our study were raised fall in the second category.

A limitation of the study is that salivary cortisol was sampled on 1 day only at Time 1 and at Time 2 rather than on several days to incorporate the possible instability of the cortisol values. In addition, the physical measures were reported by the parents, which may have introduced error. However, the high correlations between the auxological measures at 2 and 6 months after arrival and the correlations among these measures both at Time 1 and Time 2, indicate reliable assessments. As in many adoption studies,<sup>7,8,22</sup> we lacked reliable information about pre- and perinatal characteristics (e.g., birth weight).

## CONCLUSION

This study is one of the few studies examining adopted children from China and the first to compare the development of foster and institutionalized children shortly after international adoption. It seems that the differential effects of pre-adoption foster and institutional care are more pronounced for cognitive and motor development than for physical growth and stress regulation. Our finding that foster care is less detrimental to children's cognitive and motor development than institutional rearing should be taken into account by clinicians working with adoptive families. It may also encourage adoption authorities to stimulate the increase of the number of foster families in the countries of origin.

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## 4. Infants' Attachment Security after International Adoption from Foster Care or Institutions in China

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### ABSTRACT

*Objective:* To compare attachment security, indiscriminate friendliness and responsiveness of infants adopted from institutional care (PI) and foster care (FC) in China, and compare their development with non-adopted children. *Method:* Fifty PI and 42 FC children, aged 11-16 months on arrival, were studied 2 and 6 months post-adoption. Attachment was assessed with the Strange Situation Procedure. Mothers reported on indiscriminate friendliness, and child responsiveness to the mother was observed during free play. *Results:* FC children were as securely attached as non-adopted children, whereas PI children showed more insecure attachment. Both groups showed more disorganized attachment than non-adopted children. FC and PI children did not differ on responsiveness and indiscriminate friendliness, but FC children increased more in responsiveness than PI children. Children with higher cognitive scores and children with more sensitive adoptive mothers showed less indiscriminate friendliness. *Conclusion:* Pre-adoption foster care is less detrimental to children's attachment security than institutional care.

### INTRODUCTION

Adopted children are at risk of developing insecure and disorganized attachment relationships with their adoptive parents, particularly when they are adopted after their first birthday.<sup>1</sup> Here we address the question whether infants adopted from institutions versus foster families differ in their way of adapting to their new family, how their adaptation develops across time, and what role the adoptive parents play. We examined the social-emotional development of infants adopted from China to the Netherlands around their first birthday. We observed the children two and six months after adoption and compared their development with that of normative, non-adopted children.

#### *Foster care versus institutional care*

In China, the number of foster families is increasing, as foster care is perceived as less detrimental than institutional care.<sup>2</sup> However, hardly any study has contrasted the development of former foster (FC) and post-institutionalized (PI)

children after their adoption.<sup>3</sup> For example, not much is known about potential differences regarding their attachment formation with the adoptive parents, although one study found no differences in parent-reported attachment behavior between FC and PI children.<sup>4</sup> Whether the *observed* attachment behavior of FC and PI children differs from that of non-adopted children and whether there are changes in attachment security in the first months after adoption is, to our knowledge, examined for the first time in the current study.

#### *Attachment security*

Forming an attachment relationship is a salient developmental milestone. For example, secure attachment is associated with a more positive social development,<sup>5</sup> whereas insecure and disorganized attachment is related to later externalizing behavior<sup>6</sup>. A central assumption in attachment theory is that daily interactions with caregivers in the first years of life contribute to the development of *internal working models* of attachment.<sup>7</sup> These models contain mental representations of the attachment figure and the self, and are used to interpret and anticipate the behavior of the attachment figure and thereby influence the child's own attachment behavior. Especially during early childhood internal working models are flexible, and can change as a consequence of changing environments.<sup>8</sup> Thus, the transition from an adverse pre-adoption rearing setting to a more sensitive adoptive family may (eventually) result in a corresponding change in adopted children's internal working model. In the current study we included children adopted around their first birthday, a period considered formative for the development of a first attachment relationship. The effect of the pre-adoption rearing setting (foster family versus institution) on children's attachment relationship with the adoptive parents is one of the central questions of our study.

The transition to a more sensitive adoptive family may also contribute to an increase in children's responsiveness to their new parents. A more passive and less responsive interaction style is characteristic of post-institutionalized children, possibly due to the lack of sensitive care before the adoption.<sup>9</sup> In the current study we tested whether children's responsiveness shortly after adoption and possible changes in responsiveness during the first half year in the adoptive family depended on pre-adoption care (foster versus institutional care).

#### *Indiscriminate friendliness*

Indiscriminately friendly children react in too intimate ways towards unknown strangers (e.g., climbing on their lap), without showing "normal" fear or reticence<sup>10</sup>. Indiscriminate friendliness (IF) has been hypothesized to result from the lack of consistent and responsive caregiving. IF may then be adaptive, as it may maximize the probability of being cared for.<sup>11</sup> Several studies have found that institutionalized children and post-institutionalized adopted children show IF.<sup>9</sup> IF has been found to persist in the first years after adoption.<sup>4,11</sup> Since FC children probably received more consistent, family-type care in their early lives than PI children, lower levels of IF may be expected in FC children.

### *Hypotheses*

We examine the following hypotheses: (1) PI children show higher rates of insecure, in particular insecure disorganized attachment, compared to non-adopted children. FC children, who may have experienced pre-adoption care of higher quality, present a more normative distribution of organized and disorganized attachment; (2) Reversibility of insecure and disorganized attachment is expected to be associated with parental sensitivity, with higher sensitivity related to changes to secure and organized attachments; (3) Adopted children show more IF than non-adopted children, and PI children are expected to exhibit more IF than FC children; (4) PI children are expected to display less responsiveness than FC children, and both groups of children are expected to show an increase in responsiveness over time.

## METHOD

### *Participants and procedure*

Adoptive families, adopting a girl aged between 11 and 16 months on arrival, were recruited through all three Dutch adoption agencies arranging adoptions from China. As the majority of children adopted from China are female (89% when the data collection started<sup>12</sup>), we included only girls in our study. In total, 198 families were contacted, of which 152 families responded (77%). Of these 152 families, 100 families agreed to participate (66%), 52 families did not want to participate (most families mentioned that the laboratory was too far away or they found participating too time-consuming/exhaustive for their child). Eight families dropped out for various personal reasons.

The 92 families that participated were visited at home and visited the university, two months (Time 1) and six months (Time 2) after the children's arrival in the Netherlands. At arrival the children's mean age was 13.03 months ( $SD = 1.35$ ). At the first home and lab visit the children had been in their adoptive family for an average of 2.21 months ( $SD = 0.19$ ) and 2.64 months ( $SD = 0.30$ ), respectively. The second visits were on average 6.30 ( $SD = 0.26$ ) and 6.82 months ( $SD = 0.48$ ) after arrival, respectively. All visits were conducted with the primary caregiver (90 mothers, 2 fathers), hereafter: mothers. In addition, the parents received questionnaires on their child's pre-adoption experiences (e.g., months in institutional and/or foster care) and their child's behavior (e.g., indiscriminate friendliness).

Based on pre-adoption care, children were classified as either post-institutionalized (PI) or former foster children (FC). PI children had lived in an institution prior to their adoption and had experienced other types of care for a maximum of one month ( $n = 50$ ). Children who had only experienced foster care (or another type of family care) or experienced a combination of both foster care and institutional care were classified as former 'foster children' ( $n = 42$ ). Sixteen of them had not experienced institutional care at any time. Children with a foster care background had on average experienced 3.65 months of institutional care and 9.31 months of foster care before their adoption.

Ninety children were adopted into two-parent families, while two children were adopted by single mothers. The mothers' age averaged 36.60 years ( $SD = 2.82$ ) and fathers' 37.50 years ( $SD = 2.67$ ). Most parents had a high education on a scale ranging from 1 [primary school only] to 5 [university] (mothers:  $M = 3.79$ ,  $SD = 0.92$ ; fathers:  $M = 4.09$ ,  $SD = 0.89$ ). For IF, the adopted children at Time 2 were compared to 129 non-adopted, first-born Dutch girls (Mean age = 17.98 months,  $SD = 0.80$ ).<sup>13</sup> At Time 1 the age difference between the adopted and non-adopted children was too large to compare the groups. The attachment distribution of the adopted children was compared to normative distribution<sup>14</sup> and the meta-analytic distribution of attachment in adopted children.<sup>1</sup>

#### *Measures*

*Strange Situation Procedure.* The Strange Situation Procedure (SSP<sup>15</sup>) is an observational laboratory procedure consisting of eight 3-minute episodes with two separations from and reunions with the parent. Attachment in the SSP is classified as secure, insecure-avoidant, insecure-ambivalent and insecure disorganized based on the patterns of (in-)secure attachment behavior and the presence of disorganized attachment behavior.<sup>15,16</sup> Secure (B) children usually have sensitive caregivers whom they use as a 'secure base' when exploring the environment and as a safe haven when they are distressed. Insecure-avoidant (A) children have experienced rejection or uninvolved care, leading to a minimization of their expressions of negative affect, in order to avoid the anticipated rejection of distress signals. Insecure-ambivalent (C) children usually have inconsistently responsive caregivers and maximize negative emotions to evoke care. Secure, ambivalent and avoidant children show *organized* strategies of emotion regulation. *Disorganized* attachment behavior is shown by children who are confronted with an insolvable paradox in stressful circumstances: their caregiver is at the same time a source of fear and the only potential source of comfort.<sup>17</sup> In the SSP disorganized (D) children show disorganized behavior toward the parent, suggesting a (temporary) breakdown of a consistent attachment strategy while dealing with the stress of the reunion; these children for example show contradictory or misdirected attachment behaviors, or fear or apprehension regarding the parent.<sup>16</sup> Children classified as 'D' received a secondary A/B/C-classification.

The videotaped SSPs were coded by two well-trained coders (MHvIJ en LRAA) who were blind to the assessment time as well as the children's pre-adoption care setting. First and second assessments of the same child were never coded by the same coder. Interrater reliability (kappa) among the coders on 15 tapes was .63 for the ABC-classifications and .52 for the ABCD-classifications. The percentages of agreement were 80% and 67%, respectively. For the continuous security and disorganization ratings the intraclass intercoder reliabilities were .69 and .63, respectively. The security scores were computed using the simplified Richters, Waters, and Vaughn<sup>18</sup> algorithm for attachment security<sup>19</sup> on the basis of the interactive SSP scores for proximity-seeking, contact maintenance, resistance, and avoidance. Due to technical problems one of the SSP recordings of the second assessment could not be coded.

*Indiscriminate friendliness.* IF was measured using five multiple-choice questions, each with one of the four answers reflecting IF.<sup>10</sup> At both times mothers reported: 1) how friendly their daughter was to new adults; 2) whether she was shy; 3) what she did upon meeting new adults; 4) whether she was willing to go home with a stranger, and 5) whether she had a tendency to wander off without being distressed. Not all mothers had yet observed their child in every situation. For example, at Time 1, 17 mothers were unable to answer question 4 (see above). As earlier research used two subscales for IF (items 1-3 versus items 4 and 5<sup>13</sup>), we decided to use only the first three items, that were more applicable for our children. Total scores were computed for children for whom at least two questions were answered. Cronbach's Alpha was .77 ( $n = 129$ ) for the non-adopted children and .65 ( $n = 82$ ) and .65 ( $n = 87$ ) for Time 1 and Time 2 of the adopted children, respectively. Total IF-scores were transformed to normalize the skewed distribution ( $1 - 1/[\text{original value} + 1]^{20}$ ).

*Emotional Availability Scales.* Children's responsiveness and maternal sensitivity were observed at home during 8 minutes of free play and coded with the Emotional Availability Scales (EAS<sup>21</sup>). Responsiveness (7-point rating scale) reflects children's eagerness and willingness to respond to the mother, taking the affective quality of the response into account. Sensitivity (9-point rating scale) refers to the mother's ability to correctly read and respond to the child's signals, and includes affect shown towards the child.<sup>21</sup> Both mother and child scales, and both assessments of all dyads were assessed by different coders, resulting in four coders per dyad. The intraclass intercoder reliabilities with the expert coder were .77 and .79 for responsiveness and .76 and .89 for sensitivity. Sensitivity and responsiveness were compared with the cutoff scores representing at risk development<sup>22</sup>: Sensitivity: risk 1-5, non-risk 5.5-6.5, optimal 7-9; Responsiveness: risk 1-3, non-risk 3.5-4.5, optimal 5-7. As sensitivity and responsiveness were measured in the same situation, they were not used in the same analyses.

#### *Missing data and data-analysis*

Apart from one missing attachment classification (see above), the attachment of two children could only be classified with the 3-way classification system: one child refused to let her mother leave the room (Time 1 and 2), while in another session a mistake was made (Time 2), preventing proper coding of disorganized attachment. For IF and for the continuous attachment scores missing values were substituted with mean scale scores (range = 0-3 missings). Results were similar when children with missing values were excluded from the analyses.

We first present the categorical attachment classifications, and compare the classifications of the adopted children with the normative distribution<sup>14</sup> and with the meta-analytic distribution of attachment in adopted children,<sup>1</sup> using Multinom.<sup>23</sup> To examine the development of the continuous attachment scores over time and to compare the FC and PI children, we present repeated measures ANOVAs. We conclude with repeated measures ANOVAs for child responsiveness, IF, and maternal sensitivity. Because FC children outperformed

the PI children on cognitive and motor development (Van den Dries, Juffer, Van IJzendoorn, & Bakermans-Kranenburg, 2010), we included these variables as covariates in the repeated measures ANOVAs. When their contribution was not significant, the covariates were removed from the final analyses. Correlations were computed between child outcomes and for the continuity between Time 1 and Time 2. Two-tailed tests were used in all analyses.

## RESULTS

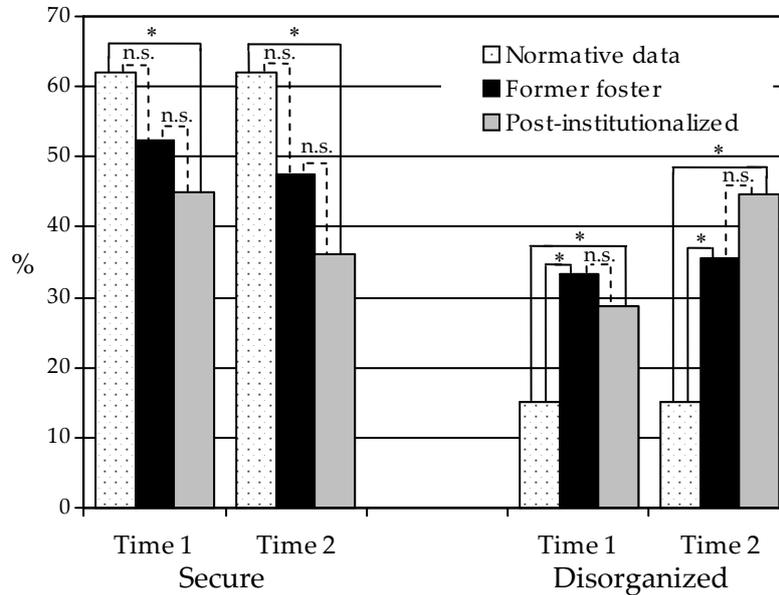
### *Preliminary analyses*

Preliminary analyses did not show any differences between PI and FC children on relevant child variables (e.g., age at adoption, physical growth, place in the child row), nor on parent variables (e.g., parents' age and education).

### *Categorical attachment classifications*

Two months after arrival, 10% of the children were classified as avoidant, 48% as secure, 11% as ambivalent, and 31% as disorganized. Six months after arrival the distribution was: 7% avoidant, 42% secure, 11% ambivalent, and 40% disorganized (see Table 1 for separate distributions of the FC and PI children). There were no significant differences between the distributions of the PI and FC children ( $\chi^2[3, n = 91] = 6.01$  and  $\chi^2[3, n = 89] = 3.24$ ,  $ps > .05$ , at Time 1 and Time 2, respectively).

Compared to the normative distribution of attachment (15% A, 62% B, 9% C, and 15% D<sup>14</sup>), the PI children showed significantly less secure and more disorganized attachments at both assessments ( $\chi^2$ -values ranging from 6.08 to 32.47,  $ps < .05$ , with  $N = 91$  and  $N = 89$  for Time 1 and Time 2, respectively; see Figure 1). The FC children were as often securely attached as the non-adopted children ( $\chi^2[1, N = 91] = 1.65$  and  $\chi^2[1, N = 89] = 3.69$ ,  $ps > .05$ , at Time 1 and Time 2 respectively; see Figure 1), but showed more disorganized attachments ( $\chi^2[1, N = 91] = 11.07$  and  $\chi^2[1, N = 89] = 14.13$ ,  $ps < .05$  for Time 1 and 2, respectively; see Figure 1). Compared to the meta-analytic attachment distribution of adopted children (47% B and 31% D<sup>1</sup>), similar percentages of secure and disorganized attachment were found for both the PI and FC children ( $0.09 < \chi^2[1, N = 91] < 0.49$  and  $0.01 < \chi^2[1, N = 89] < 4.11$ ,  $ps > .05$ , for Time 1 and 2, respectively). The four-way ABCD-classifications of the children were not stable in the four months between Time 1 and Time 2 (kappas .01, .04, and -.03,  $ps > .05$ , for the entire sample, FC, and PI children, respectively). The three-way ABC-classifications were more stable over time (kappa = .24,  $p < .01$ ), suggesting instability of disorganized attachment in particular. Of the 24 children who showed an *organized* attachment relationship at Time 1 and a *disorganized* attachment relationship at Time 2, 18 children had stable three-way classifications. Of the 16 children who developed an *organized* attachment relationship with their adoptive mother, 11 children had stable three-way attachment classifications. Twelve children remained disorganized over the four-month period.



\*  $p < .05$ ; n.s.: not significant

Figure 1. Percentages of secure and disorganized attachment classification for former foster children, post-institutionalized children, and normative data from Van IJzendoorn et al. (1999).

#### Continuous attachment scores

Using repeated measures ANOVAs, we found no differences between PI and FC children on the continuous security and disorganization scores. We did not find changes in security or disorganization scores over time, nor an interaction between time and pre-adoption care (Table 2). Attachment security scores were significantly correlated over time ( $r = .28, p < .01$ ), whereas this was not true for disorganization ( $r = .17, p > .05$ ). Neither security nor disorganization was significantly correlated with the other variables ( $-.18 > r > .18, p > .05$ ).

#### Indiscriminately friendliness

Children of more sensitive adoptive mothers showed less IF than children of less sensitive mothers ( $r = -.20, p = .053$  and  $r = -.25, p < .05$ ; for Time 1 and Time 2, respectively). No relation was found between IF and the other variables ( $-.14 > r > .18, p > .05$ ). IF was significantly correlated over time ( $r = .30, p < .01$ ). PI children did not show more IF than FC children, nor did we find a change in IF over time (Table 3). The FC and PI children did not differ from the non-adopted children on IF (adopted children: means ranging from .18 to .23; non-adopted children:  $M = .27, SD = .31; F[2, 218] = 1.23, p > .05$ ).

Maternal sensitivity and child cognitive development at Time 1 were significant covariates in the repeated measures ANOVA ( $F[1,88] = 6.35, p < .05$ , partial  $\eta^2 = .07$ ;

Table 1. Attachment classifications of post-institutionalized (PI) and former foster (FC) children at Time 1 and Time 2.

	Time 1				Time 2			
	PI		FC		PI		FC	
	3-way (n = 49) N (%)	4-way (n = 49) N (%)	3-way (n = 41) <sup>1</sup> N (%)	4-way (n = 42) N (%)	3-way (n = 49) N (%)	4-way (n = 47) N (%)	3-way (n = 41) <sup>1</sup> N (%)	4-way (n = 42) N (%)
A (avoidant)	4 (8.2)	4 (8.2)	6 (14.6)	5 (11.9)	4 (8.2)	2 (4.3)	8 (19.5)	4 (9.5)
B (secure)	31 (63.3)	22 (44.9)	31 (75.6)	22 (52.4)	31 (63.3)	17 (36.2)	29 (70.7)	20 (47.6)
C (ambivalent)	14 (28.6)	9 (18.4)	4 (9.8)	1 (2.4)	14 (28.6)	7 (14.9)	4 (9.8)	3 (7.1)
D (disorganized)		14 (28.6)		14 (33.3)		21 (44.7)		15 (35.7)

Note. <sup>1</sup> Not included: Cannot Classify in 3-way classifications: Time 1: PI, n = 1; FC, n = 1; Time 2: FC, n = 1.

Table 2. Repeated Measures ANOVAs for Continuous Attachment Scores, Indiscriminately Friendly Behavior and Responsiveness of Post-Institutionalized (PI) (n = 50) and Former Foster (FC) Children (n = 42).

	Time 1				Time 2				Repeated Measures		
	PI		FC		PI		FC		Time	Group	Time x Group
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	F-value	F-value	
Attachment Security	1.46 (2.33)	1.59 (2.70)	1.02 (2.48)	0.88 (2.47)	3.38	0.00	0.17				
Attachment Disorganization	3.19 (2.03)	3.64 (2.29)	3.79 (2.15)	3.96 (2.29)	2.45	0.80	0.23				
Indiscriminate Friendliness	0.21 (0.30)	0.18 (0.26)	0.19 (0.28)	0.23 (0.29)	0.18	0.00	1.33				
Responsiveness to Mother	4.86 (0.99)	4.67 (0.70)	5.07 (0.90)	5.32 (0.76)	17.05**	0.06	4.30*				

Note. \* p < .05, \*\* p < .01

$F[1,88] = 7.17, p < .01$ , partial  $\eta^2 = .08$ , respectively), revealing less IF for children of more sensitive mothers compared to children of less sensitive mothers, and less IF for children with higher cognitive scores compared to children with lower cognitive scores.

#### *Child responsiveness*

Using a repeated measures ANOVA (Table 2), we found an increase in child responsiveness over time (partial  $\eta^2 = .16$ ). A significant interaction between time and pre-adoption care showed that FC children presented a larger increase in responsiveness than PI children (partial  $\eta^2 = .05$ ). The adopted children's mean responsiveness scores (ranging from 4.76 to 5.32, Table 2) were well above the cut-off scores for at risk development (1-3), at both times. Responsiveness was not related to other child variables ( $-.14 > r > .14, ps > .05$ ), while Time 1 and Time 2 responsiveness were significantly correlated ( $r = .30, p < .01$ ).

#### *Maternal sensitivity*

A repeated measures ANOVA for sensitivity showed that mothers of FC and PI children were equally sensitive ( $F[1,90] = .03, p > .05$ ; Time 1: PI:  $M = 5.64, SD = 1.52$ , FC:  $M = 5.89, SD = 1.44$ ; Time 2: PI:  $M = 5.86, SD = 1.55$ , FC:  $M = 5.70, SD = 1.50$ ) and that their sensitivity scores did not change over time ( $F[1,90] = 0.01, p > .05$ ). Time 1 and Time 2 sensitivity scores were correlated,  $r = .43 (p < .01)$ . Maternal sensitivity scores (means ranging from 5.64 to 5.89) were within the non-risk zone (5.5-6.5). Sensitivity at Time 1 was not significantly related to the continuous attachment security scores (correlations .14 and .13,  $ps > .05$ , for Time 1 and 2, respectively) or disorganization scores (correlations .03 and .01,  $ps > .05$ , for Time 1 and 2, respectively), nor was sensitivity at Time 1 a significant predictor for changes in attachment security or disorganization ( $F[1,90] = 0.01, p > .05$  and  $F[1,90] = 0.03, p > .05$ , respectively), or a significant covariate in the repeated measures analyses (except for IF).

## DISCUSSION

We examined the social-emotional development of internationally adopted infants from institutional (PI) or foster care (FC) in China. FC children were as often securely attached as non-adopted children, whereas PI children showed significantly more insecure attachments. Both groups of children showed more disorganized attachments than non-adopted children. The FC and PI children did not differ on responsiveness and indiscriminate friendliness (IF) and their scores were comparable with those of normative, non-adopted children. However, we found a larger increase in responsiveness over time for the FC children compared to the PI children. Maternal sensitivity scores were in the non-risk range, while children of more sensitive adoptive mothers showed less IF compared to children of less sensitive mothers. Children with higher cognitive scores also showed less IF.

This study has several limitations. Details on pre-adoption care could not be established reliably, and parental attachment has not been included. In addition, attachment to the fathers and paternal sensitivity were not measured as more visits were not feasible. IF was measured by a questionnaire, which may be less valid than observations.

For the PI children the deviation from the normative attachment distribution was probably due to unresponsive pre-adoption care.<sup>24</sup> Although the PI children received relatively good physical care in China, as indicated by their only minor growth delays, the absence of responsive care was supported by their large cognitive delays (Van den Dries, Juffer, Van IJzendoorn, & Bakermans-Kranenburg, 2010). The normative percentage of secure attachments of the FC children may be the result of better pre-adoption care, which is consistent with the smaller cognitive and motor delays of the FC children compared to the PI children (Van den Dries, Juffer, Van IJzendoorn, & Bakermans-Kranenburg, 2010). However, for the FC children the adoption was also inextricably associated with the loss of their foster parent(s), which may have had an adverse effect on the development of new attachment relationships, possibly resulting in disorganized attachments.

The adopted children's attachment classifications were not stable over time, suggesting a rearrangement of their attachment system as an adaptation to life in the adoptive family. This instability is congruent with a study that showed a mixture of various attachment behaviors in foster children in the first months after placement.<sup>25</sup> Many children in our study developed secure and organized attachment relationships, but a substantial number of children developed disorganized relationships. For most of these children their ABC-classifications were stable. This is consistent with the stability of the security scores over time, and suggests a partial rearrangement of the attachment system, specifically regarding (dis)organization of attachment. For adopted children, disorganization may have a different meaning and may reflect "a *lack* of a coherent strategy for obtaining felt security from a new parent (rather than a *lapse* in strategy)",<sup>25</sup> implying reorganization is necessary to develop coherent attachment strategies. One study has shown that institutionalized children classified as disorganized had the highest security scores two years after adoption,<sup>26</sup> which may suggest that especially these children are open to changes in attachment.

In our study, maternal sensitivity was not associated with attachment. However, it should be noted that although the relation between sensitivity and attachment is empirically well established, the strength of this association is modest.<sup>27</sup> The short time our children have spent in the care of their generally sensitive adoptive mothers may not have been sufficient to affect attachment security. Moreover, Stovall and Dozier<sup>25</sup> indicated that sensitively responding to adopted/foster children's needs is not enough to influence attachment security. Parents have to act "therapeutically", for example by challenging children's alienating behaviors. Finally, as especially sensitive responses to infant *distress* are assumed to influence attachment,<sup>28</sup> the use of a free-play situation to measure sensitivity may not have been ideal.

The comparable levels of IF in PI, FC, and non-adopted children were unexpected, as higher levels were hypothesized for PI children. Rather than or in addition to the adaptive value of IF to increase the chance of being cared for, it has also been suggested that children develop IF when they lack contingent interactions with stable caregivers, which are necessary for developing preferences for familiar individuals.<sup>29</sup> Our PI children may have received just enough care in China to develop such preferences. This is in line with the improvements in care in Chinese institutions<sup>2,30</sup>, especially in institutions benefiting from international adoption fees<sup>2</sup>. Further, the fact that the children formed an attachment relationship with the adoptive parents soon after the adoption may suggest that there were some basic social contacts available to the children in China, although this could not be verified. The higher cognitive scores of children with lower levels of IF may suggest that these children were indeed able to profit from basic (social) stimulation in China. The lower levels of IF for children receiving more sensitive care compared to children of less sensitive adoptive mothers suggest some flexibility in IF in the first months after adoption, and an influence of parenting on its development.

For child responsiveness we found larger increases for FC than for PI children. The FC children may have felt at ease in the adoptive family more rapidly, due to their familiarity with family-rearing, and may therefore have benefited more from this environment. For PI children it may take longer before they respond to their new parents in affectively attuned ways.

## CONCLUSION

Based on our findings we conclude that pre-adoption foster care appears to be more beneficial for the development of children's attachment relationships and for increasing rates of child responsiveness after adoptive placement, compared to pre-adoption institutional care. Nevertheless, for children adopted from both types of pre-adoption care early interventions are necessary to diminish the rate of disorganized attachment.

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## 5. General discussion: Adoption, Risk, and Protection

### INTRODUCTION

This thesis examined the development of adopted children to shed more light on the effects of deprivation on child development and the potential for catch-up and recovery after placement in a more advantageous environment. In the first part of the thesis a meta-analysis is presented in which we compared adopted children's attachment relationships with the normative attachment distribution of non-adopted children raised by their biological parents, and - as a comparison - we also compared the attachment distribution of foster children with the normative distribution. The second part of the thesis focused on the development of former foster and post-institutionalized children, 11 to 16 months old at arrival, two and six months after their adoption from China. Several salient developmental domains were studied: attachment, cognitive and motor development, physical growth, stress regulation, and social-emotional behavior. In this chapter the results are summarized and discussed, and recommendations for practice and future research are presented.

### ATTACHMENT

#### *Meta-analysis*

For adopted children the development of a secure attachment relationship with their adoptive parents is not straightforward, as they have been subjected to experiences of separation and loss of their caregivers (Bowlby, 1982) and, additionally, many of them have experienced social deprivation in institutional care (e.g., Zeanah, Smyke, Koga, Carlson, & the BEIP Core Group 2005), possibly preventing the development of (secure) selective attachment relationships. For foster children comparable risks may be present, as there are several similarities in the background of adopted and foster children. For example, foster children have also experienced a separation from their birth parents and many have been victims of neglect or abuse before their foster placement (e.g., Department for Children, Schools and Families, 2008; Oosterman & Schuengel, 2008). There are, however, also differences between foster and adopted children, which makes the foster group an interesting comparison group. For example, foster children may still have - some - contact with their biological parents and they may have experienced multiple disruptions and placements (see e.g., Oosterman, Schuengel, Slot, Bullens, & Doreleijers, 2007) due to the temporary nature of foster care placements.

In our meta-analysis (see Chapter 2) we found that adopted children (47% secure [B], 31% disorganized [D]) showed less favorable outcomes compared to normative, non-adopted children (62% B, 15% D), but they scored favorably compared to still institutionalized children (11% B, 73% D). Adoption thus appears to be a risk factor resulting in more insecure and disorganized attachment (compared to non-adopted comparisons) as well as a protective factor leading to an improvement in the distribution of attachment relationships (compared to still institutionalized peers).

Our analyses on the core set of studies, using only reliable observational measures, revealed that especially children adopted before their first birthday benefited from their adoptive placement and showed secure attachments as often as non-adopted children. This may be due to their placement in a generally sensitive adoptive family during a period when attachment is still developing (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1982), and may also have resulted from a shorter exposure to deprived care. In the BEIP study (see Introduction), Smyke and colleagues found that children placed before their second birthday presented more secure attachment relationships than children placed after their second birthday (Smyke, Zeanah, Fox, Nelson, & Gunthrie, 2010). It would therefore be interesting to meta-analytically contrast attachment security of children adopted before their first birthday with children adopted between their first and second birthday, and with children adopted after their second birthday. Unfortunately, insufficient studies were available to examine these contrasts in our meta-analysis.

We found that Eastern European children showed less attachment security than Asian children, which may be explained by the poor reputation of institutional care in Eastern European countries (Dobrova-Krol, Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2010; Nelson et al., 2009; Zeanah et al., 2003). When both observational and self-report measures of attachment security were included in a meta-analytic comparison, the risk for adopted children to develop insecure attachment relationships after their first birthday was not revealed, thus showing the advantage of using standardized observations compared to self-report measures.

The adopted children showed disorganized attachments more often than non-adopted children, but no evidence of beneficial effects of early placement were found, suggesting that early experiences of neglect and maltreatment negatively influence attachment *organization*, even when these experiences do not extend beyond the first year of life. This corresponds with studies in which 13-month old children who experienced maltreatment in their first year of life showed high levels of disorganized attachment (Carlson, Cicchetti, Barnett, & Braunwald, 1989; Cicchetti, Rogosch, & Toth, 2006). Both for attachment security and disorganization other contrasts, such as domestic versus international adoption and same-race versus transracial placements, were not significant. These different 'types' of adoption may be less relevant, compared to the significant effect of the adoptive placement itself. As only a limited number of studies used - reliable - observational measures to assess attachment, we could not disentangle the

effects of age at placement and the other contrasts, possibly masking their effects. When more studies on the attachment of adopted children become available, additional moderators (e.g., pre-adoption foster care versus institutional care) can be included in future research.

Comparable with the adopted children, foster children showed more disorganized attachments than non-fostered children. Further, foster children were as securely attached as the normative group. For the foster children no moderators were tested, so we do not know whether earlier placements have the same beneficial effect for foster children as they have for the adopted children.

#### *Empirical study*

In our empirical study we included young girls adopted from foster care ( $n = 42$ ) and institutional care ( $n = 50$ ) in China. As the former foster children were expected to have received more family-like care, better developmental outcomes were anticipated for former foster children compared to children raised in institutional care. The outcomes of our empirical study correspond with the results of our meta-analysis: Both the former foster and post-institutionalized children did not differ from the meta-analytic distribution of secure and disorganized attachment of adopted children. However, the children raised in foster families were as securely attached as non-adopted children, whereas the post-institutionalized children showed more insecure attachments. Both groups of adopted children showed more disorganized attachments than the normative group. On the continuous attachment scales there were no differences between the former foster and post-institutionalized children, and a catch-up over time was not found. The A/B/C/D-classifications of the children were not stable over time, with some children developing an organized attachment strategy between both assessments and others developing a disorganized strategy. The A/B/C-classifications were more stable, suggesting instability of especially disorganized attachment.

#### PHYSICAL GROWTH AND STRESS REGULATION

Several studies have documented the detrimental effects of institutional care on physical growth. A meta-analysis on the physical growth of adopted children indeed found large delays at adoptive placement, with effect sizes (Cohen's  $d$ ) ranging from -2.36 to -2.60 (Van IJzendoorn, Bakermans-Kranenburg, & Juffer, 2007). In our study, the adopted children showed modest growth delays for weight, height and head circumference, which were similar for the post-institutionalized and former foster children (see Chapter 3). We found a significant catch-up over time for weight and head circumference, especially for earlier adopted children, suggesting the presence of a sensitive period during which recovery is easier (Nelson et al., 2007). The former foster and post-institutionalized children had similar patterns of diurnal cortisol production compared to non-adopted children, proposing pre-adoption foster and institutional care were not risk factors for the development of the stress regulation system (see Chapter 3).

## COGNITIVE AND MOTOR DEVELOPMENT

A meta-analysis on the cognitive development of institutionalized children has clearly shown the disadvantageous effect of institutional care (Van IJzendoorn, Lujik, & Juffer, 2008), with institutionalized children scoring 20 IQ points lower than family-reared children. In our study we indeed found large cognitive delays for the post-institutionalized children ( $M = 74$  at Time 1 and  $M = 84$  at Time 2), and significantly smaller delays for the former foster children ( $M = 84$  at Time 1 and  $M = 92$  at Time 2). Both groups of children showed a significant and remarkable catch-up in cognitive development after adoption. The motor development of the adopted children was below that of non-adopted children, with again significantly larger delays for the post-institutionalized children ( $M = 85$  at both assessments) than for the former foster children ( $M = 93$  at Time 1 and  $M = 91$  at Time 2). Between both assessments the adopted children did not show a catch-up in motor development; their motor skills developed in a similar pace as those of non-adopted children (see Chapter 3). This may be due to the fairly complex skills the children needed to develop (e.g., walking) and the relatively high level of motor development at the first assessment.

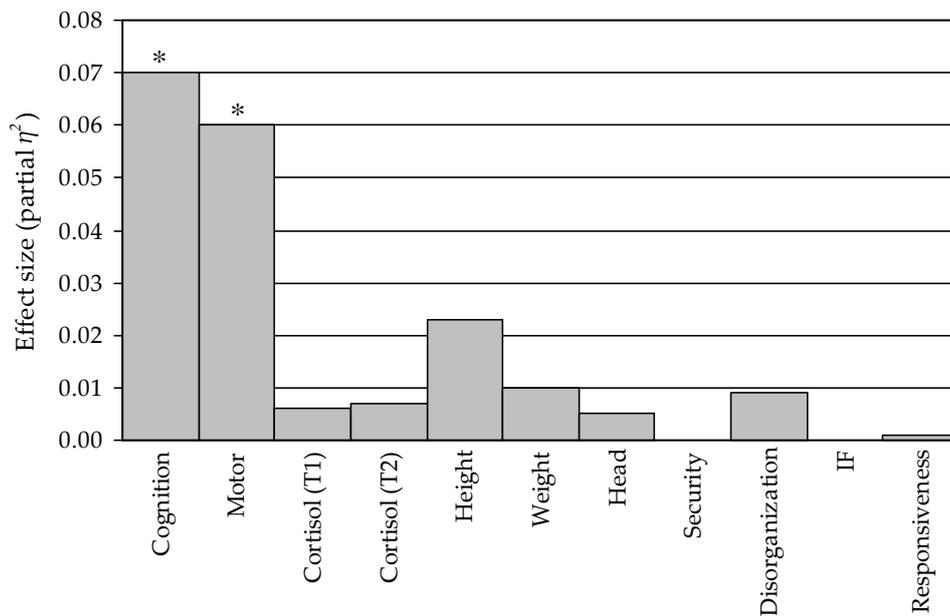
## SOCIAL-EMOTIONAL DEVELOPMENT

Due to high child-to-caregiver ratios, regimented daily routines and frequent changes in caregiving personal, institutionalized children are often deprived of stable and personal contact with their caregivers, which may lead to a compromised social development (Bakermans-Kranenburg et al., 2010). For example, when a group of Romanian children was adopted from institutional care, more than half of the children were characterized as unresponsive (McMullan & Fisher, 1992). In our study the adopted children showed adequate levels of responsiveness to their adoptive mother, and they showed an increase in responsiveness over time. This increase was larger for the former foster children, possibly due to their familiarity with family care. We found low levels of indiscriminate friendliness in the adopted children, which were comparable to the levels found in non-adopted children. These low levels may be due to the presence of just enough (basic) social stimulation in China to develop a preference for individual caregivers. Although this could not be verified, it is at least consistent with the better cognitive development that we found for children with lower levels of indiscriminate friendliness. In addition, we found less indiscriminate friendliness in children of more sensitive mothers, suggesting an influence of the adoptive parents on the level of their children's indiscriminate friendliness (see Chapter 4).

## THE INFLUENCE OF DIFFERENT TYPES OF PRE-ADOPTION CARE

Our hypothesis that foster care would be less detrimental for child development than institutional care could not be confirmed for all developmental domains (see Figure 1). For example, for physical growth, similar - modest - growth

delays were found for the post-institutionalized and former foster children. These only modest growth delays may point to a relatively adequate quality of pre-adoption health care and nutrition in Chinese institutions nowadays (Johnson, 2004; Van Schaik, Wolfs, & Geelen, 2009), which may subsequently explain the lack of differences in physical growth between the two groups of adopted children. However, consistent with our hypothesis, the former foster children outperformed the post-institutionalized children on cognitive and motor development, probably because the foster children experienced more one-on-one attention and stimulation before their adoptive placement than the post-institutionalized children. This is supported by the normative levels of secure attachment the former foster children showed after their adoption. Nevertheless, the significant cognitive and motor delays of the former foster children suggest imperfections in pre-adoption foster care as well.



\*  $p < .05$ , pointing to larger delays for the institutionalized children. Motor: Motor development; T1: Time 1; T2: Time 2; Head: Head circumference; Security: Continuous security scores; Disorganization: Continuous disorganization scores; IF: Indiscriminate friendliness; Responsiveness: Child responsiveness.

Figure 1. Effect sizes of the comparison between former foster and post-institutionalized children as reported in the repeated measures ANOVA's.

The absence of a sensitive and stable caregiver has been found to negatively influence children's social development (Bakermans-Kranenburg et al., 2010). In our study we indeed found that the post-institutionalized children showed more insecure attachments than non-adopted children, whereas the former

foster children showed secure attachments as often as the non-adopted children, demonstrating the beneficial effect of pre-adoption family-rearing. However, an effect of family-care on attachment disorganization was not found. Further, the former foster and post-institutionalized children did not differ in their mean levels of indiscriminate friendliness, responsiveness to the mother, and continuous attachment scores. This may be due to the 'only' suboptimal quality of pre-adoption foster care, supported by the developmental delays of the former foster children, but may also reflect a just sufficient quality of institutional care. In a study on institutionalized children in Romania only 3% of institutionalized children showed clear attachment patterns. Ten percent of the institutionalized children showed no attachment behavior, 25% of the children showed fragmented or incomplete sequences of attachment behavior and 31% showed only isolated attachment signals and responses (Zeanah et al., 2005). The children in our study all showed a selective, although often disorganized, attachment relationship with their adoptive parents two months after their adoption, which may point to sufficient (basic) social care in China necessary to develop selective attachment relationships. We have no empirical data to verify this, but it is in line with a recent study on Chinese institutionalized children that showed clear attachment patterns for all children (Steele, Steele, Jin, Archer, & Herreros, 2009).

Several studies have reported a link between inconsistent and instable caregiving and high levels of indiscriminate friendliness (for a review see Bakermans-Kranenburg et al., 2010), and less sensitive parenting styles have been reported to result in low levels of child responsiveness (Chaudhuri, Easterbrooks, & Davis, 2009; Salo et al., 2009). The relatively high level of responsiveness and low level of indiscriminate friendliness of the post-institutionalized children thus support the presence of some (basic) social care in the institutions, which for instance may have been provided during feeding and other caregiving routines. Because it was not possible to visit the children directly after their arrival in the Netherlands, we do not know whether the post-institutionalized children differed from the former foster children when they first met their adoptive parents, and whether they had already benefited from the generally more sensitive care in the adoptive family at our first assessment (two months after adoption). The high percentage of disorganized attachment in both post-institutionalized and former foster children shows that although the children may have received basic social care in China, the quality of this care was insufficient for a normative development of attachment organization. For both groups of children the loss of their pre-adoption caregiver may also have been important in the development of disorganized attachment relationships after adoptive placement.

#### CLINICAL IMPLICATIONS

What does it mean for children to be raised in foster families or institutions in China before their adoption to another country, in this case the Netherlands? Taken together, the quality of care in the Chinese institutions in which half of our children were raised, seems to correspond with the second level of deprivation,

as described by Gunnar, Bruce, and Grotevant (2000), in which adequate health care and nutrition are provided, but the needs for stimulation and stable relationships are not met (see General introduction). The advanced outcomes of the former foster children on several developmental domains point to a lower level of deprivation in foster care, although the former foster children presented developmental delays as well. This suggests that the shift from institutional care to family-based foster care in China (Johnson, 2004; Liu & Zhu, 2009) is a positive development and should be encouraged, although at the same time the quality of foster care should also be improved.

Reliable, empirical information on the foster care system in China is hard to obtain. Foster parents have been reported to develop emotional bonds with their foster children (Wang, 2007 as cited in Liu & Zhu, 2009), but there are also anecdotal reports of the use of the foster care system as part of governmental welfare programs, where poor families are paid to take care of institutionalized children (Zhong, 2004). The quality of care in these families is often unknown (Zhong, 2004), which suggests that a more regulated foster care program in China and a focus on parenting education seems desirable. In addition, as long as not all abandoned children can be cared for by foster parents, improving the quality of institutional care is also essential (Bakermans-Kranenburg & Van IJzendoorn, 2009), for example by assigning stable caregivers to children (Groark, Muhamedrahimov, Palmov, Nikiforva, & McCall, 2005; St. Petersburg-USA Orphanage Research Team, 2008), providing more cognitive stimulation (Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2008), and promoting sensitive caregiving (Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2008).

Furthermore, it is important to focus on life after placement in the adoptive family as post-institutionalized children (see Chapter 4) and later adopted children (see Chapter 2) are at elevated risk of developing insecure attachments, while both early and later adopted children (see Chapter 2) and former foster and post-institutionalized children (see Chapter 4) are at risk of developing disorganized attachments. Therefore, interventions aimed at enhancing sensitive parenting and promoting attachment security may be beneficial for adopted children. An example of such an intervention using video-feedback has been presented by Juffer, Bakermans-Kranenburg and Van IJzendoorn (2005). In addition, Stovall and Dozier (2000) have suggested that foster (and by implication adoptive) parents should actively counteract their children's alienating behavior for secure attachment relationships to develop: Parents should not only respond sensitively to children needs, but also to their children's avoidant or resistant attachment behaviors. As our study shows elevated risks for attachment disorganization and demonstrates that the attachment relationships of the children are open to change in the first months after adoption, we conclude that *early* interventions, soon after adoptive placement, are badly needed. This is even more urgent because nowadays early - beneficial - placements (before the child's first birthday, as shown in our meta-analysis, see Chapter 2) are no longer common in international adoption and children will have been exposed to pre-adoption deprivation for longer periods of time.

## LIMITATIONS AND FUTURE DIRECTIONS

### *Pre-adoptive care*

In the current empirical study it was not feasible to include detailed information about pre-adoption care, as many adoptive parents had no information on relevant caregiving characteristics, such as the child-to-caregiver ratio, and the presence of physical abuse and/or social and emotional neglect. Caregiving environments can however vary greatly between and within institutions (Gunnar et al., 2000; Steele et al., 2009), and may also vary between foster families, demonstrating the importance of obtaining information on pre-adoption care in order to explain adoptees' diverse developmental trajectories. Moreover, such information can help adoptive parents to better understand their children's behavior and development. Unfortunately, as China is an immense country and the children in our study were adopted from many institutions, it was impossible to assess the pre-adoptive care the children experienced. Regrettably, we also had no information on why some children were placed and remained in institutions while others were raised in foster families.

Different developmental trajectories do not only reflect different qualities of pre-adoption care, but may also reflect individual child characteristics, such as birth weight and prenatal alcohol exposure, on which information was unfortunately not available. Thus, to effectively study the development and catch-up of adopted children, future research should - whenever possible - use a comprehensive approach and take salient factors into account, such as the pre-, peri- and postnatal history of the children (e.g., prenatal alcohol and/or drug exposure; Ladage, 2009; Miller, Chan, Tirella, & Perrin, 2009), their biological make-up (Bakermans-Kranenburg & Van IJzendoorn, 2007; Ellis & Boyce, 2008), the quality of pre-adoption care (e.g., malnutrition and deprivation; Ladage, 2009; Zeanah et al., 2005), and rearing arrangements in the adoptive family (e.g., parental sensitivity; Juffer et al., 2005). The use of a comprehensive approach when studying the development of adopted children is gaining popularity, although the lack of information on birth parents and pre- and perinatal histories of the children continues to be problematic. Palacios and Brodzinsky (2010) recently published an overview of adoption research in which they identified three successive trends in adoption research. In the first phase adoption researchers compared adopted with non-adopted children, mainly identifying maladjustment, developmental delays and behavior problems, while in the second phase researchers focused on the positive catch-up and recovery of adopted children after early adversity. Currently, in the third phase the emphasis is and should be on gaining insight in the individual variability of adoptees' adjustment, with as primary goal defining the neurobiological, developmental, and relational factors influencing the adjustment of adopted children. In this third phase, the concept of differential susceptibility, which suggests that some individuals are more susceptible to environmental influences than others - for better and for worse - might play a crucial role (Belsky, Bakermans-Kranenburg, & Van IJzendoorn, 2007).

*Parental attachment and sensitivity*

Studies have found a high correspondence between parental representations of attachment and infant-parent attachment relationships. The model of intergenerational transmission of attachment is based on the assumption that parental attachment representations influence parents' sensitive responsiveness to infants' attachment behaviors and thus influence the infants' attachment relationships (Van IJzendoorn, 1995). This intergenerational transmission of attachment may also be present for children raised in foster or adoptive families. For example, Dozier and colleagues (Dozier, Stovall, Albus, & Bates, 2001) have found that foster children organize their attachment behavior around the availability of their new foster parent, with children of foster mothers with non-autonomous (insecure) states of mind showing disorganized attachments more often (63% D) than children of autonomous mothers (21% D). This may suggest that the adoptive parents' attachment representations may also have played a role in the development of the attachment relationships of the adopted children in our study. Although it was not feasible to measure parental attachment representations in the current study, we have included parental sensitivity, which is part of the model of intergenerational transmission of attachment, at least for the organized attachment strategies. In our study, mean maternal sensitivity scores fell within the normal range and were not related to attachment security or disorganization, possibly due to the relatively short period of time the children have spent in the adoptive family. Sensitivity was related to indiscriminate friendliness, with children of more sensitive mothers showing lower levels of indiscriminate friendliness.

*Special needs adoptions*

In our study almost no children with special needs were present, although for example one child had a missing underarm, while another child had ear microtia. However, in the last few years the number of special needs adoptions from China has increased rapidly (Selman, 2009), creating an urgent need for studies focusing on these children. One preliminary study (Tan, Marfo, & Dedrick, 2007) has examined differences between children adopted from China to the USA with and without special needs, and found no differences in developmental delays at placement and parent-reported problem behavior, both in preschool and school-aged children, assessed at approximately two and six years after arrival, respectively. However, in that study the mean ages at adoption differed significantly between children with and without special needs, preventing robust conclusions.

As many children with special needs need extra medical attention after their adoption and possibly experience additional separations from their adoptive parents due to hospital admittance, these children may also require specific parental care, for instance to form secure attachment relationships with their adoptive parents. On the other hand, as children with special needs may have received more, and more specialized care in China (e.g., a child with a cleft lip/ palate needs more assistance during feeding; Pronk, 2007), they may also

have a certain advantage compared to children without special needs. Whether parents adopting a child with special needs require specific, additional support to optimally care for their child becomes a relevant question with the current increase of special needs adoptions, and should be examined in future studies.

## CONCLUSION

Our meta-analysis on attachment revealed that adopted children show a favorable attachment development compared to still institutionalized children, pointing to the positive effects of adoptive placement compared to institutional care (Van IJzendoorn & Juffer, 2006). The adopted children still lag behind the non-adopted children, although children adopted before their first birthday develop secure attachment as often as non-adopted children. Based on our empirical study we conclude that both former foster and post-institutionalized adopted children show developmental delays for disorganized attachment, physical growth, and cognitive and motor development compared to non-adopted children. However, positive catch-up after adoption was confirmed for the former foster and post-institutionalized children for physical growth, cognition, and child responsiveness to the mother. For physical growth earlier adopted children showed a larger catch-up over time compared to later adopted children, while for responsiveness we found a larger catch-up for the former foster children than for the post-institutionalized children.

Pre-adoption foster care appeared to be associated with more favorable outcomes than pre-adoption institutional care for cognitive and motor development, and for attachment security. The less favorable outcomes for post-institutionalized children converge with the extensive evidence on the detrimental effects of institutional care. Similar to what Bowlby already hypothesized in the 1950's (Bowlby, 1952), for children without parents both adoptive and foster care placements provide better child-rearing arrangements than institutional care.

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# Samenvatting

## INLEIDING

Jaarlijks worden tienduizenden kinderen na een internationale adoptie opgenomen in een nieuw gezin. De meeste van deze internationaal geadopteerde kinderen komen uit China (Selman, 2009; zie hoofdstuk 1 voor cijfers over Nederland), waar veel van hen voorafgaand aan hun adoptie in een kindertehuis verbleven. Tegenwoordig zijn er echter steeds meer adoptiekinderen die in China vóór hun adoptie in een pleeggezin hebben gewoond (Johnson, 2004). In dit proefschrift wordt de ontwikkeling van deze twee groepen adoptiekinderen onderzocht en vergeleken.

### *Opgroeien in een kindertehuis voorafgaand aan de adoptie*

Kinderen die opgroeien in een kindertehuis hebben vaak een ontwikkelingsachterstand (Dobrova-Krol, Van IJzendoorn, Bakermans-Kranenburg, & Juffer, 2010), als gevolg van het ontbreken van adequate zorg en stimulering en een tekort aan sociaal contact met de verzorgsters in het tehuis. Deze kinderen hebben vaak een lager IQ (Van IJzendoorn, Luijk, & Juffer, 2008) en ze laten een achterstand zien in hun lichamelijke groei (Van IJzendoorn, Bakermans-Kranenburg, & Juffer, 2007) en sociaal-emotionele ontwikkeling (Smyke, Zeanah, Fox, Nelson, & Gunthrie, 2010) vergeleken met kinderen die in een gezin opgroeien. Na hun adoptie maken veel tehuis kinderen een gedeeltelijke of complete inhaalslag in hun ontwikkeling als gevolg van de plaatsing in een adoptiegezin waar zij gestimuleerd worden om zich verder te ontwikkelen (Van IJzendoorn & Juffer, 2006).

### *Opgroeien in een pleeggezin voorafgaand aan de adoptie*

Over de ontwikkeling van kinderen die voorafgaand aan hun adoptie in een pleeggezin verbleven, is minder bekend. Dit komt met name omdat het plaatsen van kinderen in een pleeggezin vóór internationale adoptie een relatief recente ontwikkeling is (Johnson, 2004). Uit het weinige onderzoek dat is gedaan, bleek dat kinderen die voorafgaand aan hun adoptie in een pleeggezin woonden - in de betreffende studie in Guatemala - een minder grote groeiachterstand hadden dan kinderen die vanuit een kindertehuis werden geadopteerd, hoewel ook de voormalige pleegkinderen na de adoptieplaatsing kleiner en lichter waren dan niet-geadopteerde kinderen (Miller, Chan, Comfort, & Tirella, 2005). Ook wat betreft de mentale ontwikkeling bleken de voormalige pleegkinderen het beter te doen dan de voormalige tehuis kinderen, terwijl er geen verschillen werden gevonden in de motorische en sociaal-emotionele vaardigheden van beide

groepen kinderen. Deze studie doet vermoeden dat een verblijf in een pleeggezin voorafgaand aan de adoptie voordelen heeft ten opzichte van een verblijf in een kindertehuis, terwijl het tegelijkertijd suggereert dat opgroeien in een pleeggezin vóór de adoptie ook niet optimaal is.

### *Gehechtheid*

Gehechtheid is de aangeboren neiging van ieder kind om bij angst, verdriet en pijn troost en steun te zoeken bij een beschermende volwassene. Kinderen ontwikkelen een veilige of onveilige gehechtheidsrelatie (Ainsworth, Blehar, Waters, & Wall, 1978) op basis van hun ervaringen tijdens de dagelijkse omgang met hun ouders (of verzorgers). *Veilig* gehechte kinderen vertrouwen op de steun van hun ouders en gebruiken hen als een 'veilige basis' om de omgeving te verkennen en als bron van troost en bescherming in stressvolle situaties. *Onveilig* gehechte kinderen hebben daarentegen minder vertrouwen in de beschikbaarheid van hun opvoeder. *Onveilig-gedesorganiseerde* gehechtheid is daarbij het meest zorgwekkend omdat het latere gedragsproblemen en psychopathologie voorspelt. Kinderen met een gedesorganiseerde gehechtheid ervaren 'angst zonder oplossing' (Main & Hesse, 1990): voor deze kinderen zijn de ouders tegelijkertijd een bron van angst en de enige mogelijkheid tot het vinden van troost. Deze tegenstrijdigheid leidt ertoe dat de kinderen niet in staat zijn om op een georganiseerde manier met hun gevoelens van stress om te gaan. Deze kinderen zoeken bijvoorbeeld contact met de ouder waarbij ze zich halverwege de toenadering van de ouder wegdraaien.

Door gebrek aan voldoende steun en bescherming van hun verzorgsters ontwikkelen kinderen in tehuizen vaak onveilige en gedesorganiseerde gehechtheidsrelaties (Vorria e.a., 2003; Zeanah, Smyke, Koga, Carlson, & the BEIP Group, 2005). In dit proefschrift wordt onderzocht in hoeverre kinderen na hun adoptie een inhaalslag maken op het gebied van gehechtheid en in staat zijn alsnog een veilige relatie met hun adoptieouders op te bouwen.

## ONDERZOEK

### *Meta-analyse naar gehechtheid van adoptiekinderen*

In een meta-analyse worden de kwantitatieve resultaten van studies over hetzelfde onderwerp geïntegreerd en wordt de invloed van moderatoren getoetst. In dit proefschrift onderzochten wij met behulp van een meta-analyse of adoptiekinderen even vaak (on-)veilig gehecht waren als kinderen die in tehuizen opgroeiden en kinderen die door hun biologische ouders werden opgevoed. Daarnaast toetsten we of de geadopteerde kinderen even vaak geclassificeerd werden als gedesorganiseerd vergeleken met de bovengenoemde twee vergelijkingsgroepen. Vervolgens hebben wij de invloed van verschillende moderatoren onderzocht door de resultaten van subgroepen van studies met elkaar te vergelijken. Een van onze hypothesen hierbij was dat kinderen die vóór hun eerste verjaardag worden geadopteerd even vaak veilig gehecht zijn als niet-geadopteerde kinderen, terwijl we bij kinderen die na hun eerste verjaardag worden geadopteerd vaker een onveilige gehechtheidsrelatie verwachtten (zie hoofdstuk 2).

*Empirische studie naar de ontwikkeling van geadopteerde kinderen uit China*

In een empirische studie hebben wij onderzoek gedaan naar mogelijke verschillen in de ontwikkeling van adoptiekinderen die in China in een kindertehuis of in een pleeggezin hebben gewoond. Omdat de omstandigheden in kindertehuizen en pleeggezinnen in verschillende landen uiteen kunnen lopen - en vervolgens de ontwikkeling van de kinderen op een verschillende manier kunnen beïnvloeden (Pomerleau et al., 2005) - hebben wij ons in dit onderzoek alleen gericht op adoptiekinderen uit China. In totaal hebben 92 geadopteerde meisjes uit China aan het onderzoek meegedaan, waarvan 50 meisjes vóór hun adoptie in een kindertehuis hebben gewoond en 42 in een pleeggezin. Bij aankomst in Nederland waren de kinderen gemiddeld 13 maanden oud (range: 11 - 16 maanden). Alle adoptiekinderen zijn zowel twee als zes maanden na aankomst in Nederland thuis bezocht en ze hebben op beide tijdstippen samen met hun ouders een bezoek aan de universiteit gebracht.

In onze studie onderzochten we mogelijke verschillen tussen beide groepen kinderen in lichamelijke groei (lengte, gewicht en hoofdomtrek), mentale en motorische ontwikkeling en het omgaan met stress (hoofdstuk 3). Dit laatste is vastgesteld door bij alle kinderen het cortisolniveau in hun speeksel te bepalen. Cortisol is een stof die in het lichaam geproduceerd wordt en een rol speelt bij het omgaan met psychologische of fysieke stress. In hoofdstuk 4 beschrijven we de sociaal-emotionele ontwikkeling van beide groepen adoptiekinderen. Hiervoor onderzochten we de gehechtheidsrelaties die de kinderen met hun adoptieouders opbouwden, analyseerden we of de kinderen overvriendelijk gedrag vertoonden tegenover voor hen onbekende personen (zoals gerapporteerd door de adoptieouders) en observeerden we de responsiviteit van de kinderen. Bij dat laatste gaat het om het enthousiasme en de bereidheid van kinderen om op het gedrag van hun adoptieouders in te gaan. Daarnaast hebben we onderzocht of de sensitiviteit van de adoptieouders verband houdt met de sociaal-emotionele ontwikkeling van de adoptiekinderen.

Bij al deze ontwikkelingsdomeinen analyseerden we ook of beide groepen adoptiekinderen verschilden in de snelheid waarmee ze zich (mogelijk) aanpasten aan het leven in het adoptiegezin. Dit toetsten wij door de metingen die twee en zes maanden na aankomst zijn gedaan met elkaar te vergelijken. Daarnaast bestudeerden we of de ontwikkeling van de geadopteerde kinderen verschilde van die van niet-geadopteerde kinderen.

**RESULTATEN***Meta-analyse naar gehechtheid van adoptiekinderen*

Uit de meta-analyse bleek dat 47% van de adoptiekinderen een veilige gehechtheidsrelatie met de adoptieouder had ontwikkeld en dat 31% van de kinderen geclassificeerd werd als gedesorganiseerd. Dit laat zien dat de adoptiekinderen een inhaalslag hebben gemaakt ten opzichte van kinderen die in een kindertehuis wonen (11% veilig en 73% gedesorganiseerd), maar dat ze tegelijkertijd achterblijven bij niet-geadopteerde kinderen (62% veilig en 15% gedesorganiseerd).

Uit de meta-analyse bleek verder dat kinderen die vóór hun eerste verjaardag werden geadopteerd even vaak veilig gehecht waren als kinderen die bij hun biologische ouders opgroeiden, terwijl kinderen die na hun eerste verjaardag geadopteerd werden minder vaak veilig gehecht waren. Dit komt waarschijnlijk doordat jong geplaatste kinderen minder verwaarlozing hebben meegemaakt en al tijdens het opbouwen van een eerste gehechtheidsrelatie in een adoptiegezin zijn geplaatst. Bij gedesorganiseerde gehechtheid hebben we dit verschil niet gevonden. Zowel kinderen die vóór als na hun eerste verjaardag werden geadopteerd, hadden een groter risico om een gedesorganiseerde gehechtheidsrelatie te ontwikkelen vergeleken met niet-geadopteerde kinderen. Dit lijkt erop te wijzen dat het meemaken van verwaarlozing en mishandeling de *organisatie* van de gehechtheidsrelatie beïnvloedt, ook als deze ongunstige ervaringen alleen tijdens het eerste levensjaar aanwezig zijn.

Verder vonden we dat kinderen die vanuit Azië werden geadopteerd vaker een veilige relatie met hun adoptieouders opbouwden dan adoptiekinderen uit Oost-Europa. Dit komt waarschijnlijk door de ontoereikende kwaliteit van zorg in Oost-Europese kindertehuizen (Zeanah e.a., 2003). Er zijn geen verschillen aangetroffen tussen kinderen die geadopteerd werden door adoptieouders met dezelfde etniciteit als de kinderen en kinderen van adoptieouders met een andere etnische achtergrond. We hebben ook geen verschillen gevonden tussen binnenlands en internationaal geadopteerde kinderen. De gunstiger omstandigheden in het adoptiegezin - vergeleken met een kindertehuis - zijn waarschijnlijk belangrijker dan deze verschillende 'typen' adopties. Er zijn helaas nog te weinig studies gedaan om het effect van leeftijd bij aankomst tegelijkertijd met andere factoren meta-analytisch te toetsen, wat mogelijk de effecten van deze andere factoren verhult.

In onze meta-analyse hebben we ook getoetst of pleegkinderen - die in verschillende opzichten vergelijkbaar zijn met geadopteerde kinderen - vaker een (on-)veilige gehechtheidsrelatie met hun pleegouders opbouwen en of ze vaker geclassificeerd worden als gedesorganiseerd, vergeleken met kinderen die bij hun biologische ouders opgroeien. De pleegkinderen bleken in het algemeen even vaak veilig gehecht te zijn als kinderen die bij hun biologische ouders opgroeien. We hebben hierbij echter geen moderatoren getoetst, waardoor we geen uitspraken kunnen doen over het effect van plaatsingen vóór en na het eerste levensjaar. Daarnaast werden de pleegkinderen net als de adoptiekinderen vaker geclassificeerd als gedesorganiseerd.

*Empirisch onderzoek: verblijf in kindertehuis of pleeggezin voorafgaand aan de adoptie*  
*Fysieke groei.* Uit de empirische studie bleek dat zowel de adoptiekinderen uit China met een kindertehuis-achtergrond (hierna: geadopteerde tehuis-kinderen) als de kinderen die voorafgaand aan hun adoptie in een pleeggezin hebben gewoond (hierna: geadopteerde pleegkinderen) een relatief geringe groeiachterstand vertoonden vergeleken met niet-geadopteerde kinderen. We vonden hierbij geen verschillen tussen de geadopteerde tehuis- en pleegkinderen, wat aangeeft dat de kwaliteit van fysieke zorg in de Chinese kindertehuizen mogelijk niet slechter

is dan de fysieke zorg in Chinese pleeggezinnen. Tussen de eerste en tweede meting haalden de adoptiekinderen hun achterstand in gewicht en hoofdomtrek gedeeltelijk in, waarbij vooral de jongere kinderen bij de tweede meting vooruit waren gegaan.

*Stressregulatie.* We vonden geen afwijkende cortisolcurves voor de geadopteerde tehuis- en pleegkinderen vergeleken met niet-geadopteerde kinderen. Ook onderling zijn geen verschillen aangetroffen in de cortisolcurves van beide groepen adoptiekinderen, en ook niet in de metingen die twee en zes maanden na aankomst zijn gedaan.

*Mentale en motorische ontwikkeling.* Zowel de geadopteerde tehuis- als pleegkinderen vertoonden twee en zes maanden na aankomst een achterstand in hun mentale en motorische ontwikkeling vergeleken met niet-geadopteerde kinderen, waarbij de geadopteerde tehuis kinderen een grotere achterstand vertoonden dan de geadopteerde pleegkinderen. Beide groepen kinderen liepen hun achterstand in mentale ontwikkeling tussen de eerste en tweede meting gedeeltelijk in, waarbij we geen verschil vonden in de snelheid waarmee beide groepen kinderen zich ontwikkelden. Bij de motorische ontwikkeling vonden we geen extra vooruitgang over de tijd. Dit betekent dat de geadopteerde kinderen zich motorisch gezien even snel ontwikkelden als niet-geadopteerde kinderen. Dit zou kunnen komen door de complexe motorische vaardigheden die kinderen tijdens het tweede levensjaar moeten ontwikkelen (zoals lopen) en door de kleinere achterstand in motorische ontwikkeling vergeleken met de achterstand in mentale ontwikkeling.

*Gehechtheid.* De geadopteerde pleegkinderen waren even vaak veilig gehecht als de niet-geadopteerde kinderen, terwijl de geadopteerde tehuis kinderen vaker onveilig gehecht waren. Beide groepen adoptiekinderen lieten vaker een gedesorganiseerde gehechtheid zien vergeleken met kinderen die bij hun biologische ouders opgroeiden. We hebben geen verschillen gevonden in de verdeling van de gehechtheidsclassificaties van de geadopteerde tehuis- en pleegkinderen. De vergelijking van de gehechtheidsclassificaties van de eerste en tweede meting toonde aan dat sommige adoptiekinderen na hun adoptie een georganiseerde gehechtheidsrelatie ontwikkelden, terwijl andere adoptiekinderen een gedesorganiseerde relatie ontwikkelden. In deze korte periode na de adoptie lijkt gehechtheid nog weinig stabiel, met name wat betreft gedesorganiseerde gehechtheid. We vonden bij gehechtheid geen invloed van sensitiviteit van de ouders op de gehechtheidsclassificaties van de kinderen, mogelijk omdat de kinderen nog maar kort in hun nieuwe gezin woonden toen ze werden onderzocht.

*Sociaal-emotionele ontwikkeling.* Beide groepen adoptiekinderen toonden volgens hun ouders weinig overvriendelijk gedrag tegenover onbekende volwassenen (zoals op schoot kruipen) en hun scores waren vergelijkbaar met die van niet-

geadopteerde kinderen. Een verklaring hiervoor kan zijn dat de kinderen in China voldoende contact met hun verzorgsters hebben gehad om een zekere voorkeur voor individuele verzorgers te ontwikkelen. Deze verklaring lijkt te worden ondersteund door de bevinding dat kinderen met een betere mentale ontwikkeling, en dus waarschijnlijk betere zorg voor de adoptie, minder overvriendelijk gedrag lieten zien. Daarnaast bleken sensitievere adoptieouders kinderen te hebben die minder overvriendelijk gedrag lieten zien tegenover onbekende volwassenen.

Beide groepen geadopteerde kinderen lieten al vanaf de eerste meting enthousiasme en bereidheid zien om op het gedrag van hun ouders in te gaan, ze waren dus al responsief. Daarnaast lieten alle kinderen een stijging in responsiviteit zien, waarbij de stijging sterker was voor de geadopteerde pleegkinderen. Een mogelijke verklaring is dat de geadopteerde pleegkinderen door hun ervaringen met een gezin sneller gewend zijn geraakt aan het leven in hun nieuwe adoptiegezin en zich hieraan sneller konden aanpassen.

#### BEPERKINGEN EN VERVOLGONDERZOEK

Een van de belangrijkste beperkingen van dit onderzoek is dat onvoldoende (betrouwbare) gegevens beschikbaar waren over de omstandigheden waaronder de kinderen in China zijn opgegroeid. We weten bijvoorbeeld niet hoeveel contact de kinderen met hun verzorgsters hebben gehad en hoe hun dagindeling eruit zag. Daarnaast is het niet duidelijk waarom sommige kinderen in China in een kindertehuis werden geplaatst terwijl andere kinderen in een pleeggezin werden opgenomen. Na de adoptie heeft bij alle kinderen twee maanden na aankomst het eerste bezoek plaatsgevonden, waardoor achterstanden en verschillen direct na aankomst niet onderzocht konden worden. Daarnaast hebben we overvriendelijk gedrag tegenover onbekende volwassenen gemeten door de ouders een vragenlijst in te laten vullen. Dit levert mogelijk een minder betrouwbaar beeld op dan het observeren van dit gedrag bij het kind.

Momenteel worden steeds meer kinderen met een 'special-need' of handicap vanuit China geadopteerd. Het is belangrijk om hier aandacht aan te besteden in toekomstig onderzoek omdat deze kinderen mogelijk aangepaste zorg en opvang nodig hebben om zich optimaal te kunnen ontwikkelen. Daarnaast is meer inzicht nodig in de individuele eigenschappen van geadopteerde kinderen, zoals hun genetische bagage en neuro-biologische ontwikkeling, omdat deze eigenschappen mogelijk individuele verschillen in ontwikkelingstrajecten van geadopteerde kinderen kunnen verklaren.

#### CONCLUSIE

De studies die in dit proefschrift zijn beschreven tonen aan dat een verblijf in een pleeggezin in China voorafgaand aan de adoptie voordelen heeft ten opzichte van het wonen in een Chinees kindertehuis vóór de adoptie. Geadopteerde pleegkinderen hebben een betere mentale en motorische ontwikkeling, zijn

even vaak veilig gehecht als niet-geadopteerde kinderen en laten een snellere stijging in responsiviteit zien. Met betrekking tot de fysieke ontwikkeling en overvriendelijkheid zijn echter geen verschillen tussen beide groepen adoptiekinderen gevonden.

Vergeleken met niet-geadopteerde kinderen hebben de adoptiekinderen uit China op verschillende ontwikkelingsgebieden achterstanden die zij echter in het eerste half jaar na hun adoptie al deels inlopen. Hieruit blijkt dat de plaatsing in een adoptiegezin de ontwikkeling van deze kinderen ten goede komt, hoewel de mogelijkheden die ze hebben om hun achterstanden in te lopen niet onbegrensd zijn. Kinderen die na hun eerste verjaardag geadopteerd worden, kunnen minder gemakkelijk een veilige gehechtheidsrelatie met hun adoptieouders opbouwen en zowel geadopteerde pleeg- als tehuis kinderen laten vaker een gedesorganiseerde gehechtheidsrelatie zien vergeleken met kinderen die bij hun biologische ouders opgroeien. Dit pleit voor het aanbieden van specifieke ondersteuning en nazorg aan adoptieouders zodat zij de ontwikkeling van hun kinderen zo optimaal mogelijk kunnen begeleiden en stimuleren.

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## Curriculum Vitae

Linda van den Dries werd geboren op 8 december 1982 in Leiden. In 2000 behaalde zij haar VWO-diploma aan de Regionale Scholengemeenschap Pantarijn te Wageningen. In datzelfde jaar begon ze aan de opleiding Pedagogische Wetenschappen en Onderwijskunde aan de Katholieke Universiteit Nijmegen, waar ze in 2004 met lof afstudeerde bij de vakgroep Gezin en Gedrag. Van 2005 tot 2010 werkte Linda als promovenda op de Afdeling Algemene en Gezinspedagogiek (AGP) van de Universiteit Leiden waar zij onderzoek deed naar de ontwikkeling van jonge adoptiekinderen uit China. De resultaten van haar onderzoek zijn in dit proefschrift beschreven. Naast haar aanstelling als promovenda was Linda ook één dag in de week aangesteld als docent bij AGP. Momenteel is zij als post-doc onderzoeker betrokken bij de Leidse Longitudinale Adoptiestudie (LLAS) waarin de ontwikkeling van geadopteerde kinderen tot in de volwassenheid wordt onderzocht.





