Running head: EFFECTS OF TYPE OF CARE ON MULTIPLE DEVELOPMENTAL OUTCOMES AMONG GIRLS ADOPTED FROM CHINA

Experiencing different types of care preceding adoption: Implications for the health, development, strengths, competencies and indiscriminate friendliness of girls adopted from China to the Netherlands

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Abstract

The current study investigated and compared the development of Chinese girls adopted from institutional care, foster care, or from a mixture of both types of care to the Netherlands. The sample consisted of 1106 girls who were between 4 and 18 years of age (mean age 7 years). Parents completed several questionnaires addressing all kinds of subjects related to the health and development of the adopted children. Results revealed that most girls adopted from China were healthy and experienced few developmental delays. Most girls scored high on individual strengths and competencies as well and they had satisfying relationships with their adoptive parents. Part of the adoptees showed some indiscriminate friendliness. A comparison of the care groups revealed that girls adopted from foster care were in an advantage with regard to their general health and developmental status. Mean differences between the groups, however, were small. Neither a mediating effect of children's self-regulatory abilities, nor a moderating role of either age at adoption or the parent-child relationship could be established. Some direct effects, however, were found. Children adopted before their first birthday and children who had a very good relationship with their parents showed most developmental gains. Overall, this study provides information regarding the adjustment and development of female children adopted from various types of care in China that might be useful to adoptive parents and a range of professionals and organizations working with international adoptees.

Keywords: China, international adoption, pre-adoption care, health, development, strengths, competencies, indiscriminate friendliness.

Experiencing different types of care preceding adoption: Implications for the health, development, strengths, competencies and indiscriminate friendliness of girls adopted from China to the Netherlands

Millions of children around the world are abandoned and in need of alternative and supportive living arrangements as their biological parents are not able to provide sufficient food, shelter, care and safety for them (Van IJzendoorn et al., 2011). As a consequence, there are large numbers of international adoptees in North America and Europe nowadays. Each year, approximately 45,000 children worldwide are adopted among more than 100 sending and receiving countries (Selman, 2009). Before international adoption, however, children are often found to reside in different caregiving arrangements (Bruce, Tarullo, & Gunnar, 2009). Previous studies therefore have had different focuses as well. Many studies, for example, have compared adopted children to either non-adoptees, domestic adoptees, or to children adopted from institutions (e.g., Bruce et al., 2009; Dobrova-Krol, Van IJzendoorn, & Juffer, 2010; Juffer & Van IJzendoorn, 2005; Van den Dries, Juffer, Van IJzendoorn, & Bakermans-Kranenbrug, 2010). Placement in foster care before international adoption, however, is a relatively new phenomenon (Zeanah et al., 2003). As a consequence, many adoption studies to date have not differentiated extensively between former foster and post-institutionalized adopted children (but see Miller, Chan, Comfort, & Tirella, 2005; Van den Dries, Juffer, Van IJzendoorn, Bakermans-Kranenburg, & Alink, 2012). This study will focus on the development of Chinese adopted girls in the Netherlands who were adopted from institutional care, foster care, or from a mixture of both types of care.

Chinese Abandoned Children and International Adoption

In the mid-1990s, China entered the field of inter country adoption. Since then, and still nowadays, it is the most important Asian state of origin for most adopted children worldwide (Selman, 2009). In 1998, China became the main country of origin for adoption to the Netherlands as well, responsible for a quarter of all international adoptees (Ministry of Justice, 2000). From that year on, the number of children adopted from China continued to rise with a peak of 800 adoptions in 2004. This rate was more than 60% of the total number of adoptees arriving that year in the Netherlands (Ministry of Justice, 2009).

In 1979, after China's population rates had increased drastically, China implemented the one-child policy which involved a birth control program allowing one child per family, punishments and inducements to ensure its success, and it was intended to limit population growth (Dowling & Brown, 2009). Accordingly, many female children were abandoned as in China dominated an historical preference for sons to support and care for parents in an old age and to preserve the family name (Dowling & Brown, 2009). Although children were usually not abandoned without any care and concern, most of them could not be taken care of by families and were placed in Chinese institutions (Zhang, 2006). This resulted in drastic increases in the number of girls in state-run orphanages during

the past decade (Rojewski, Shapiro, & Shapiro, 2000).

As soon as China opened its borders for adoption, and in an effort to relieve some of the pressures associated with institutional care, the Chinese government allowed international adoption of abandoned girls. As such, inter-country adoption was used both as a means of reducing the large number of children who resided in institutions and to meet children's needs and rights to have a family life (Dowling & Brown, 2009).

From 2005 onwards, however, the number of adoptions from China has begun to decrease drastically in the Netherlands as well as in other countries (Selman, 2009). Reasons for this decline included restrictions on individuals who can adopt from foreign countries, the support of nongovernmental organizations and local communities in China to develop domestic fostering programs, and the relaxations of China's one-child policy. Also, after the publication of revealing reports in the mid-1990s (e.g., by Human Rights Watch), significant changes were made in the care provided to abandoned children in China (Dowling & Brown, 2009). China's ratification of the Hague Adoption Convention in 2005 and its approval of the UN Convention on the Rights of the Child (United Nations, 1989), for example, has led to the development of family care for children within China itself. This resulted in more domestically adopted children (Dowling & Brown, 2009).

Although family related care, like domestic adoptions and fostering, continues to be developed nowadays, and as day care arrangements and medical interventions for disabled children are more and more taken care of, it will still take considerable amounts of time and resources for policies and schemes to be operational throughout China (Dowling & Brown, 2009). Therefore, still a lot of children reside in institutions nowadays and international adoptions remain regarded as a valuable alternative for children who otherwise have to be cared for in institutions (Bakermans-Kranenburg et al., 2011).

There have actually been acknowledgements of the successes associated with inter-country adoptions from China. These were for example marked by very few adoptive breakdowns in countries around the world, suggesting that international adoption does not much harm to children (Dowling & Brown, 2009).

Comparing Institutional Care and Foster Care

The often found damaging consequences of institutional care have been known for many years (Johnson, Browne, & Hamilton-Giachritsis, 2006). Children exposed to institutional care namely do usually not receive the type of care and stimulating environment needed for individual growth and healthy (psychological) development (Bruce et al., 2009; Van IJzendoorn et al., 2011). Also in China, during the first few years of international adoption, the conditions in most institutions were severely inadequate and depriving (Van den Dries et al., 2012). Orphanages were typically marked by high caregiver-child ratios, non-optimal stimulation levels and inadequate nutrition. Besides, institutional buildings were found to be poorly heated and conditions were unhygienic. Children in institutions

therefore often experienced stunted physical growth, inhibited (motor) exploration, impaired medical health (Cohen, Loikasek, Yaghoub Zadeh, Pugliese, & Kiefer, 2008), and more socio-emotional, behavioral and cognitive impairments (Bruce et al., 2009; Van den Dries et al., 2012) than family-reared peers (Van IJzendoorn et al., 2011).

From the mid-1990s on, however, as the care system in China underwent some drastic changes, the quality of institutional care improved and some abandoned children were given the opportunity to stay in foster care before their adoptive placement (Meng & Kai, 2009). Foster care families are marked by a family environment that usually provides children with one stable caregiver providing consistent and responsive individualized care for at least part of their lives. Foster care is therefore often perceived as less detrimental for children's development than institutional care (Bakermans-Kranenburg et al., 2011; Bruce et al., 2009; Pears, Bruce, Fisher, & Kim, 2010; Van den Dries et al., 2012).

Several studies have indeed revealed that foster care leads to better developmental outcomes than institutional care (e.g. Meng & Kai, 2009; Smyke, Zeanah, Fox, Nelson, & Guthrie, 2010; Van den Dries et al., 2010). A review of the literature on the long-term effects of foster care, for example, found that children who stayed in foster families generally had a tendency to function better as adults than children who spent at least some part of their early lives in residential care (Barth, 2002). Perhaps the most notorious study to date having compared institutional care and foster care is the Bucharest Early Intervention Project (BEIP) (Nelson, Zeanah, Fox, Marshall, Smyke, & Guthrie, 2007). Results from this study revealed that institutional care is detrimental for child development, whereas foster care placements effectively reduce the negative effects of early institutionalization and simultaneously result in significant developmental gains (Smyke et al., (2010).

It should be noted, however, that some studies have also revealed that even children who resided in foster care preceding international adoption showed delayed growth and development (Miller et al., 2005). This indicates that foster care might not always be an ideal living environment either and that foster care arrangements are likely to provide less enriched and supportive environments than later adoptive homes. Furthermore, some children might have experienced multiple foster placements before adoption (Miller et al., 2005), and some adopted children may have experienced a mixture of both foster and institutional care (Tieman, Gast, & Juffer, 2009). These multiple shifts might hinder optimal development even further (Barth, 2002; Juffer & Van IJzendoorn, 2005; Pears et al., 2010). There is, however, evidence that children who experienced a stable, harmonious home environment prior to being placed into residential care (i.e. because of political, economic, or personal circumstances ultimately prevented the birth family from continuing to care for their child), experienced fewer emotional, behavioral, and scholastic difficulties at adoption than children who experienced family disruption and subsequent residential care at birth (Gunnar et al., 2000).

Finally, conditions experienced in institutions are often complex, varying and heterogeneous

(Dobrova-Krol et al., 2008). As a consequence, Gunnar (2000) identified three levels of privation within an institution that should be considered in the examination of children's developmental outcomes: (1) institutions with global privation of health, nutrition, stimulation, and relationship needs; (2) institutions with adequate health and nutrition support, but privation of stimulation and relationship needs; and (3) institutions that meet all needs except for stable, long-term relationships with consistent caregivers.

It seems very difficult to entangle the degree of privation internationally adopted children encountered prior to adoption. Clear is that provided individualized care may vary and that it may affect children in different ways (Gunnar et al., 2000).

General Development of Adopted Children

Although it is known that Chinese adopted children are usually quite young at the time of adoption, and they therefore seem to have sufficient time to catch-up in their development, most adoptees are found to have already reached an age when non-adopted children mostly have achieved critical developmental milestones on several domains (Cohen et al., 2008). Because of their early life experiences, many adopted children arrive in their adoptive families in poor medical health, with stunted physical growth, and with varying degrees of developmental delays (Gunnar et al., 2000). Besides, several meta-analyses have revealed that many adopted children continued to show developmental delays and difficulties after the adoption procedure (Cohen et al., 2008).

Despite these impairments, researchers have often found that many adopted children make excellent progress after adoption as well (Cohen et al., 2008; Juffer & Van IJzendoorn, 2005). Adoption namely concerns a phenomenon which usually offers improved medical, physical, educational, and psychological opportunities for children who were formerly abandoned or institutionalized. Actually, adoptive families are often marked by having a high motivation to raise children and having ample opportunities to invest in children's development because of their relatively high socioeconomic status (Gunnar et al., 2000; Juffer & Van IJzendoorn, 2005). These enhanced conditions within a family environment have often led to substantial recovery rates among children who have experienced early deprivation (Rutter, 1998). Findings converge with other studies on international adoptees stating that the majority of the adopted children are well-adjusted within for example socio-emotional and cognitive domains (Juffer & Van IJzendoorn, 2005; Rojewski et al., 2000; Van IJzendoorn & Juffer, 2006).

Although discrepancies in research findings do exist, social deprivation and different types of care preceding international adoption may be associated with impairments across a range of developmental domains. The degree of impairment and the trajectories of recovery, however, may vary for these different domains, for individual children, and for children who experienced different types of care (Rutter, 1998).

Indiscriminate Friendliness

What is evident is that early maternal separation and institutional rearing, like orphanages, have some implications for mental health outcomes in children (Rutter, 1998). Post institutionalized children, for example, are often found to demonstrate socio-emotional difficulties which are marked by an unusual lack of social reserve with unfamiliar adults. This behavior is often referred to as *indiscriminate friendliness*, or disinhibited attachment behavior (Bruce et al., 2009; Olsavsky et al., 2013).

Usually, the early human environment comprises one or two caregivers who will typically remain present (Bakermans-Kranenburg et al., 2011). This consistent caregiver presence is a necessary and expected humanitarian environmental condition which initiates a developmental learning process whereby infants learn to show preference for that specific caregiver over and above all other adults (Olsavsky et al., 2013). Indiscriminate friendliness, on the other hand, has been hypothesized to result from a lack of consistent and responsive caregiving. So, if the presence of a stable caregiver is required for the development of typical attachment-related behaviors, including the discrimination between mothers and strangers, then it seems not very surprising that post-institutionalized and former foster children are at increased risk for developing indiscriminate behaviors (Olsavsky et al., 2013).

So far, indiscriminate friendliness has been investigated extensively in post-institutionalized children (Bruce et al., 2009; Chisholm, 1998). Much less is known, however, about this behavior in (former) foster children (Pears et al., 2010). Nevertheless, one study actually did compare disinhibited social behavior among post-institutionalized and former foster children and found that both groups of children displayed more disinhibited behavior than non-adopted children (Bruce et al., 2009). Yet another study found no differences in this behavior among children adopted from either foster care or institutions either (Van den Dries et al., 2012). Evidence, however, is not decisive yet. As institutional care and foster care differ greatly in terms of provided individualized and consistent care, children adopted from different caregiving arrangements might differ in their development of attachment-related behaviors (Garvin, Tarullo, van Ryzin, & Gunnar, 2012; Gunnar et al., 2000).

Self-control

Self-control concerns a person's capacity to exercise restraint or control over one's feelings, emotions, thoughts, behaviors, and reactions and it is thought to result from consistent and responsive caregiving as well (Pears et al., 2010). It has indeed been found that children adopted from institutions and children who have experienced caregiving disruptions during their early lives are likely to develop attention regulation problems, resembling difficulties in focused attention and effortful control (Garvin et al., 2012). More specifically, a consistent state of abandonment, deprivation, and neglect of basic emotional needs, especially among former institutionalized children, may create a sense of instability and a lack of control among adopted children. Besides, the clear daily routines, rigid schedules, no personal attention, and no private possession of goods within an institution may hinder the development of self-control and self-regulatory abilities even further (Gindis, 2005). On the other

hand, as a consequence of uncontrollable changes in the environment, early deprived children might be placed in a position where they actually learn to take care of their own emotional needs and behaviors. This might result in better self-regulatory abilities (Gindis, 2005). Clear is that early separations from biological parents may influence children's socio-emotional development, which subsequently may impact later development (Garvin et al., 2012).

Positive Parenting

It has been suggested that post-adoptive parenting may exert a beneficial influence on child development. This indicates that adoptive parents can moderate or ameliorate the effects of early deprivation (Garvin et al., 2012). Again the quality of care, which includes the sensitivity, availability, acceptance, and a sense of belonging from the caregiver, seems to be important (Bakermans-Kranenburg et al., 2011).

Several studies have indeed revealed that increased parental sensitivity, or positive caregiving, may reverse the adverse effects of early circumstances experienced by abandoned children (Dobrova-Krol et al., 2010). For example, a study among internationally adopted children from institutions or foster care revealed that more sensitive mothers had children who showed less indiscriminate friendliness behavior. Besides, it was found that adopted children showed a significant increase in their eagerness and ability to respond to a new attachment figure over time, but this was only the case for children with a sensitive mother and most pronounced for children who were already familiar with a family setting, like former foster children (Van den Dries et al., 2012). Furthermore, some studies among institution-reared Romanian toddlers and children reported that observed caregiving quality was more predictive of child developmental outcomes than the percentage of time a child had resided in an institution (Bruce et al., 2009; O'Connor, Bredenkamp, Rutter, & the English and Romanian Adoptees Study Team, 1999). These results indicate that the caregiving environment in which a child develops is more predictive of his or her development than the pure effects of a certain type of care arrangement (Johnson et al., 2006). Tracing changes in adopted children's behavior after a positive transition to an enriched environment therefore might reveal some impressive outcomes.

Timing of Placement

Studies have suggested that age at adoption may significantly impact child behavior and development as well. Already with the rise of psychoanalytic theory and attachment theory claims were put forward emphasizing the possible damaging consequences of maternal deprivation in infancy, especially if it continued past 2 years of age (Gunnar et al., 2000). Since then, multiple studies have found support for these findings (e.g., Gunnar et al., 2000; Rutter, 1998). Studies for example found that children who were older than two years of age at adoption were at higher risk for developing multiple and persistent problems. Also later studies have revealed that adoption later than 6 or 8 months of age may put children at risk for developing growth delays (Cohen et al., 2008) and that children adopted before

their first birthday usually display most developmental gains (Van IJzendoorn & Juffer, 2006).

Some opposing findings, however, have been reported as well. A meta-analysis on behavior problems and mental health referrals of international adoptees, for example, revealed that age at adoption was not important for the development of behavioral problems (Juffer & Van IJzendoorn, 2005). Furthermore, a study investigating parental perceptions of their adopted children's behaviors revealed that both internalizing and externalizing behaviors, like aggression and anxiety, could not significantly be predicted by the age at which children were adopted from China (Rojewski et al., 2002).

Because many factors seem to influence the duration of a child's institutional stay, it might be difficult to ascertain whether age at adoption actually influences a child's recovery and (maladaptive) development (Gunnar et al., 2000). Nevertheless, depriving children of relevant stimulation during a period when they are most susceptible to certain experiences may impair their subsequent development, leading to less developmental gains compared to children who are raised without any experiences of privation (Cohen et al., 2008). Time at adoptive placement might therefore help to shed light on sensitive periods during (infant) development.

Current Study

The aim of the current study is twofold. First of all, the study intends to examine the physical growth, functioning, and development of Chinese girls among multiple areas of functioning, including general health, development, strengths, competencies and relationships, self-control and indiscriminate friendliness after adoption in the Netherlands. The second purpose is to investigate whether the type of pre-adoption care arrangement influences those developmental domains of the children within the adoptive family. Time of placement preceding adoption will be taken into account as this might lead to the discovery of possible dose-response relationships. Furthermore, possible mediating influences of children's self-control, or self-regulatory abilities, and moderating effects of a positive parent-child relationship on the strengths and competencies of the children and accompanying rates of indiscriminate friendliness will be investigated as these might lead to suggestions for future research promoting a healthy development of children within adoptive families.

This study will contribute to the existing literature about adoption since China is currently the main country of origin for adoption worldwide, and because few studies to date have focused exclusively on the development of adopted girls from China (Selman, 2009). Besides, 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 (but see van den Dries et al., 2010, 2012). As behavior, like indiscriminate friendliness, is mostly measured within a couple of months after the adoption procedure (Albus & Dozier, 1999; Pears et al., 2010; Zeanah, Smyke, Alina, & Dumitrescu, 2002), this study will assess developmental outcomes and (disinhibited social) behavior at later time-points, several years post adoption. Furthermore, although foster care is widely believed to

result in better health and developmental outcomes for children without biological parents, a direct comparison of the development of adopted children who received either foster care, institutional care, or a combination of both types of care during their early years has, as far as we know, not previously been reported. These three groups of children therefore provide an opportunity for studying the effects of a circumscribed period of deprivation and the potential for recovery following a dramatic change in context; adapting to life in a new and consistent family environment. As such, the included mixed-care group can be seen as a new aspect compared to former studies because the effects of multiple shifts between caregiving arrangements preceding adoption can be investigated in this way. Taken together, this study may provide essential information regarding the post-adoptive adjustment and development of female children adopted from various types of care in China that might be useful to parents and a range of professionals and organizations.

Research Question and Hypotheses

It will be expected that, on average, Chinese adopted girls will experience a reasonable overall health and few developmental delays at the time of adoption. Among the children who are found to experience health related problems and/or developmental delays, children adopted from foster care are expected to experience the least problems. Because of early disruptions in early individualized care, rates of indiscriminate friendliness are expected to be found for all adopted children. Children adopted from foster care, however, are expected to show the lowest amounts of this behavior. The family environment children have experienced in foster families preceding adoption is thought to result in better parent-child relationships than the institutional environment. Furthermore, as former foster children usually have experienced less impaired individualized care, self-confidence rates are expected to be the highest among this group of children, possibly resulting in better overall strengths and competencies and lower rates of disinhibited social behavior as well. This latter relation will indicate a mediating effect. A moderating effect of age at adoption on the relation between pre-adoption care arrangement and multiple developmental outcomes is anticipated. Being adopted before the age of one year is hypothesized to result in fewer developmental delays, a better general health status and less indiscriminate friendliness among all Chinese adopted girls than being adopted after one year of age. Lastly, the relation between type of care preceding adoption and multiple developmental outcomes is expected to be different for children experiencing different qualitative relationships with their parents. For children with a positive parent-child relationship, it is hypothesized that there will be no relation between pre-adoption care and multiple developmental outcomes, whereas for children with a parent-child relationship of somewhat lower quality, this relation is hypothesized to exist. More specifically, for children who experience a positive parent-child relationship, the (negative) effects of pre-adoption care are expected to be erased, whereas for children who experience a parent-child relationship of somewhat lower quality, the experienced pre-adoption care is hypothesized to result in lower strengths and competencies, higher rates of indiscriminate friendliness, and more developmental delays.

Method

Study Background

The current study is part of a larger study investigating the development of internationally adopted children from China in the Netherlands. Starting in 2005, Leiden University approached all three adoption agencies in the Netherlands involved in adoptions from China – Wereldkinderen, Meiling and Stichting Kind en Toekomst – to recruit participants. The organizations agreed upon participation and were willing to approach all families with children adopted from China aged between 4 and 16 years. This finally resulted in a sample of 1233 children (1130 girls (92%); 103 boys (8%)) adopted from China (response rate: 55.4%) (Juffer, & Tieman, 2009).

Parents who agreed upon participation were asked to fill out several questionnaires addressing all kinds of subjects related to the adoption procedure and to the adopted children. Next, all returned questionnaires were analyzed at Leiden University and preliminary results have been published in scientific articles, internal reports and informative brochures for the adoptive parents (e.g., Juffer & Tieman, 2009; Tieman et al., 2009).

Participants

Based on an inspection of the dataset, it turned out that the majority of the adopted children from China were female (*N* = 1130; 92%). For the performance of subsequent analyses, and for ease of interpretation of the results, it was decided to only include girls in the present study. As such, the initial sample consisted of 1130 girls who were between 4 and 18 years of age (*M* = 7.03 years, *SD* = 2.66) at the time of the original study. On average, children had resided with their adoptive families for approximately 5½ years (*M* = 5 years and 7 months) then.

It were mostly adoptive mothers who filled out the questionnaires (*n* = 1032; 93%), but also some fathers (*n* = 69; 6%) and step-parents (*n* = 4; 1%) completed them. Most children had parents who were still married with the same partner as at the time of adoption (*n* = 1050; 95%). In 32 families (3 %) however, parents were found to be divorced when the study was conducted, and in approximately 1% of the cases (*n* = 9), adoptive parents were only living together. The remainder of the parents were either single, widow, or married with another partner as at the time of adoption (*n* = 13; 1%). Adoptive parents were on average 43 years old (*SD* = 4.26, range = 34-56 years) at the time of the study and 37 years (*SD* = 3.40, range = 28 – 46) upon arrival of their adopted child. Most adoptive parents were employed (*n* = 831; 74%) and most of them were also highly educated (*n* = 511, 46%). The remainder of the parents either completed high school (*n* = 429; 38%) or they were poorly educated (*n* = 181; 16%). With regard to the living arrangements, half of the families lived in cities (*n* = 559; 50%), whereas 476 families (43%) resided in villages and 83 families (7%) in rural areas.

As the purpose of this study was to compare the development of children who received different types of care preceding adoption, children were classified based on pre-adoption care. Inspection of the dataset revealed that most pronounced types of care included foster care, institutional

care, and a mixture of both of these types of care. Accordingly, three different groups were created and used for subsequent analyses. Information about the place where the children resided before the adoption procedure was available for 1106 of the 1130 adopted girls (98%). From this group of children, 67 % (*n* = 745) resided exclusively in institutions, 7% (*n* = 80) in foster care families, and 25% (*n* = 281) of all adopted children had experienced a mixture of both types of care during their early lives (Figure 1).

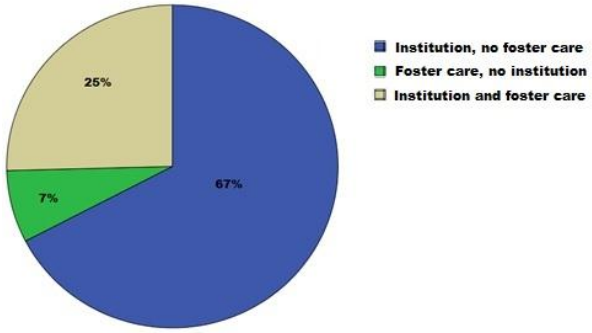

Figure 1. Distribution of pre-adoption care arrangements

Exclusion Criteria

As relatively few boys were adopted from China, (*n* = 103; 8%) it was decided to exclude all male children from further analyses. Besides, as the main focus of interest of the study was to compare Chinese children adopted from foster care with children adopted from institutions and with children who had experienced a mixture of both types of care preceding adoption, it was decided to exclude all children for whom pre-adoption care information was not available and children who were adopted from their biological families. It was decided, however, not to exclude children with special needs and/or children who were maltreated, neglected, malnourished and/or disabled. This in order to keep the sample as intact as possible and to be better able to generalize the results to all adopted children from China.

Final Sample

The final sample for the current study consisted of 1106 females adopted from China who were on average 1 year old at adoptive placement (*SD* = 1.06, range = 0-5 years) and approximately 7 years at the time of the study (*SD* = 2.52, range = 4-16 years). Adoptive parents were on average 43 years old then (*SD* = 4.26, range = 34-56). Most of the parents were employed (*n* = 803; 74%) and a high percentage of the parents were either highly educated (*n* = 501; 46%) or they completed high school (*n* = 423; 39%). Most of the families lived in cities (*n* = 549; 50%), whereas 464 families (42%) resided in villages and 83 families (8%) in rural areas.

Procedure

The dataset of the larger study on the development of internationally adopted children has been investigated further and analyzed in somewhat more detail. The variables of interest for this particular study were selected, some new variables were created and a new dataset was constructed to facilitate further analyses. In order to investigate if the time spent in foster care, institutional care or a mixture of both types of care preceding adoption would influence the developmental outcomes of the children, age at arrival was included as covariate in all subsequent analyses. Furthermore, a dichotomous time variable was created in order to investigate possible dose-response relations using moderation analyses. All female participants were accordingly classified as having been adopted either before (n = 485; 44%) or after their first birthday (n = 621; 56%).

Measures

Children's general health at placement

Inspection of the dataset revealed that there was only one question which retrospectively addressed the general health status of the adopted children upon arrival in the family. Parents could indicate on a four-point rating scale if their adopted child either (1) enjoyed a good health; (2) experienced unexpected but light health related problems; (3) dealt with unexpected and severe health related problems; or (4) experienced expected health related problems. The variable actually contained two dimensions. One related to the expected-unexpected health related problems dimension and the other implied the light-severe health related problems dimension. An inspection of the answers provided by the parents suggested to create a variable which would indicate if children either (1) experienced health related problems (expected and unexpected), or (2) enjoyed a good overall health at the time of the adoptive placement. Thereupon, the variable was recoded and a new variable representing this dimension was created.

Developmental status

Children's developmental status upon arrival at their adoptive family was assessed by asking parents to indicate if their adopted child experienced any developmental delays. Parents could either provide a "yes" or a "no" answer to this question. Next, a composite variable was created of the variables "delays in fine motor skills", "delays in gross motor skills", "delays in language development, "delays in social development", "bed-wetting", "uncleanliness", "being continuously fearful/anxious", "being inconsolable while upset", "being too inactive" and "responding inadequately or too little" in order to assess the presence of more specific developmental delays among Chinese adopted girls within their adoptive family. A reliability analysis demonstrated that this composite variable was a good indicator of children's developmental status (10 items; $\alpha = .80$). Initially, parents could rate these items by indicating whether their adopted child either experienced no problems (0), problems at placement (1), problems now (2) or problems both at placement and now (3). For ease of interpretation and for later intended analyses, it was decided to create a composite variable with only two categories. These

indicated if children either experienced no developmental delays (0) or developmental delays (1).

Children's strengths and competencies

Children's strengths and competencies were assessed with the Behavioral and Emotional Rating Scale (2nd Edition): Youth Rating Scale (BERS-2). This questionnaire emerged in 1998 as a strength-based measure in the U.S. and it became a widely used standardized and norm-referenced instrument to assess children's emotional and behavioral strengths (Epstein & Sharma, 1998). The used questionnaire for the current study contained 52 items which were rated by the parent on a scale of 0 to 3 (0 = not at all like the child; 1 = not much like the child; 2 = like the child; 3 = very much like the child). The scale successively provided both an overall Strengths Index (52 items; $\alpha = .83$), which represented a single summary score of the adopted children's strengths, and five subscales: interpersonal strengths, family involvement, intrapersonal strength, school functioning, and affective strength (Cronbach's alpha $\alpha > .75$ for all subscales). The BERS-2 has been widely adopted throughout the U.S. and it has been used and validated in several studies among children with and without disabilities (Buckley, Ryser, Reid, & Epstein, 2006; Uhing, Mooney, & Ryser, 2005). No studies to date have actually validated the instrument in the Netherlands.

Self-control/self-regulatory abilities

In order to create a self-control variable, or a variable indicating children's self-regulatory abilities, the items of the above described BERS-2 scales were investigated in somewhat more detail. This inspection yielded a composite variable similar to the interpersonal strengths scale of the BERS-2 questionnaire. The variable actually contained items regarding the regulation of both emotions and behaviors, like sharing, being aware of the consequences of own behavior, and regulating anger. Therefore, it was decided to use the 'interpersonal strengths scale' of the BERS-2 as an index for 'self-control' in subsequent analyses (14 items, $\alpha = .90$). Just as with the other scales of the BERS-2, parents could rate each item on a scale of 0 to 3 (0 = not at all like the child; 1 = not much like the child; 2 = like the child; 3 = very much like the child). As some of the intended analyses required this variable to be dichotomous, the variable was further recoded in a two-categorical response variable with a value of 1 indicating low self-regulatory abilities and a value of 2 for high self-regulatory abilities.

Indiscriminate friendliness

While inspecting the dataset of the larger study, parents were found to have answered three questions about behaviors of their adopted children possibly reflecting indiscriminate friendliness as described in the literature elsewhere (Chisholm, 1998; Van den Dries et al., 2012). That is, the current dataset included questions regarding the children's reactions towards new adults, how friendly the child was with new adults, and whether the child had a tendency to wander. As "having a tendency to wander" concerns behavior most often exhibited by toddlers, and as the original Leiden research project on internationally adopted children from China investigated mostly infant behaviors, it was not surprising that "having a tendency to wander" was often not rated by the parents (Missing values = 323). This

item therefore did probably not correspond to the overall scale either. As a consequence, it was decided to only include the variables "children's reactions towards new adults" and "how friendly is the child with new adults" in the composite variable of indiscriminate friendliness behavior. The variables needed to be recoded first for use in subsequent analyses and in order to correspond to an interpretable overall scale. As such, the answer categories of the included variables were recoded in such a way that a score of (1) indicated indiscriminate friendliness behavior and a score of (0) indicated no indiscriminate friendliness behavior. After the recoding procedure, the composite variable turned out be a reliable indicator of indiscriminate friendliness behavior (Cronbach's alpha $\alpha = .82$).

Parent-child relationship

It was also decided to create a composite variable of the questions "how well does the parent get along with the adopted child", "communication between parent and child", "does the parent trust the adopted child", "does the parent feel respected by the child" and "does the parent feel closely connected to the child" to reflect a positive parent-child relationship (Juffer, Geerars, Jansen, & Taalman, 2005). As most of these questions turned out to contain four different response categories, it was decided to create a composite variable with four equal answer categories indicating whether parents rated the relationship with their child either as (1) = bad, (2) = not very well, (3) = ok, (4) = very well. Inspection of the items indicated that this variable was a reliable indicator of a positive parent-child relationship (5 items; $\alpha = .78$). Furthermore, as some of the analyses required this variable to be dichotomous, a two-categorical response variable was constructed as well with a value of (1) indicating a less positive parent-child relationship and a value of (2) indicating a positive parent-child relationship. As such, the composite variable could be used in subsequent analyses to test possible moderating effects.

Statistical Analyses

All analyses were conducted using IBM SPSS statistics (version 21). Before the main analyses were carried out, data inspection was performed in order to check the assumption of normality. Furthermore, the data was inspected for outliers and missing values. Participants with missing values on the testing variable were excluded from further analyses. Participants with missing values on the outcome variables were only excluded from those analyses in which they were included. As such, missing data was pairwise deleted. Significant outliers were winsorized by replacing their value with the value of the closest observation (Tabachnick & Fidel, 2007).

The three included groups were subsequently compared on all outcome measures by performing one ANOVA and multiple Analysis of Covariance (ANCOVA) tests for the BERS-2 scales and by using chi square analyses for the included dichotomous and categorical outcome measures. Age at arrival was included as a covariate in all analyses. Gabriel's procedure was used as a post-hoc test for the AN(C)OVAs as this test allows for unequal sample sizes (Field, 2013). Furthermore, means were weighted according to their sample size using the Type II model for the

factorial analysis of variance in SPSS. With regard to the chi-square analyses, standardized residuals were computed and clustered bar charts were plotted in order to visualize exact differences between the groups and in order to determine which groups differed significantly from each other.

Next, Pearson correlations were calculated in order to assess the relation between the predictors and the outcome variables. Hereupon, mediation analysis was used to assess whether the relation between type of care preceding the adoption procedure and the overall strengths and competencies of the Chinese adopted girls would be mediated by the self-control, or self-regulatory abilities, of the children. First, dummy variables were created of the categorical independent testing variable "Type of care" in order make this categorical variable suitable for a regression analysis. The institutional care group was thereby chosen as the reference category. The mediation analysis next was performed in four steps. First, a regression analysis was performed with the dummy variables of placement status preceding adoption as the predictor variables and the overall BERS-2 scale as the dependent variable. This relation assessed the effect of type of placement before adoption on the adopted children's overall strengths and competencies. Second, a regression analysis was carried out with children's self-regulatory abilities as the dependent variable and the dummy variables of the pre-adoptive care arrangement as the predictor. This step investigated whether there existed a relation between the predictor variable and the possible mediator. In a possible, but not necessary third step (e.g., if no significant effect is found in the former step), a regression analysis was conducted with self-control rates as the predictor and the overall BERS-2 scale as the dependent variable, controlled for type of care preceding adoption. If all former steps turned out to be significant, a fourth and final regression analysis was carried out with care arrangement as the predictor, children's overall strengths and competencies as the dependent variable, controlling for self-control rates. Evidence for a mediation effect was found if the first three steps were significant, and the fourth step was attenuated. If a mediation effect was found, this effect would be tested using the Sobel test (Sobel, 1982):

$$z = \frac{ab}{SE_{ab}} = \frac{ab}{\sqrt{b^2 s_a^2 + a^2 s_b^2 + s_a^2 s_b^2}}$$

Next, the mediating effect of children's self-regulatory abilities on the relation between type of care arrangement preceding adoption and rates of indiscriminate friendliness behavior of the Chinese adopted girls was investigated. For this purpose, the same steps as outlined above were carried out, but a chi-square analysis was performed first by means of exploring possible relations between the dependent and the independent variables. Next, a logistic regression analysis for testing mediation effects would possibly be performed instead of a linear regression analysis as the dependent variable concerned a dichotomous variable in this case.

Finally, moderation analyses were carried out in order to investigate whether early adoptive placement and a positive parent-child relationship would reverse the (negative) effects of early deprivation. In other words, through the use of moderation analyses, it first of all was investigated whether the relation between type of care preceding adoption and all outcome measures would be

different for children adopted either before or after their first birthday. Besides, it was assessed whether the relation between type of care preceding adoption and all outcome measures would be different for children experiencing different qualitative relationships with their parents. Two-way ANOVAs were hereby performed for the overall BERS-scale outcomes and logistic regression analyses were carried out for the dichotomous outcome measures. Dummy variables were created for all categorical variables and continuous variables were centered in order to prevent possible multicollinearity and in order to make the interpretation of effect sizes easier. In logistic regression analyses, the institutional care group was again chosen as the reference category. Since this study dealt with unequal sample sizes, means were weighted according to their sample size using the Type II model for the factorial analysis of variance in SPSS.

Statistical significance for all analyses was set to $\alpha = .05$.

Results

Descriptives and Preliminary Analyses

Table 1 displays the means, standard deviations, and the skewness and kurtosis statistics of all variables. The assumption of normality was met for all variables, except for the variables *parent-child relationship* and *developmental status*. There was one participant with an extreme value (7) on the parent-child relationship variable. This participant caused the distribution to be highly skewed. It was therefore decided to winsorize this extreme value by replacing its value with the value of the closest observation. The winsorized variable turned out to be normally distributed (see Table 1). The composite variable developmental status was highly skewed as well. A logarithmic transformation of this variable caused the distribution to become less skewed (*skewness*: -1.88, *kurtosis*: 3.38). It was therefore decided to include the log-transformed variable in subsequent analyses.

Table 1. *Descriptive statistics of all variables*

	N	*M*	*SD*	Skewness	Kurtosis	Missing %
General health status at adoptive placement	1105	1.73	0.45	-1.01	-0.97	0.1
Developmental delays (Yes/No)	1091	1.22	0.41	1.38	-0.10	1.4
Developmental status (composite variable)	1106	0.08	0.28	3.04	7.28	7.4
Indiscriminate friendliness (composite variable)	1106	0.38	0.49	0.50	-1.75	0
Positive parent-child relationship (composite variable)	1087	18.64	1.68	-1.53	2.47	1.7
BERS scale interpersonal	1087	32.00	6.43	-0.24	0.22	1.7
BERS scale family involvement	1091	23.42	3.56	-0.61	0.74	1.3
BERS scale intrapersonal	1090	25.58	4.29	-0.57	0.52	1.4
BERS scale school functioning	1021	18.72	5.55	-0.55	-0.38	7.6
BERS scale affective strength	1097	16.68	2.98	-0.67	0.56	0.8
Age at placement (years)	1106	1.05	1.07	1.12	1.20	0

Missing data analysis revealed that the overall missing data percentage was rather low (see Table 1) and that missing data was missing completely at random. As data imputation may influence results, it was per analysis decided to exclude those participants with missing values on the concerning outcome variable. Sample sizes therefore differed per analysis and results should be interpreted with care and with this known fact in mind.

Comparing the Different Types of Care Arrangements

Most of the adopted girls were found to be healthy at the time of placement in their adoptive families (n = 802; 73%) and most of them experienced neither overall developmental delays (n = 855; 79%) nor the more specific developmental delays as investigated in this particular study (n = 1015; 92%). Furthermore, a high percentage of the adopted girls enjoyed a very good relationship with their

adoptive parents (n = 962; 89%). Although a lot of children did not demonstrate any signs of indiscriminate friendliness (n = 418; 38%), still almost two third (n =688; 62%) of the adopted children actually showed some signs of this behavioral pattern. With regard to the investigated strengths and competencies of the Chinese adopted girls, mean scores on all five subscales were found to be rather high: interpersonal strengths: M = 32.00 (range = 7.00 – 45.00); family involvement: M = 23.42 (range = 7.00 – 30.00); intrapersonal strengths: M = 25.58 (range = 5.00 – 33.00); school functioning: M = 18.72 (range = 1.00 – 27.00); affective strengths: M = 16.68 (range = 4.00 – 21.00).

While comparing the three different groups on all relevant outcomes measured on a continuous scale, none of the performed ANCOVA's did reveal any significant effects. That is, controlled for age at placement, none of the main effects of type of care on any developmental outcome reached significance (see Appendix A). Children adopted from institutional care, from foster care, or from a mixture of both types of care clearly did not differ on levels of interpersonal strengths, family involvement, intrapersonal strengths, school functioning, affective strengths, and on their overall strength and competency levels. Bootstrapping, a procedure which investigates whether results can be generalized to the population, and at the same time accounts for differences in sample sizes among the included groups, revealed similar results and thereby confirmed the findings.

Controlling for sample size, no significant differences between the foster care group, the institutionalized group and the mixed care group were found either for rates of indiscriminate friendliness and for the experience of a positive parent-child relationship with the adoptive parent (p > .05). Significant differences, however, were found for the overall developmental status ($\chi^2(2, n = 1091) = 0.11$, $p = .00$), for the specific developmental outcomes ($\chi^2(2, N = 1106) = 0.08$, $p = .04$) and for the general health status of the children ($\chi^2(2, n = 1105) = 0.10$, $p = .01$) at the time of adoptive placement. Standardized residuals are presented in Table 2. With regard to the general developmental status of the adopted children, the high negative standardized residual value of the foster care group as compared to the standardized residual values of the other two care groups revealed that children in the foster care group experienced fewer developmental delays than children in the other two care groups. Besides, the negative standardized residual value of the mixed care group as compared to the positive value in the institutional care group indicated that children in the mixed care group experienced fewer developmental delays than children in the institutional care group and that children in the institutional care group experienced most delays. Furthermore, with regard to the specific developmental delays, the positive standardized residual value of the institutional care group, as compared to the negative standardized residual values of the two other care groups, revealed that children adopted from institutions showed more specific developmental delays (e.g., gross and fine motor development, language, social development) than children adopted from the other two care groups. With regard to the general health status of the children, both the standardized residuals and the clustered bar charts (Figure 2) revealed that children adopted from foster care were somewhat healthier than children adopted from alternative types of care. Obviously, Chinese girls in the foster care group experienced

less often unexpected and expected health related problems, and they enjoyed more often a good overall health, than the girls in the other two care groups. Children in the mixed care group were in turn found to experience less health related problems and a better general health than children adopted from institutions. Mean differences on all outcome measures, however, were rather small.

Table 2. *Standardized residuals*

	Institutional Care	Foster Care	Mixed Care
Developmental delays (yes/no)			
No	-0.9	1.1	0.8
Yes	1.6	**-2.1**	-1.5
Specific developmental delays			
No	-0.4	0.4	0.4
Yes	1.4	**-1.4**	**-1.5**
General health			
Health related problems	1.4	**-2.1**	-1.1
Good overall health	-0.8	**1.3**	0.7
Indiscriminate Friendliness			
No	-0.4	0.9	0.2
Yes	0.6	-1.1	-0.3
Parent-child relationship			
Adequate	0.1	-0.7	0.3
Very good	0.0	0.2	-0.1

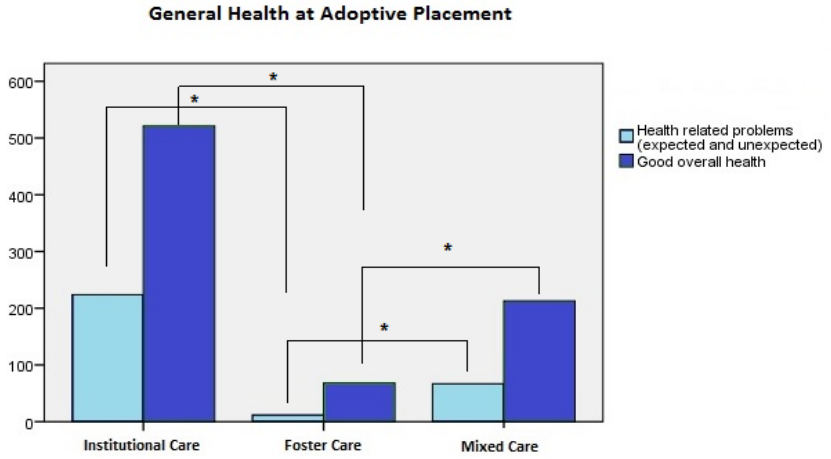

Figure 2. *General health at adoptive placement*

The correlations between all variables, including the independent test variable and the dependent outcome variables, are presented in Table 3.

Mediating Role of Children's Self-Regulatory Abilities

To investigate whether type of care preceding adoption was able to predict children's strengths and competencies, a linear regression analysis using dummy variables for the categorical dependent variable was performed. Results confirmed the findings of the earlier performed ANCOVA's and revealed that differences in care did not predict children's overall strengths and competencies $F(2, 904) = 0.47$, $p = .63$. As no direct effect was found, it was investigated whether there possibly existed

an indirect effect of children's self-regulatory abilities. The intended mediation model is depicted in Figure 3.

As the main effect included in the first step of the mediation analysis was not significant, a regression analysis with type of care as the independent variable and children's self-regulatory abilities as the dependent variable was performed in the second step. This relation turned not out to be significant either ($F(2, 1086) = 0.66$, $p = .52$), indicating that a mediating effect of children's self-control, or self-regulatory abilities did not exist.

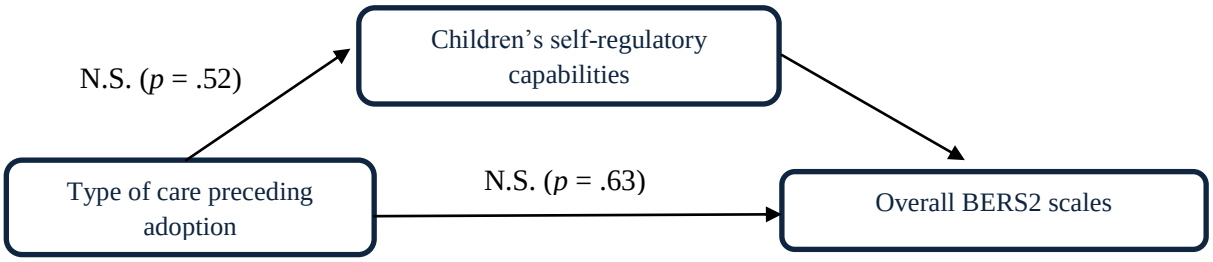

Figure 3. *Mediating role of children's self-regulatory abilities on the relation between type of care and children's overall strengths and competencies*

To test a mediating effect of children's self-regulatory behaviors in the relation between type of care preceding adoption and rates of indiscriminate friendliness, a similar mediation model was intended to be investigated using logistic regression analysis for dichotomous dependent variables. The model is depicted in Figure 4.

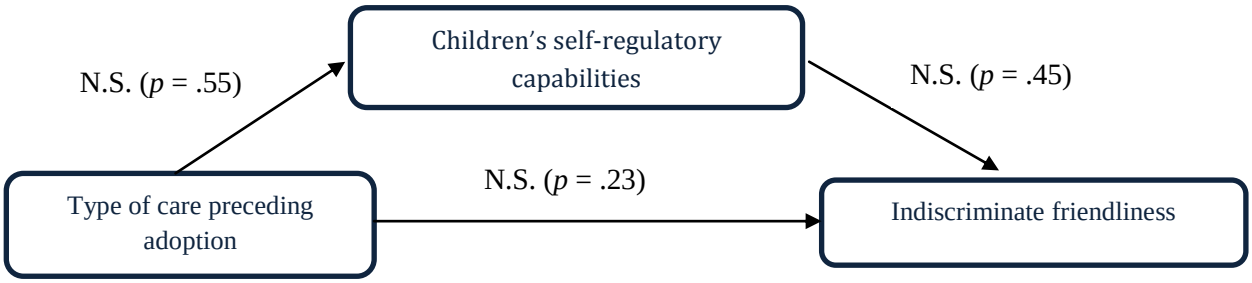

Figure 4. *Mediating role of children's self-regulatory abilities on the relation between type of care and rates of indiscriminate friendliness behavior*

As the dependent variable concerned a dichotomous variable, chi-square analyses were performed first in order to establish possible relations between the dependent and the independent variables. Results confirmed previous reported findings and revealed that type of care was not related to indiscriminate friendliness ($\chi^2(2, N = 1106) = 2.73$, $p = .23$). Children's self-control rates were not related to indiscriminate friendliness either ($\chi^2(1, n = 1087) = 0.60$, $p = .45$). Furthermore, type of care was also not significantly related to children's self-regulatory abilities ($\chi^2(2, n = 1087) = 1.20$, $p = .55$). As both independent variables were not related to the dependent variable, no mediation was possible and a logistic regression analysis was therefore not performed.

Table 3. *Correlations between all variables*

	TypeC	Devdel	Genhea	ComDevd	IndisFr	ParChild	Placemst	Zelfv	BERSInte	BERS-FI	BERSIntr	BERS-SF	BERS-AS	OVBERS2	Ageplace
TypeC															
Devdel	**-.08****														
Genhea	**.07***	**-.21***													
ComDevd	**-.10***	**.70***	**-.23****												
IndisFr	-.03	.04	-.00	.01											
ParChild	.00	**-.12****	.05	**-.13****	**-.08****										
Placemst	.02	**.15****	-.01	**.15****	**.08***	-.04									
Zelfv	.01	**-.20****	.01	**-.22****	**.08****	**.19****	.02								
BERSInter	-.01	**-.10****	.04	**-.13****	.02	**.33****	-.01	**.27****							
BERS-FI	-.01	**-.09****	.02	**-.14****	-.01	**.31****	-.05	**.24****	**.68****						
BERSIntra	.01	**-.15****	.01	**-.18****	**.08****	**.30****	.01	**.40****	**.70****	**.66****					
BERS-SF	.02	**-.18****	-.02	**-.20****	**-.09****	**.09****	.02	**.13****	**.40****	**.32****	**.43****				
BERS-AS	.01	**-.10****	.03	**-.13****	**.07***	**.31****	-.01	**.32****	**.68****	**.69****	**.75****	**.27****			
OVBERS2	.00	**-.16****	.00	**-.18****	.01	**.33****	-.01	**.31****	**.89****	**.80****	**.87****	**.66****	**.80****		
Ageplacem	.02	**.18****	-.02	**.14****	**.08****	-.03	**.72****	.03	.01	**-.07***	.00	.02	-.03	-.02	

TypeC = Type of care preceding adoption
Devdel = Developmental delays at time of adoption (yes/no)
Genhea = General health status at time of adoption
ComDevd = Composite variable developmental delays (log variable)
IndisFr = Indiscriminatie Friendliness behavior (yes/no)
ParChild = Composite variable parent-child relationship (recoded)
Placemst = Placement status (adopted before or after 1 year)
Zelfv = Self-confidence
BERSInte = BERS Interpersonal strength scale
BERS-FI = BERS Family Involvement scale
BERS-Intra = BERS Intrapersonal strength scale
BERS-SF = BERS School functioning
BERS-AS = BERS Affective strength scale
OVBERS2 = Overall BERS scale
Ageplacem = Age in years at adoptive placement

Note. Significant correlations are displayed in bold face, *$p < .05$, **$p < .01$

Moderating Influences

Age at adoption

Initially, moderation analyses were carried out in order to examine whether early adoptive placements would reverse the (negative) effects of early deprivation. All assumptions for a two-way analysis of variance were met. Results revealed that the age of the children at adoptive placement did not moderate the relation between type of care and children's overall strengths and competencies (Table 4). For children adopted either before or after their first birthday, the effect of having been adopted from different types of care on children's overall strengths and competencies was similar.

Table 4. *The effects of age at adoption on children's overall strengths and competencies*

Source of variance	SS (Type II)	*df*	MS	F	*p*
Type of care (3 categories)	0.11	2	0.06	0.45	.64
Age at adoption	0.01	1	0.01	0.07	.79
Type of care*Age at adoption	0.01	2	0.01	0.06	.94
Error (Residual)	111.57	899	0.12		
Total (= 'Corrected total' in SPSS)	111.71	904			

R^2 =.00

Next, several moderation analyses were performed with the dichotomous outcome variables 'indiscriminate friendliness', 'developmental status', and 'children's general health status' as the dependent variables. With regard to children's indiscriminate friendliness, logistic regression analyses revealed that the logistic model with both main and interaction terms included (Model 2) was not statistically significant for indiscriminate friendliness ($\chi^2(5) = 9.52$, $p = .09$). Both interaction terms were not significant either (Wald = 0.00, $p = .93$; Wald = 0.43, $p = .51$), indicating that no moderating effect of age at adoption was found for indiscriminate friendliness. For children adopted either before or after their first birthday, the effect of having been adopted from different types of care on the chance of developing indiscriminate friendliness was the same. A main effect, however, was found. Results are presented in Table 5. In terms of overall model fit, Model 1, with only main effects included, was found to be superior to the model with also the interaction terms included (Model 2) as the percentages correctly classified cases did not change from Model 1 to Model 2. Furthermore, there was no significant reduction in the log-likelihood ratio statistic (-2LL) from Model 1 to Model 2 (p >.05). Besides, the Hosmer and Lemeshow statistic was not significant in the first model (p =.94) and Model 1 with only the main effects included turned out to be significant ($\chi^2(3)$= 9.08, p =.03). These latter findings indicate that this model suited the data better than a model with only the constant included. Results revealed that age at adoption made a significant contribution to the prediction of indiscriminate friendliness (Table 5). All children adopted after their first birthday had a higher chance

of showing this behavior than children adopted before their first birthday. The variance explained by this model was 1% (Nagelkerke's R^2).

Table 5. *Goodness of fit statistics for type of care and age at adoption in predicting children's indiscriminate friendliness (Model 1: main effects)*

	Indiscriminate friendliness					
Variable	B	S.E.	Wald	Df	Sig.	Exp (B)
Constant	-0.62	0.11	35.47	1	.00	0.54
Foster care (dummy)	-0.38	0.26	2.23	1	.14	0.68
Mixed care (dummy)	-0.11	0.15	0.61	1	.44	0.89
Age at adoption (dummy)	0.32	0.13	6.24	1	**.01**	1.37

With regard to children's developmental status, the second logistic regression model, with all main and interaction effects included, turned out to be significant ($\chi^2(5) = 12.64$, $p < .03$). There was a significant reduction in the -2LL statistic from Model 1 to Model 2 ($p = .03$). Besides, the Hosmer and Lemeshow test was not significant in the second model ($p = 1.00$), indicating that this model suited the data well. The model explained 2.6% (Nagelkerke's R^2) of the total variance in children's developmental status. No significant interaction effects were found (Table 6), indicating that no moderating effect was found. For children adopted either before or after their first birthday, the effect of having been adopted from different types of care on experiencing developmental delays was similar. A significant main effect of age at adoption, however, was found (Table 6). Age at adoption thus significantly contributed to the prediction of children's developmental delays. The positive B-value indicated that children adopted after their first birthday had a higher chance of experiencing developmental delays than children adopted before their first birthday.

With regard to children's general health status at adoptive placement, the logistic regression model with both the main and the interaction terms included (Model 2) turned out to be significant ($\chi^2(5) = 14.25$, $p = .01$), indicating that this model suited the data better than a model without any predictors included. Furthermore, there was a significant reduction in the -2LL statistic from Model 1, with only main effects included, to Model 2 ($p = .01$) and the Hosmer and Lemeshow test was not significant in the second model ($p = 1.00$). The second model apparently suited the data well. The model explained 1.9% (Nagelkerke's R^2) of the total variance in children's general health status. No significant interaction effects were found (Table 7). This indicates that for children adopted either before or after their first birthday, the effects of having been adopted from different type of care on children's general health status were similar.

Table 6. *Goodness of fit statistics for type of care and age at adoption in predicting children's developmental status (Model 2: main and interaction effects)*

	Developmental delays					
Variable	B	S.E.	Wald	Df	Sig.	Exp (B)
Constant	-2.59	0.22	143.29	1	.00	0.08
Foster care (dummy)	-1.01	1.04	1.13	1	.29	0.33
Mixed care (dummy)	-0.15	0.45	0.11	1	.74	0.86
Age at adoption (dummy)	0.58	0.26	4.72	1	**.03**	1.78
Foster care*Age at adoption	0.20	1.27	0.02	1	.88	1.22
Mixed care*Age at adoption	-0.70	0.58	1.42	1	.23	0.50

A significant main effect of the mixed care group, however, was found (Table 7). This care group contributed to the prediction of the general health status of the adopted children in such a way that children adopted from a mixture of both types of care preceding adoption had a higher chance of enjoying a good overall health at adoption than children adopted from institutional care.

Table 7. *Goodness of fit statistics for type of care and age at adoption in predicting children's general health status (Model 2: main and interaction effects)*

	General health status					
Variable	B	S.E.	Wald	Df	Sig.	Exp (B)
Constant	0.81	0.12	46.40	1	.00	2.26
Foster care (dummy)	0.77	0.43	3.15	1	.08	2.15
Mixed care (dummy)	0.63	0.27	5.58	1	**.02**	1.87
Age at adoption (dummy)	0.05	0.16	0.11	1	.74	1.06
Foster care*Age at adoption	0.28	0.65	0.19	1	.67	1.33
Mixed care*Age at adoption	-0.51	0.34	2.35	1	.13	0.60

Parent-child relationship

To assess whether the relation between type of care preceding adoption and children's overall strengths and competencies would be different for children experiencing a different qualitative relationship with their parents, a two-way analysis of variance was performed. All assumptions were met. Results of the analysis are presented in Table 8.

The interaction between type of care and the parent-child relationship was not significant.

Therefore, no moderating effect of the parent-child relationship on the relation between type of care and children's overall strengths and competencies was found.

Table 8. *The effects of a positive parent-child relationship on children's overall strengths and competencies*

Source of variance	SS (Type II)	*df*	MS	F	*p*
Type of care (3 categories)	0.05	2	0.03	0.26	.77
Parent-child relationship	11.32	1	11.32	107.21	**.00**
Type of care*Parent-child relationship	0.19	2	0.09	0.88	.42
Error (Residual)	93.25	883	0.11		
Total (= 'Corrected total' in SPSS)	104.83	888			

R^2=.11

There was, however, a significant main effect of the parent-child relationship, indicating that only the parent-child relationship exerted a direct influence on the strengths and competencies of the Chinese adopted girls. The direct effect is depicted in Figure 5. Controlling for type of care, adopted children who enjoyed a good relationship with their adoptive parents apparently scored better on overall strength and competency levels than children who experienced a parent-child relationship of somewhat lower quality.

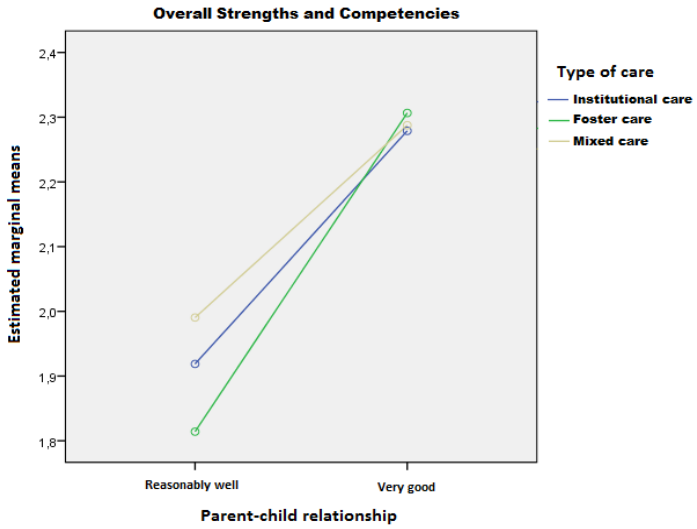

Figure 5. *Effect of the parent-child relationship on children's overall strength's and competencies*

Next, logistic regression analyses were performed with the dichotomous outcome variables 'indiscriminate friendliness' and 'children's developmental status' as the dependent variables.

No moderating effect of the parent-child relationship on children's general health status was investigated as this outcome variable concerned children's health status at adoptive placement.

With regard to children's indiscriminate friendliness, logistic regression analyses revealed that the logistic model with both the main and interaction terms included (Model 2) was not statistically significant for indiscriminate friendliness ($\chi^2(5) = 4.80$, $p = .44$). The logistic model with only the main effects included (Model 1) was not significant either ($\chi^2(5) = 4.68$, $p = .20$). This indicates that adding the predictors to the model did not significantly improve the model with only the constant included and that the predictors did not have a significant effect on indiscriminate friendliness. The model was therefore not analysed any further.

Regarding children's developmental status, the logistic regression model with all main and interaction effects included (Model 2) turned out to be significant ($\chi^2(5) = 33.05$, $p = .00$). As the log-likelihood ratio statistics from Model 1, with only main effects included, and Model 2 did not differ much (558.654 and 558.426 respectively), the Hosmer and Lemeshow test was similar and insignificant in both models ($p = 1.00$) and as the percentage correctly classified cases did not differ between Model 1 and Model 2 (92.3%), both models were found to suit the data well. They explained 7.1% (Nagelkerke's R^2) of the total variance in children's developmental status. Because possible moderation effects were examined, the second model was decided to be analysed in somewhat more detail. Results are depicted in Table 9. No significant interaction effects were found, indicating that there was no moderating effect of the parent-child relationship on the developmental status of the children. For children with either a very good relationship or a relationship of somewhat lower quality with their parents, the effects of type of care on experiencing developmental delays was similar. Significant main effects of parenting and of the mixed care group, however, were found (Table 9). The negative B-value of the parent-child relationship variable indicated that all adoptees who enjoyed a very good relationship with their parents had a lower chance of experiencing developmental delays. Furthermore, compared to children adopted from institutions, children adopted from the mixed care group were found to have a lower chance of experiencing developmental delays.

Table 9. *Goodness of fit statistics for type of care and parent-child relationship in predicting children's developmental status (Model 2: main and interaction effects)*

	Developmental status					
Variable	B	S.E.	Wald	Df	Sig.	Exp (B)
Constant	-1.67	0.17	98.51	1	.00	0.19
Foster care (dummy)	-1.66	1.03	2.60	1	.11	0.19
Mixed care (dummy)	-1.05	0.45	5.35	1	**.02**	0.35
Parent-child relationship (dummy)	-1.05	0.23	17.02	1	**.00**	0.35
Foster care*Parent-child relationship	0.51	1.46	0.12	1	.73	1.67
Mixed care*Parent-child relationship	0.23	0.67	0.12	1	.73	1.26

Discussion

The current study investigated the health, development, strengths, competencies, relationships and indiscriminate friendliness behaviors of 1106 girls adopted from China (mean age at arrival = 1.05 years; mean age at the time of the study = 7.18 years) approximately six years after their adoption to the Netherlands. Age at adoption was taken into account to investigate whether early adoptive placements would possibly reverse the (negative) effects of early deprivation. Furthermore, the role of children's self-regulation and the effects of a positive parent-child relationship on all children's behaviors and developmental outcomes were examined. A comparison was made between girls adopted from institutions, from foster care and from a mixture of both types of care. This paper thereby expands upon previous adoption studies as it is the first study that included a mixed-care group as comparison group and it is one of the first studies that focused exclusively on adopted girls from China.

Results revealed that most Chinese adopted girls were functioning well. They were healthy and experienced no or few developmental delays. Most girls scored also high on individual strengths and competency rates and they had close and mutually satisfying relationships with their adoptive parents. Three thirds of the adoptees were found to show some indiscriminate behaviors. Furthermore, a comparison of the three care groups revealed that girls adopted from foster care were in an advantage with regard to their general health and developmental status. Children adopted from institutions held the least favorable position for these outcomes, and the mixed care group scored in between. Mean differences, however, were small. Neither a mediating role of children's self-regulatory abilities, nor a moderating role of either age at adoption or the parent-child relationship could be established. Some direct effects of age at adoption and of the parent-child relationship, however, were found. These results were in the expected direction with children adopted before their first birthday and children who had a very good relationship with their parents showing the best outcomes.

General Outcomes

Our positive results are in line with previous studies indicating that most adoptees are functioning well after their adoptive placement (Juffer & Van IJzendoorn, 2005). They suggest that adoption is a positive intervention (Van IJzendoorn & Juffer, 2006) and that adoption might be a valuable option for children who otherwise have to reside in institutions or alternative types of care (Dowling & Brown, 2009). Because children with special needs and children with any other disabilities or developmental delays were included in the sample, the possibility that primarily healthier or developmentally more advanced children were selected to participate was eliminated. As not much further background information about the children's histories was available either, only speculations about the positive outcomes found in the present study can be made. One explanation might be that conditions in Chinese orphanages increased in recent years (van Schaik, Wolfs, & Geelen, 2009) and that the care system in China has improved through some drastic changes since the mid-1990s (Dowling & Brown,

2009; Meng & Kai, 2009). Furthermore, adoptive parents who were informed about the quality of the experienced pre-adoption care arrangements of their adopted children indicated that early provided care was mostly of good quality. It should however be noted that this study lacked the appropriate information to determine the actual degree of privation the Chinese adopted children encountered prior to adoption (Gunnar et al., 2000). Results should therefore be interpreted with care.

As expected, almost two-third of the children were found to show behavioral patterns resembling some indiscriminate friendliness. This finding confirms previous research findings, indicating that inconsistent caregiving and early maternal deprivation are often associated with disturbed attachment-related patterns in children (Bruce et al., 2009; Pears et al., 2010). Although the assessment of indiscriminate friendliness in this study consisted of only two items, and as such does not fully capture the whole construct as it was intended by Chisholm (1998), it seems that results of this study can be compared with other studies assessing this behavior.

Comparison of the Different Types of Care Arrangements

Somewhat contrary to the expectations, a comparison of the three groups of adopted children showed that children adopted from institutional care, from foster care, and from a mixture of both types of care did not differ on levels of interpersonal strengths, family involvement, intrapersonal strengths, school functioning, affective strengths, and on their overall strength and competency skills. Furthermore, no significant differences were found for rates of indiscriminate friendliness behavior and for the experience of a positive parent-child relationship with the adoptive parent. An explanation for this lack in difference between the care groups might be that all those outcomes were measured at later ages, six years post-adoption. Older children reside already longer with their adoptive family and they have reached another developmental stage than younger children. The age and developmental status of the children might therefore have accounted for the reasonably high scores on the outcomes and they might have erased possible earlier developmental delays.

In line with the hypotheses, however, children in the foster care group were found to experience fewer overall developmental delays at the time of adoption than children in the other two care groups. Children in the institutional care group experienced most overall developmental delays. Furthermore, children adopted from institutions showed more specific developmental delays like delays in fine motor skills, delays in gross motor skills, delays in language development, delays in social development, bed-wetting, uncleanliness, being continuously fearful/anxious, being inconsolable while upset, being too inactive and/or responding inadequately or too little, than children adopted from the other two care groups. Besides, children adopted from foster care also experienced somewhat fewer health related problems, and they enjoyed a better overall health status, than children from the other two care groups. These results are partly in line with previous studies showing that former institutionalized children often reach their adoptive families in poor medical health, with stunted physical growth, and with varying degrees of developmental delays (Gunnar et al., 2000).

After their adoptive placement, all adopted children underwent a screening by pediatricians using standardized protocols. As a consequence, adoptive parents might have had a rather accurate notion of the health and developmental status of their adopted children upon arrival in the Netherlands, which possibly contributed to the differential outcomes in the groups with different pre-adoption arrangements. An explanation for the different outcomes might be that the quality and levels of privation have differed among the three included pre-adoption care arrangements. Research has shown that children who resided in foster care have enjoyed more favorable circumstances before adoption and that they show better outcomes than children who experienced institutional care (Van den Dries et al., 2010, 2012; see also Van Schaik et al., 2009). It is, however, only possible to speculate about the current findings as no exact information about the early care environments in China was available.

Children's Self-Regulatory Abilities

Contrasting with the hypothesis, no mediating role of children's self-regulatory abilities on the relation between type of care preceding adoption and children's overall strengths and competencies was found. Furthermore, no mediating effect of children's self-regulatory behaviors on the relation between type of care preceding adoption and rates of indiscriminate friendliness behavior was found either. It might be that the constructed composite variable of children's self-regulatory abilities in this study contained some variables which after all did not reflect children's self-regulatory abilities as it was intended in the literature (Garvin et al., 2012; Gindis, 2005). Besides, some other factors might have accounted for the measured developmental outcomes of the adopted children, such as intelligence and social support. As the outcome measures were assessed several years post-adoption, it is also possible that children's self-regulatory abilities have exerted an influence during earlier years, but that they do not play such an important role during later years anymore.

The function of disinhibited social behavior after adoption remains somewhat unclear as well. The finding that indiscriminate friendliness is associated with attention regulation and effortful control (Bruce et al., 2009) could not be replicated in this study. As the three groups of adopted children in this study showed similar rates of this behavior, it might be that previous adversity during early lives has resulted in some kind of biological programming which in turn may have caused disturbed attachment-related patterns (Rutter, 1998). The exact explanation for this relation, however, demands further research.

Age at Adoption

In contrast to the hypotheses, age at adoption did not moderate the relation between pre-adoption care arrangement and multiple developmental outcomes. The effect of type of care on all measured outcomes was apparently similar for all Chinese adopted girls at any age. Usually many factors affect the duration of a child's institutional stay. Political changes, for example, may affect opportunities for placement. These factors, however, are regarded as environmental influences and suggest that more

aspects than the child's level of functioning should be taken into account while investigating adoptees adjustment and development in their adoptive country. On its own, age at adoption might thus not always be a strong predictor of the child's recovery and developmental outcomes following adoption (Gunnar et al., 2000).

A direct effect of age at adoption on both indiscriminate friendliness and on children's developmental status, however, was found. Results were in the expected direction. Children adopted after their first birthday had a higher chance of showing indiscriminate friendliness and of experiencing developmental delays than children adopted before their first birthday. These findings confirm previous research findings and suggest that children should be adopted before their first birthday in order to experience most developmental gains (Van IJzendoorn & Juffer, 2006).

Results are apparently not decisive yet, but one still has to take into account the possibility that age at adoption may help to shed light on sensitive periods during (infant) development. Especially among young adoptees who have mostly dealt with difficult life experiences during their early years.

Parent-child Relationship

In contrast to the hypotheses, the parent-child relationship did not moderate the relation between pre-adoption care arrangement and multiple developmental outcomes of the Chinese adopted girls. This may indicate that the effects of type of care on all outcomes was similar for all Chinese adopted girls experiencing any kind of parent-child relationship. It should however be noted that no parent-child relationship of bad quality was included in the present study. Different results might have been found if the quality of the parent-child relationship differed more among the included participants.

A significant main effect of the parent-child relationship on the developmental status and on the strengths and competencies of the Chinese adopted girls, however, was found. Controlling for type of care, all adopted children who enjoyed a very good relationship with their adoptive parents had fewer developmental delays and scored better on strength and competency levels than children who experienced a parent-child relationship of somewhat lower quality. These findings are in the expected direction and indicate that increased parental sensitivity, or positive caregiving, may reverse the adverse effects of early circumstances experienced by abandoned children (Dobrova-Krol et al., 2010).

No significant main effect of the parent-child relationship on rates of indiscriminate friendliness was found. These findings partly converge with previous studies showing that that disinhibited social behavior was not significantly correlated with attachment-related behaviors (Bruce et al., 2009). Findings, however, do also contradict previous research findings. Some studies have suggested that parenting quality may moderate the effects of early institutional privation on rates of disinhibited behavior (Garvin et al., 2012) and that children with more sensitive adoptive mothers were found to show less indiscriminate behaviors (van den Dries et al., 2012). Evidence is clearly not decisive yet and further research is warranted in order to establish the real impact of a positive parent-child relationship on rates of indiscriminate friendliness behavior. The outcome that no significant

effect was found in the present study might be due to the fact that a composite variable was created. This constructed variable contained only two items which might not fully capture the whole construct of indiscriminate friendliness behavior as it was intended in previous studies.

Limitations

Several limitations should be considered while interpreting the results of the present investigation. A first remark is about the design of the study. All information used was based on data obtained through retrospective reports from adoptive parents. As no observational measures were available to confirm the findings, results might reflect some informant bias rather than a coherent pattern of behavior or true developmental status (Bryman, 2008). Besides, no true causal relations could be established with the use of parental reports as it was not possible to actively control the research setting. Furthermore, no agreed upon research instruments with established norms were used to assess children's general health, developmental status, indiscriminate friendliness, self-control rates and their relationship with their adoptive parents. This might have underestimated effects as the constructed variables might not accurately resemble the constructs as they were intended to be. One should therefore be aware of the possible limited generalizability of the current study findings.

Another limitation concerns the different sample sizes among the included groups. The foster care group included far fewer children than both the institutional and the mixed care group. Although the sample sizes of all pre-adoptive care arrangements were still rather large, and even though the statistical analyses controlled for differences between the group sizes, results should be interpreted with care.

A final limitation concerns the fact that little could be determined about the details of care the children received in any of the settings where they resided before adoption. That is, the reasons why individual children were assigned to a specific type of care were unknown, nothing was known about possible multiple placements, and it is likely that the quality of care varied considerably between and within arrangements itself. Some orphanages may for example have provided attentive, loving, individualized care in a group setting that could be superior to indifferent foster care (Miller et al., 2005). Besides, the order of placement in the mixed care group before adoption was not known. It might be that children in the mixed care group resided simultaneously in an institution and foster care by means of spending a part of the day, or a part of the week, in an institution and a part in foster care. Additionally, it might be that residing in foster care after having experienced residential care leads to better outcomes than the other way around (Gunnar et al., 2000).

Future Directions

Related to the information above, it will be important to gain accurate, detailed information regarding children's prenatal and postnatal pre-adoption care experiences to explore the impact of specific adverse circumstances on children's later developmental outcomes. Aspects of the post-adoption

environment, such as parenting style and availability of resources, should also be assessed. It is hereby recommended to study the development of adopted children longitudinally across multiple domains of functioning using objective, norm-referenced and developmentally appropriate measures. As there does exist substantial cultural diversity among countries worldwide, including religious, economic, and legal differences, it might be useful to examine whether the results of the present study can be replicated in other cultures. Lastly, it might be interesting to compare the internationally adopted children from China with domestic adoptees, with children adopted from their birth family and with non-adopted children as adoptive status and divergent racial and cultural identities may impact children's behavior and development differently (Gunnar et al., 2000; Van den Dries et al., 2012).

Conclusions and Practical Implications

Findings indicated that the majority of the Chinese adopted girls were functioning well; they were healthy, experienced no or few developmental delays, had close and mutually satisfying relationships with their adoptive parents, scored high on individual strengths and competency rates and only part of the children showed some indiscriminate friendliness. Besides, while a comparison of the three care arrangements preceding adoption revealed that the children adopted from foster care were in an advantage with regard to some developmental outcomes as compared to the other two groups of children, and that children adopted from institutions seemed to hold the least favorable position for these outcomes, mean differences were rather small. It should be mentioned, however, that the used BERS-2 scales were based on American reference groups and that no Dutch validation and norm-reference group of this instrument does yet exist. It will therefore be important for researchers to use more culturally-sensitive established norms and measurement instruments to assess and confirm the findings of the adopted children's strengths and competencies. This in order to be able to inform for example teachers, parents and clinicians about the actual skills of the children.

Furthermore, although a strong study design was lacking and results should be treated cautiously, the obtained findings mostly converge with previous studies and do suggest that it is possible to further researchers' understanding of the concepts of resiliency as many of the girls demonstrated adequate recovery following adoption despite their early adverse experiences. Researchers therefore are recommended to include measures like personal characteristics, genes, brain imaging, quality of the home environment and other possible resilience factors in order to investigate which factors might support the finding that a lot of adopted children function well after the adoption (Palacios & Brodzinsky, 2010). This might help to inform interveners about the development of possible (preventive) interventions for children at risk at the time of, and after, adoption. Also, as this study focused on adopted girls who were on average 7 years of age, the current sample and study design may help to provide insight into the long-term effects of both foster care, institutional care and a mixture of both types of care preceding adoption. This in turn may contribute to the identification of safe and sustainable care options for adopted children as soon as possible after their abandonment by

their biological parents.

Taken together, this study provides a model for studying the effects of a circumscribed period of privation and the potential for recovery after a dramatic change in context. Besides, it provides essential information regarding the post-adoptive adjustment and development of female children adopted from various types of care in China that might be useful to parents and a range of professionals and organizations. As most adopted girls were found to function well, irrespective of the care they received preceding adoption, it can be stated that adoption is a positive intervention for children who otherwise have to grow up either in institutional or foster care. This finding thereby contributes to previous adoption studies emphasizing the importance of a stable family environment needed for optimal child development.

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Appendix A. Covariance matrices for comparing the different care groups on the BERS outcomes variables.

Table. *Main effect of type of care on interpersonal strength skills, controlling for age at adoption (N =1087)*

Source of variance	SS	*df*	MS	F	*p*	Partial η^2
Age at adoption	4.80	1	4.80	.12	.73	.000
Type of care (3 categories)	55.62	2	27.81	.67	.51	.001
Error (Residual)	44809.77	1083	41.38			
Total (= 'Corrected total' in SPSS)	44868.96	1086				

$R^2 = .00$

Table. *Main effect of type of care on family involvement, controlling for age at adoption (N = 1091)*

Source of variance	SS	*df*	MS	F	*p*	Partial η^2
Age at adoption	74.02	1	74.02	5.86	**.02**	.005
Type of care (3 categories)	1.56	2	.78	.06	.94	.000
Error (Residual)	13722.96	1087	12.63			
Total (= 'Corrected total' in SPSS)	13798.05	1090				

$R^2 = .01$

Table. *Main effect of type of care on intrapersonal strength skills, controlling for age at adoption (N = 1090)*

Source of variance	SS	*df*	MS	F	*p*	Partial η^2
Age at adoption	.16	1	.16	.01	.93	.000
Type of care (3 categories)	3.44	2	1.72	.09	.91	.000
Error (Residual)	20021.33	1086	18.44			
Total (= 'Corrected total' in SPSS)	20024.90	1089				

$R^2 = .00$

Table. *Main effect of type of care on school functioning, controlling for age at adoption (N = 1021)*

Source of variance	SS (Type II)	*df*	MS	F	*p*	Partial η^2
Age at adoption	11.68	1	11.68	.38	.54	.000
Type of care (3 categories)	52.65	2	26.32	.85	.43	.002
Error (Residual)	31411.23	1017	30.89			
Total (= 'Corrected total' in SPSS)	31474.33	1020				

$R^2 = .00$

Table. *Main effect of type of care on affective strength skills, controlling for age at adoption (N = 1097)*

Source of variance	SS (Type II)	*df*	MS	F	*P*	Partial η^2
Age at adoption	8.47	1	8.47	.95	.33	.001
Type of care (3 categories)	1.42	2	.71	.08	.92	.000
Error (Residual)	9754.63	1093	8.93			
Total (= 'Corrected total' in SPSS)	9764.33	1096				

$R^2 = .00$

Table. *Main effect of type of care on the overall BERS scales, controlling for age at adoption (N = 905)*

Source of variance	SS (Type II)	*df*	MS	F	*p*	Partial η^2
Age at adoption	.04	1	.04	.28	.60	.000
Type of care (3 categories)	.11	2	.06	.45	.64	.001
Error (Residual)	111.56	901	.12			
Total (= 'Corrected total' in SPSS)	111.71	904				

$R^2 = .00$