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INTERNATIONAL ADOPTION:
SYMPTOMS OF ATTACHMENT DISORDERS AND THEIR ASSOCIATIONS WITH THE CHILD'S BACKGROUND AND DEVELOPMENTAL OUTCOME

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ABSTRACT

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Many internationally adopted children have lived their first years of life in an environment with limited opportunities for primary caregiving. The lack of consistent care increases the prevalence of attachment disorders among them. Less is known about the influences of attachment disorders on a child's later course of life.

This study is part of the Finnish Adoption Study. Parents of all Finnish children who had been internationally adopted by legal adoption organisations between 1985 and 2007 were sent questionnaires (N=1450). Parental evaluations of the children's symptoms of reactive attachment disorder (RAD) at the time of adoption, their later learning or language problems using a screening scale, and children's self-reported school bullying experiences were evaluated. Each child's attachment-related behavioural problems were requested in a follow-up survey 1.9 and 3.8 years after adoption and compared with a Finnish reference group.

This study indicated that Finnish internationally adopted children have at least three-fold prevalence of learning and language problems compared with their age-mates. A child's symptoms of attachment disorders were associated with learning or language problems at school age as well as with his/her school bullying experiences. The adopted children had more attachment-related behavioural problems two years after adoption than their age-mates, but the difference was no longer evident four years after adoption.

In conclusion, this study showed that the symptoms of attachment disorder indicate a risk for an adopted child's later developmental outcome. The findings demonstrate the need for comprehensive clinical examinations and planning of treatment strategies for children with symptoms of RAD.

Keywords: International adoption, attachment disorder, developmental problems

TIIVISTELMÄ

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Monet ulkomailta adoptoidut lapset ovat eläneet ensimmäisen elinvuotensa ympäristössä, jossa ei ole ollut mahdollisuutta muodostaa suhdetta yhteen pääasiallisesti lasta hoivaavaan aikuiseen. Pysyvän hoivaajasuhteen puutteen tiedetään lisäävän kiintymyssuhdehäiriöiden esiintyvyyttä. Vähemmän kuitenkin tiedetään näiden häiriöiden vaikutuksista lapsen myöhempään kehitykseen.

Tämä tutkimus on osa suomalaista FinAdo- tutkimusta (Finnish Adoption Study). Tutkimuksessa lähetettiin kyselylomakkeita kaikille vuosina 1985-2007 adoptiojärjestöjen kautta adoptoitujen lasten vanhemmille ja lapsille itselleen (N= 1450). Vanhemmat arvioivat lapsen reaktiivisen kiintymyssuhdehäiriön oireita adoption jälkeen, lapsen senhetkisiä oppimiseen ja kielenkehitykseen liittyviä ongelmia, sekä lapsilta itseltään kysyttiin heidän koulukiusauskokemuksistaan. Tämän lisäksi arvioitiin muutosta osalle lapsista toteutettavassa kiintymyssuhdekäyttäytymisen seurantatutkimuksessa 1,9 ja 3,8 vuotta adoption jälkeen. Tuloksia verrattiin suomalaiseen verrokkiryhmään.

Tutkimus osoittaa, että suomalaisilla adoptiolapsilla on vähintään kolme kertaa enemmän oppimisen ja kielenkehityksen ongelmia kuin heidän ikätovereillaan. Oppimisen ja kielenkehityksen ongelmia sekä koulukiusauskokemuksia oli enemmän niillä lapsilla joilla oli tulovaiheessa kiintymyssuhdehäiriön oireita. Adoptoiduilla lapsilla oli enemmän kiintymyssuhdekäytöksen ongelmia kuin verrokkilapsilla kaksi vuotta adoption jälkeen, mutta ero ikätovereihin ei ollut nähtävissä enää neljä vuotta adoptiosta.

Tutkimuksen johtopäätöksenä voidaan todeta, että adoption jälkeiset kiintymyssuhdehäiriön oireet ovat merkki riskistä myöhemmille kehityksen ongelmille. Tutkimus osoittaa laaja-alaisen kehityksellisen arvion ja hoitosuunnitelman tarpeellisuuden mikäli lapsella on näitä oireita.

Avainsanat: Ulkomainen adoptio, kiintymyssuhdehäiriöt, kehitykselliset ongelmat

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ABBREVIATIONS

ADHD	Attention-Deficit Hyperactivity Disorder
AGFI	Adjusted Goodness of Fit –Index
ASD	Autism Spectrum Disorder
BEIP	Bucharest Early Intervention Project
CAIC	Comparative analysis by independent contrasts
CBCL	Child Behaviour Checklist
CI	Confidence Interval
DSP	Deprivation-Specific Patterns
DSM	Diagnostic and Statistical Manual of Mental Disorders
ERA	English and Romanian Adoption Study
ESSENCE	Early Symptomatic Syndromes Eliciting Neurodevelopmental Clinical Examinations
FinAdo	Finnish Adoption Study
FTF	Five to Fifteen
GFI	Goodness-of-Fit Index
GHQ	General Health Questionnaire
ICD	International Statistical Classification of Diseases and Related Health Problems
IQ	Intelligence Quotient
KCAQ	Kinship Center Attachment Questionnaire
N	Number
NFI	Normed Fit Index
OBVQ	Olweus Bully Victim Questionnaire
OR	Odds Ratio
Pearson r	Pearson correlation coefficient
P	Probability
PTSD	Post Traumatic Stress Disorder
r.a.	Registered Association
RAD	Reactive Attachment Disorder
RMSEA	Root Mean Square Error of Approximation
RR	Rate Ratio
SAS	Statistical Analysis System
SD	Standard Deviation
SES	Socioeconomic status
VCI	Verbal IQ and Verbal Comprehension Index
WISC	Wechsler Intelligence Scale for Children

LIST OF ORIGINAL PUBLICATIONS

1. Raaska, H., Elovainio, M., Sinkkonen, J., Matomäki, J., Mäkipää, S., and Lapinleimu, H. (2012). Internationally adopted children in Finland: parental evaluations of symptoms of reactive attachment disorder and learning difficulties - FINADO study. *Child: Care, Health and Development,* 38(5), 697-705

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1. INTRODUCTION

Since 1945, approximately one million children have been adopted worldwide across national boundaries. The annual number peaked in 2004 with 45,000 internationally adopted children, but has since fallen (Selman 2012; Selman 2009). The increase is thought to have its roots in increasing demand for children, at the same time as more children were available for adoption in China, Russia and Guatemala. The subsequent decline in international adoptions, on the other hand, seems to be due to the increase in domestic adoptions in the same key states of origin (Selman 2009). Despite these declines, the numbers of children from Ethiopia, Haiti, Vietnam and Colombia have increased in recent years, and there are now new programmes for children with special needs (Selman 2009).

The countries sending the highest numbers of children have changed over time. The highest numbers of children adopted internationally between 1992 and 2010 were from China (over 125,000) and from Russia (over 110,000). However, some other countries send proportionately more in terms of their birth rates. One of the highest ratios over the years has been in Bulgaria, with 1.5 children per 100 births in 2003. The ratio for Romania in 1991 may have been even higher (Selman 2012). Altogether, it is estimated that over 950,000 children were internationally adopted in the period from 1948 to 2010. The top five receiving countries in 1998–2010 were the USA, Spain, France, Italy and Canada, with over 22,000 adoptions in the USA, 5,500 in Spain and 4,000 in France in 2004 (Selman 2012).

Finland's history as a receiving country for internationally adopted children began in the 1970s. Despite being a much smaller country population-wise, Finland's numbers have followed worldwide trends. In the first few decades fewer than 100 children arrived in Finland annually. Since 1993 the numbers have begun to increase, with a peak of 308 children arriving in 2005. Ever since, the numbers have decreased. In 2009 Finland had 3,644 children adopted under the terms of the Finnish Adoption Act. Most of these children originated from Russia, China, Thailand, Colombia and Ethiopia (The Finnish Board of Intercountry Adoption Affairs 2010). Programmes for children with special needs were introduced in 2010.

The first Finnish legislation concerning adoptions (the Adoption Act) entered into force in 1985 and the newest legislation in 2012. The general planning, supervision and control of the inter-country adoption service is the responsibility of the expert body of the Ministry of Health and Welfare and the Finnish Board of Inter-Country Adoption Affairs. The Board is the central authority referred to in the Hague Convention. Practical tasks relating to inter-country adoption are handled by three licensed inter-country adoption service providers: the City of Helsinki Social Welfare Board, Interpedia r.a. and Save the Children Association, Finland. Finnish legislation on adoption requires

the use of a child adoption service. In those cases in which the adoption takes place in accordance with a foreign country's own legislation, the Helsinki Court of Appeal can recognise the validity of the adoption in Finland (The Finnish Board of Intercountry Adoption Affairs 2010).

Post-adoption services are provided by both the adoption counselling and inter-country adoption services. They are designed to deal mainly with everyday challenges concerning the newly adopted child. If the child's problems necessitate medical or psychological services, the family will be referred to family guidance clinics or general health care.

1.1 Previous adoption studies in Finland and other countries

In Finland, very little has been published on international adoptions. Most studies are academic dissertations in branches of science other than medicine and are based on small samples and qualitative methods. The best known psychiatric studies in Finland deal mainly with domestic adoptions. In one of them, Esko Varilo (1993) included 414 adopted young people born between 1954 and 1956. He concluded that poor quality of care and frequent changes of caregivers before adoption were more reliable predictors of subsequent psychiatric illness than biological factors connected with birth and the perinatal phase (Varilo 1993). Another doctoral thesis among domestically adopted children by Ilpo Lahti (1991) used a subsample of 90 adolescents aged between 14 and 20 of the Schizophrenia Study. He found that severe disorders were overrepresented in the sample and that the most important elements associated with successful adolescent development were related to family interaction and parenthood (Lahti 1991). The aim of the wide Finnish Adoptive Family Study of Schizophrenia was to elucidate the role of genetic vs. environmental factors in the outcome of schizophrenia in a sample of domestically adopted children of schizophrenic mothers (Tienari et al. 1985).

Some relevant recent studies on international adoption in other countries and their aims are listed in Table 1.

Table 1. Some relevant recent studies on international adoption and their aims.

	N	Study design	Country of origin	Age at adoption	Aim
English and Romanian Adoptee Study (ERA)[a]	324	Longitudinal study (15 years)	Romania	under 42 months	The effects of early institutionalization
The Bucharest Early Intervention Project (BEIP)[b]	136	Longitudinal study (8 years) and randomized controlled trial	Romania	6-31 months (mean 22 months)	The effects of early institutionalization. The impact of high quality foster care as an intervention.
Leiden Longitudinal Adoption Study[c]	125	Longitudinal study (14 years)	Sri Lanka, South Korea, Colombia	before 6 months	Attachment security, maternal sensitivity, temperament
The China Adoption Research Program[d]	Total 1096	Retrospective and longitudinal study	China	mean 15.9 months (1 month – 12 years)	Long-term socioemotional and cognitive outcome
Swedish register study[e]	16134	Swedish national registers	All international adoptees	under 8 years	Cognitive and psychiatric outcome
Danish register study[f]	10997	Danish national registers	All international adoptees		Precocious puberty
The British Chinese Adoption Study[g]	72	A mid-life follow-up study (ranging from 42 to 53 years)	Women adopted from Hong-Kong		Physical and mental health, relationships, and well-being
The Dutch International Adoption Study[h]	original sample 3 519, longitudinal sample 2071	epidemiological study and a follow-up study	All children adopted in the Netherlands between 1972-1975	under 10 years	child/adolescent psychopathology

Note. [a] Rutter, Sonuga-Barke, Castle 2010
[b] Smyke et al. 2012
[c] Beijersbergen et al. 2012
[d] Tan 2006
[e] Lindblad, Weitoft, Hjern 2010
[f] Teilmann et al. 2006
[g] Feast et al. 2013
[h] Verhulst, Althaus, Versluis-den Bieman 1990; Verhulst et al. 1990

2. REVIEW OF THE LITERATURE

2.1 Risks and protective factors for adopted children´s cognitive and socioemotional development

2.1.1 Biological factors

The biological background is largely unknown for a great number of internationally adopted children. Information on the child's background before adoption has therefore been limited to gender, age at adoption and number and type of placements as far as these were known. However, biological risks may be found in adoptees' genetic, prenatal, or preadoptive backgrounds. The likelihood of a child being offered for adoption is greater if the biological parents have an intellectual disability or psychiatric disorder. General intelligence is an example of a heritable and genetically stable trait (Benyamin et al. 2014), whereas the genetic architecture of some other complex traits, such as psychiatric disorders, consists of a very large number of common variants each of very small effect. These variants, perhaps together with additional contributions of rarer variants of greater effect and environmental factors, constitute the risk of psychiatric disorders (Kendler 2013). For maltreated children the gene-environment interaction, in particular, may play a role in the outcome of adverse experiences in infancy. Genetic predispositions, on the other hand, may render some individuals more resilient to such adverse experiences via their greater neural plasticity. However, the evidence has so far been mixed (Munafo, Zammit, Flint 2014; Tottenham 2012).

Children are typically adopted from poor conditions in poor countries to wealthier countries (Selman 2012). Poor circumstances increase environmental risks prenatally, during birth and before adoption. Prenatal maternal malnutrition may retard neuronal cell division, resulting in a range of cerebral dysfunctions, such as intellectual disabilities, attention deficits, mental health disorders, and even malformations (Graf, Kekatpure, Kosofsky 2013). Prenatal deficiencies, such as deficiency of iodine and iron, can contribute further to preventing children from reaching their developmental potential (Black et al. 2013).

Alcohol and drugs may be the most common toxins to a developing brain. Prenatal alcohol exposure is reported to be relatively common, especially among children adopted from Eastern Europe (Landgren et al. 2006). It may cause a variety of neuropsychological dysfunctions such as general intellectual disability, language disabilities, problems in attention, impulsivity, hyperactivity and perceptual problems. Additionally, impaired social and adaptive abilities, deficits in executive function and sensory integration, poor motor coordination and behavioural problems in addition to depression and anxiety are commonly reported in this group (Davies and Bledsoe 2005; Graf, Kekatpure, Kosofsky

2013). Cocaine exposure, on the other hand, is reported to be common in Latin America (Davies and Bledsoe 2005) and may cause long-term problems as well, such as cognitive impairment, impaired language skills, deficits in executive functioning, impulse control with poor attention, and internalizing and externalizing behavioural traits (Graf, Kekatpure, Kosofsky 2013).

Maternal stress during pregnancy may pose a risk to the child's later wellbeing, partly by increasing the risk of preterm delivery or low birthweight (Graf, Kekatpure, Kosofsky 2013; LaPrairie et al. 2011). Prematurity (Salmaso et al. 2014) and birth complications increase developmental and psychosocial risks, especially for children in developing countries (Lawn et al. 2009). In countries with a poor health care system the mother's untreated health conditions pose a risk to the foetus (Lawn et al. 2009).

The child's gender may also play a role in his/her later cognitive and psychosocial outcome. In a Swedish study, male international adoptees generally performed better at school than expected from their cognitive competence (Lindblad et al. 2009). In other studies, however, male gender has been associated with high levels of later behavioural problems in internationally adopted children (Wiik et al. 2011). Female gender has been associated with positive adjustment (Rutter and Sroufe 2000) and with good social competence (Stams et al. 2000).

Later psychosocial and cognitive development may differ somewhat between children from different countries. Asian background has been linked to favourable behavioural adjustment, academic performance and social competence (Lindblad, Hjern, Vinnerljung 2003; Lindblad et al. 2009; Stams et al. 2000). Children adopted from Eastern Europe may have specific kinds of developmental delays partly due to the over-representation of foetal alcohol exposure among children adopted from these countries (Landgren et al. 2006). Children's later language functioning has been found to be unrelated to the country of origin (Loman et al. 2009) but their language learning strategies after adoption may show differences (Hwa-Froelich and Matsuo 2010). These strategies are still somewhat unknown, but there are some indications that adopted children's expressive language skills may develop more slowly than their receptive language skills (Cohen et al. 2008).

2.1.2 Psychosocial factors before adoption

Many internationally adopted children have lived their first years of life in institutions. Institutions offer a physically safe environment with medical care, nutrition, sanitation and even toys. The children's opportunities for primary caregiving, however, are often limited. In some institutions infants are reported to spend up to half of their time alone (Tirella et al. 2008) or have as little as 12 minutes in a three-hour period to spend with their caregiver. The interaction with, and sensitivity to, the child is low (Muhamedrahimov et al. 2004).

Institutionalization affects a child's cognitive development, partly because of the fewer challenging stimuli and opportunities to practise new skills than in home environments (Kaler and Freeman 1994; Rutter 1998). The child's cognitive ability (Rutter 1998) as well as language skills (Loman et al. 2009) may be delayed. Children from institutions are at high risk of developing difficulties in intimate social attachments, emotion regulation and interpretation of facial expressions (Hodges and Tizard 1989; Moulson et al. 2009; O'Connor et al. 2003; Tottenham et al. 2010). Difficulties related to such emotional issues are reported to be quite persistent even after placement in an adoptive or foster home (Colvert et al. 2008). The child's cognitive development, on the other hand, may show a massive catch-up after placement in a home environment thanks to the high plasticity of the human central nervous system (Fox et al. 2011; Johnson et al. 2010; Tottenham 2012; van Ijzendoorn and Juffer 2006).

In a deprived environment children lack adequate sensory and physical experiences as well as interactional stimulation and soothing (Smyke, Dumitrescu, Zeanah 2002). Some children living in a deprived environment may present with stereotypical self-soothing symptoms in response to the need for human interaction (Beckett et al. 2002; Smyke, Dumitrescu, Zeanah 2002). Some children may also have problems in sensory regulation due to a lack of sensory stimulation (Cermak and Daunhauer 1997; Cermak and Daunhauer 1997; Wilbarger et al. 2010) or developmental delay (Symons et al. 2005) in which stereotypical self-soothing is common.

Several studies have documented the association between a child's older age at adoption and poorer academic and socioemotional outcome (Hawk and McCall 2010; Kumsta et al. 2010; van Ijzendoorn, Juffer, Poelhuis 2005). This finding is not surprising knowing that children adopted at older ages have had to spend a longer time under unfavourable circumstances. There are indications that the catch-up for children adopted before 6 months of age may be at least almost complete, but after that age the cut-off points may not be that clear (Kumsta et al. 2010; Rutter et al. 2012; Zeanah and Gleason 2014).

2.1.3 Psychosocial factors after adoption

Finnish adoptive parents go through a demanding evaluation process involving assessment of their potential parenting skills. In this process, the future adoptive parents' history of social and health problems is screened. This assessment, together with the relatively high cost of the adoption process, may result in an over-representation of higher social classes among adoptive parents. There has been no systematic study as yet about Finnish adoptive parents, but the Swedish register-based study has found an over-representation of higher socioeconomic status among adoptive parents (Lindblad et al. 2009).

Among non-adopted children, familial factors such as SES have an impact on the child's academic achievement, mental health and cognition, especially language development

(Hackman, Farah, Meaney 2010; Schjolberg et al. 2011). The influence of parental SES on the child's cognitive development may partly be explained by the effects of prenatal factors, parent-child interactions and cognitive stimulation on the child's brain development (Hackman, Farah, Meaney 2010). Thus, among adopted children the connection might not be that clear. Regarding a child's bullying experiences, lower socioeconomic status of the family may also constitute a risk factor, partly due to the greater social disadvantage of the living environment (Analitis et al. 2009; Veenstra et al. 2005).

Parents' psychiatric symptoms, such as depression and anxiety, form a well-known risk factor for a child's well-being. Although the adoptive parents' severe psychiatric disorders are screened in the assessment process before adoption, the adoption process itself may make them more vulnerable to distress after adoption. In a recent study, the depressive and anxiety symptoms of 147 adoptive mothers were compared with those of biological mothers. Postpartum and adoptive mothers had comparable levels of depressive symptoms, but adoptive women reported greater well-being and less anxiety than postpartum women (Mott et al. 2011). Findings in another study indicated that internationally adoptive mothers may experience lower rates of parenting stress and other negative outcomes than the general parent population (Viana and Welsh 2010). In that study, parents' expectations about potential child-related problems after adoption were found to increase the risk of parenting stress after adoption. Realistic expectations, instead, may increase satisfaction with adoption (Viana and Welsh 2010). Parental depressive symptoms during infancy have been shown to be connected with a child's language difficulties (Paulson, Keefe, Leiferman 2009; Quevedo et al. 2012) but their effects on adopted children's language development are not clear.

Although children have to cope with the loss of their birth family and culture and integrate into a new life after adoption, the international adoption itself is considered to be a protective factor for the child. In a series of meta-analyses of more than 270 studies including over 230,000 adopted and non-adopted children and their parents, adoption was found to be an effective intervention leading to massive catch-up of growth, development and attachment (van Ijzendoorn and Juffer 2006). Thus, it might be expected that the longer the child has stayed within the adoptive family, the better the developmental and socioemotional outcome. The percentage of secure attachment classification increases and disorganised attachment decreases after adoption (van Ijzendoorn and Juffer 2006). The longer children have been in the adoptive family, the less behavioural problems they have (Juffer and van Ijzendoorn 2005). Among severely deprived children from Romanian orphanages, the catch-up of IQ may continue up to the age of 15 years (Rutter et al. 2012). Language problems, however, may become more evident as the adopted child grows older, presumably because of the increased need for higher linguistic skills (Scott, Roberts, Glennen 2011).

2.2 Adopted children's socioemotional and neurodevelopmental problems

2.2.1 Reactive Attachment Disorder (RAD)

As early as the 1940s (Goldfarb 1945a; Spitz 1945) simultaneously described a previously unknown behavioural pattern among institutionalized children that did not correspond to any diagnostic classification. The children were described as follows: "He begins to seek affection for himself, needs constant demonstration of love, but his affection is indiscriminate and he will go off with strangers" (Goldfarb 1945b). After a number of later studies had replicated these findings (e.g. (Tizard and Rees 1975; Tizard and Hodges 1978), RAD was introduced in the third edition of the Diagnostic and Statistical Manual of Mental Disorders DSM III (American Psychiatric Association. 1980) and was later included in ICD-10 (International Statistical Classification of Diseases and Related Health Problems, 10th Revision, (World Health Organisation 1992).

Since then, the growing body of research has increased our knowledge of this disturbance and shaped the diagnostic criteria accordingly. The two psychiatric classifications have shown some differences but both DSM and ICD classifications have described two presentations: one in which children are emotionally inhibited/withdrawn and show contradictory social responses, and the other in which children are indiscriminately social/disinhibited. ICD-10 classified these subtypes into two distinct disorders, namely reactive attachment disorder of childhood and disinhibited attachment disorder of childhood, whereas the DSM IV classified them as two subtypes of the same disorder (American Psychiatric Association 1994; World Health Organisation 1992). In the latest version of the DSM classification published in 2013, DSM-5, the subtypes are separated into two distinct disorders: reactive attachment disorder and disinhibited social engagement disorder (American Psychiatric Association 2013). The eleventh version of ICD is to be published by 2017, and information about it is not yet available.

Children with the inhibited variety of RAD are characterized by a lack of comfort-seeking when distressed, a lack of social and emotional reciprocity, the absence of a preferred attachment figure, and difficulties in emotion regulation (Zeanah et al. 2004). These children's behaviour is typically inhibited, hypervigilant, or ambivalent. The disinhibited subtype of RAD is characterized by children seeking attention and attachment indiscriminately from relative strangers. They show limited differentiation between adults, do not check back with the parent even in stressful situations, and lack reticence or shyness with strangers (Rutter, Kreppner, Sonuga-Barke 2009). Despite the distinction between subtypes, a number of children are known to present with mixed symptoms, i.e. they exhibit features from both subtypes (Minnis et al. 2006; Smyke, Dumitrescu, Zeanah 2002).

Reactive attachment disorder has been considered to be rare, with a prevalence of less than 1% (Boris, Zeanah, Work Group on Quality Issues 2005). However, significantly higher prevalences have been found among high-risk populations: 1.4% in a deprived

section of an urban UK centre (Minnis et al. 2013), 19.4% among children in foster care (Lehmann et al. 2013) and up to 40% in a sample of severely deprived children adopted from Romanian orphanages (Smyke, Dumitrescu, Zeanah 2002). Despite these high prevalences among risk groups, there are only few longitudinal studies. Thus, so far the course and prognosis of RAD in older children or in adulthood has been largely unknown (Minnis et al. 2006; Zeanah and Gleason 2014). The disinhibited variety, in particular, has been found to be quite persistent and to be associated with complex neurodevelopmental deficits including impulsiveness and/or poor executive functioning (Gleason et al. 2011; Kocovska et al. 2012; Rutter et al. 2007; Smyke et al. 2012). Associations with attachment quality, on the other hand, have not been verified (Kocovska et al. 2012). Children with inhibited RAD, instead, are described having a pervasive lack of attachment behaviour and children with signs of disinhibited RAD may or may not have selective attachments. Thus, disinhibited RAD may not be conceptualized as an attachment disorder at all (Zeanah and Gleason 2014).

Although some studies among Romanian adoptees have indicated a marked reduction in signs of inhibited RAD after placement in an adoptive family, there are also indications that this symptom responds poorly to improvements in parenting (Puckering et al. 2011). Recently, RAD has been associated with psychiatric morbidity such as Attention-Deficit Hyperactivity Disorder (ADHD), oppositional defiant disorder, conduct disorder, Post Traumatic Stress Disorder (PTSD), autism spectrum disorder (ASD), specific phobia and tic disorder (Elovainio et al. 2014; Minnis et al. 2013). RAD has been suspected to be a mediator between early adversity and conduct disorder (Minnis et al. 2006).

2.2.2 Learning difficulties

Several studies have shown that internationally adopted children display poorer academic performance than their non-adopted peers (Juffer and van Ijzendoorn 2005; van Ijzendoorn, Juffer, Poelhuis 2005; van Ijzendoorn and Juffer 2006). Adopted children are over-represented in special needs services and special education referrals in their new home countries (van Ijzendoorn & Juffer, 2006; Juffer & van Ijzendoorn, 2005). However, there are also contrasting findings. According to a Swedish register-based study Swedish international adoptees seem to reach educational levels similar to those of non-adoptees, while children from Korea seem to perform even better than the majority of the population (Lindblad et al. 2009).

The catch-up of adopted children's cognitive capacity seems to be better than their academic achievements. According to the meta-analysis by Van Ijzendoorn and Juffer (2006), the catch-up of IQ is remarkable although it may not always be complete (van Ijzendoorn and Juffer 2006). However, there are also studies in which the adopted children's cognitive skills have reached well into the mean range for the general population (e.g. (Park et al. 2011). The individual reasons underlying the cognitive problems may explain the variation between the results. Overall, the majority of international adoptees

have far better cognitive capacity than their peers left in institutions (van Ijzendoorn and Juffer 2006).

2.2.3 Language problems

Adopted children experience a complete change in their language environment and have to shift from one language to another (Hene 1988). Despite lacking language skills at the time of adoption, adopted children are able to gain good skills in their new mother language after placement in a home environment (Scott, Roberts, Glennen 2011). According to the meta-analysis by van Ijzendoorn and Juffer (2006), these children's language abilities show only a small but significant delay compared with the abilities of their environmental siblings or peers (van Ijzendoorn and Juffer 2006). Children with different birth languages may also have different language learning strategies after adoption (Hwa-Froelich and Matsuo 2010) and thus the learning strategies may not be generalised for children having to change their former language to Finnish. There is a lack of Finnish research in this field, but according to international research expressive language skills may develop more slowly than receptive language skills among children adopted from China (Cohen et al. 2008). In another study adopted children's sentence comprehension abilities lagged behind at school age in comparison with their age-matched peers (Desmarais et al. 2012).

2.2.4 Problems in peer relationships and social development

Early institutional rearing, in particular, may affect a child's abilities related to social skills, such as the ability to discriminate between some facial expressions of emotion (Parker, Nelson, Bucharest Early Intervention Project Core Group 2005). In the English and Romanian Adoption Study (ERA) of severely deprived children from Romania, early adverse experiences were found to cause symptoms closely resembling those of autism spectrum disorders (ASD). The so-called quasi-autistic features were linked to deprivation-specific patterns (DSP) including cognitive impairment, disinhibited patterns and inactivity in addition to quasi-autism. The quasi-autistic features included impairments in the three core features of autism: social deficits, social communication problems and unusual, restricted, intense patterns and preoccupations. Unlike with ASD, the children with quasi-autism had a more social approach, made more attempts to use communication for social purposes, displayed more flexibility in their communication, and the autistic features tended to fade between 4 and 6 years of age more often than in "real" autism cases (Kumsta et al. 2010).

However, these findings are not as clear among children adopted from less deprived environments. Factors such as the degree of deprivation and adoption age may play a crucial role. The symptoms of DSP are not present among children adopted before 6 months of age, even in children from Romanian orphanages. In a study of children adopted from less deprived environments under 6 months of age, a group of adopted

girls outperformed their classmates in social competence and peer group popularity (Stams, Juffer, van IJzendoorn 2002). According to a meta-analysis, the majority of internationally adopted children are considered to have adjusted well to their new living circumstances in childhood (van Ijzendoorn and Juffer 2006), whereas in the Swedish register-based study, internationally adopted adolescents and young adults were at a high risk of social maladjustment (Hjern, Lindblad, Vinnerljung 2002). In the FinAdo sample, a number of internationally adopted children had experienced racism in adulthood (Koskinen, Elovainio, Raaska, Sinkkonen, Matomäki, & Lapinleimu, in press).

Adopted children's psychosocial and developmental difficulties may increase their risk of school bullying experiences. In addition, their facial characteristics or skin colour may differ from the majority of children, which may make them more vulnerable to bullying than non-adoptees. In earlier studies among non-adopted children, there are indications of associations between ethnic minority background and victimization or bullying (Nansel et al. 2001; Wolke et al. 2001) and between immigrant status and elevated levels of victimization in Finland (Strohmeier, Karna, Salmivalli 2011). However, there is lack of studies of adopted children's experiences of school bullying during childhood.

2.2.5 Attachment-related behavioural problems

Attachment theory was first introduced by John Bowlby in the 1960s. Attachment is defined as a child's strong tendency to seek proximity and contact with a specific primary caregiver, especially when in need of comfort, support, nurturing or protection. As a result of repetitions, the child's experiences become mentally internalized as internal working models of attachment during the first years of life (Zeanah, Berlin, Boris 2011). These models are activated especially during stress, and they guide behaviour to ensure the child's essential need for intimacy and comfort is met (Bowlby 1973). Later, Bowlby's colleague Mary Ainsworth designed a method termed Strange Situation Procedure to classify a child's attachment pattern by his/her behaviour (Ainsworth et al. 1978). Ainsworth diveded attachment behaviours into three classes: secure, avoidant insecure and resistant insecure. A securely attached child has the experience that his/her needs are satisfied by the caregiver. An infant shows his/her distress, actively seeks comfort from the caregiver and shows resolution of distress and resumption of exploration when united with the caregiver. When a child consistently fails to achieve the needed response from the caregiver, the child's attachment pattern may become insecure. In an avoidant insecure attachment pattern the child shows minimal response to separation from the caregiver, though quality of exploration may diminish. On reunion the child may ignore or actively avoid the caregiver. In a resistant insecure pattern separation causes intense distress, whereas attempts to obtain comfort are limited, awkward or interrupted. On reunion, there is little or incomplete resolution of distress and resistance to the caregiver's attempts to soothe (Ainsworth et al. 1978; Zeanah, Berlin, Boris 2011).

Later, it was noticed that if the caregiver is frightened or frightening, neither the avoidant nor the resistant strategy works. Those children who had no recognizable attachment

pattern were classified as disorganized. In the disorganized pattern the child lacks a strategy for obtaining proximity to increase feelings of security. The child's reactions to the caregiver may include mixtures of rapid, incoherent sequences of proximity-seeking, avoidance or resistance. The child may be fearful of the parent, or show other behaviours indicating failure to use the caregiver as an attachment figure. At the preschool age disorganization may be transformed into controlling, punitive or solicitous/caregiving behaviours directed towards the parent (Carlson 1998; Zeanah, Berlin, Boris 2011).

A number of studies have indicated that insecure and disorganised attachments increase the risk of externalising behavioural problems (Fearon et al. 2010). Although the association between attachment insecurity and internalising symptoms may not be that strong, attachment insecurity, especially disorganisation, also significantly increases the risk of later internalising symptoms, depression and anxiety in particular (Brumariu and Kerns 2010; Groh et al. 2012). Internationally adopted children with inconsistent caregiving may not have had the chance to form any lasting attachment strategy. Attachment insecurity and disorganization as well as behavioural problems are therefore over-represented among internationally adopted children (van Ijzendoorn and Juffer 2006).

3. AIMS OF THE STUDY

The aims of this study were:

- to study the association between symptoms of reactive attachment disorders at the time of adoption and cognitive difficulties later at school age, e.g. difficulties in learning and language (Studies I and II)
- to study if the symptoms of reactive attachment disorder at the time of adoption are associated with problems in peer relationships later at school age as manifested by school bullying experiences (Study III)
- to study changes in the attachment behaviour of internationally adopted children compared with their non-adopted age-mates (Study IV)
- to study which variables in the adopted child's background and in his/her family are associated with psychosocial and neurocognitive outcome in the child's later life (Studies I, II, III and IV)

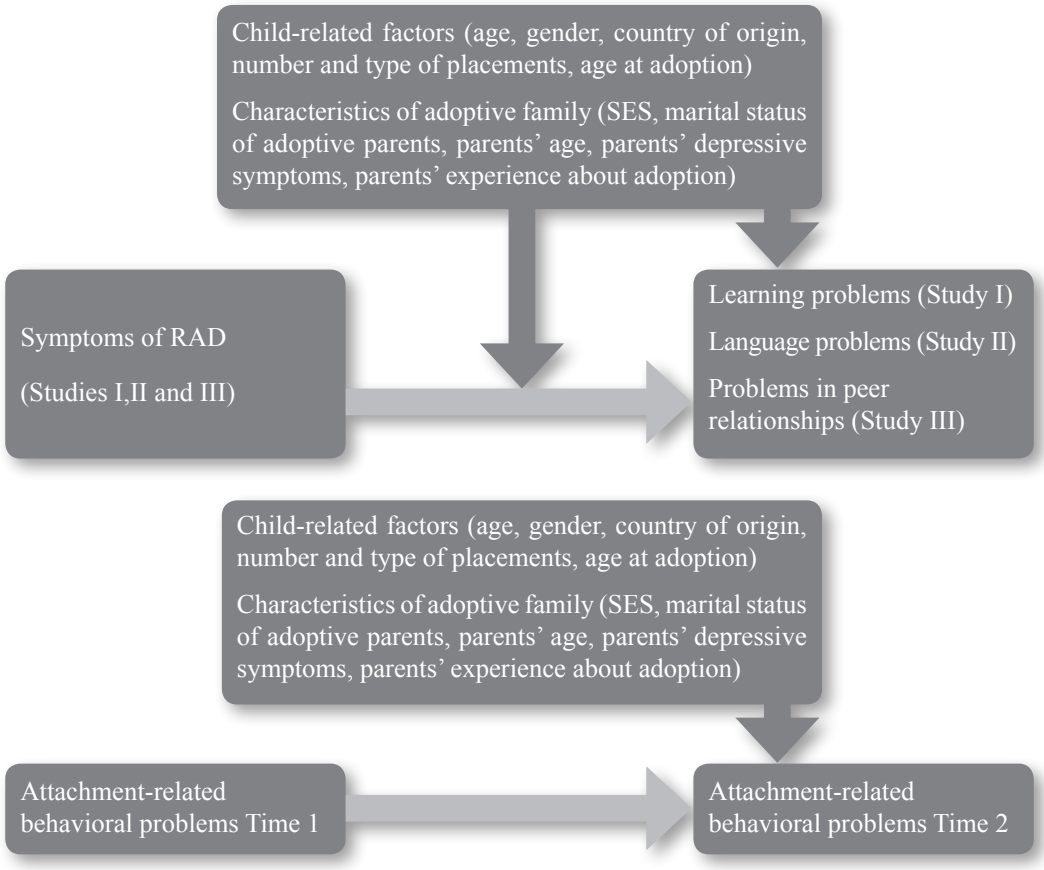


Figure 1. The aims of the study

Our research hypotheses were:

- Symptoms of reactive attachment disorder are associated with later difficulties in learning and language (Study I and II).
- Symptoms of reactive attachment disorder are associated with peer relationship problems manifesting as school bullying experiences. Physical appearance differing from Finnish appearance is associated with victimization (Study III).
- Internationally adopted children have more attachment-related behavioural problems than their peers but these decrease over time (Study IV).
- Child's age at adoption and type and number of placements before adoption are negatively associated with psychosocial and cognitive outcome later in life (Study I, II , III and IV).
- The adoptive parents' experience about adoption and depressive symptoms are negatively associated with the psychosocial and cognitive outcome of the children (Study I, II, III and IV).

4. MATERIALS AND METHODS

4.1 Participants

The data for this study is derived from the ongoing FINnish ADOption Study (FinAdo study). The target population in the FinAdo study consists of all children who were internationally adopted between 1985 and 2007 through the three legalized adoption services in Finland. The target population forms a broadly representative cross-sectional sample of adopted children in Finland. The data were collected in collaboration with all the adoption organizations: the City of Helsinki Social Welfare Board, Interpedia r.a. and Save the Children Association Finland, all of which offered help in the mailing process. In addition, information about a child's age was given so that age-adequate questionnaires could be chosen.

Parents were sent questionnaires exploring facts about the child, the adoptive family and the parents themselves. The surveys were conducted between December 2007 and March 2009 and included two mailings for non-respondents. The final FinAdo cohort of under 18-year-old internationally adopted children included 1450 children (634 boys, 44%) with a mean age of 7.5 years (*SD* 4.4) at the time of study entry. The participation rate for the FinAdo study was 55.7%. In comparisons between the non-respondents and the FinAdo respondents, older children were more likely to be non-responders, *OR* 1.06, 95% *CI* 1.04–1.08, $p < .001$. There was no significant difference between respondents and non-respondents in terms of gender, the response rate for boys being 55% and for girls 57%, $p = .34$. The FinAdo respondents' country of origin was compared with the data for all Finnish children who had been internationally adopted in the reports of The Finnish Board of Inter-Country Adoption Affairs (2010) (The Ministry of Social Affairs and Health, Finland). There was no major difference between the respondents' country of origin and all the children who have been internationally adopted in Finland.

The information was considered to be sufficient in Studies I and II if the Five to Fifteen (FTF) questionnaire and FinAdo RAD questionnaire had been completed, in Study III if the child had replied to the Olweus Bully-Victim Questionnaire (OBVQ), and in Study IV if the parents had filled in the Kinship Center Attachment Questionnaire (KCAQ) at the time of both evaluations.

The age ranges in the three studies vary depending on the methodology. In Study I the age group was from 9 to 15 because the mean scores in the FTF learning domain have been calculated for this age group (Korkman, M., Kadesjö, B., Trillinsgaard, A., Janols, L-O., Michelsson, K. and Gillberg 2004). The parents of 410 children returned the questionnaires and the questionnaires of 395 parents provided sufficient information about learning difficulties. In Study II we analysed the data on children from 6 to 15 years. The 5-year-old children were not included although the FTF age ranges are from

5 to 15 years because the data distribution for five-year-olds was skewed in comparison with the reference group. This particularly concerns the subdomain Expressive Language Skills. The age group in Study III was also from 9 to 15 due to the age limits of the OBVQ (Olweus 1996). The replies of 364 children and their parents provided sufficient information and they were included in the analyses. In Study IV the survey was repeated for those who were aged 2 to 6 years at the time of the first FinAdo survey (n = 532) and under 6 years of age over a mean period of 1.9 years (SD .21) after the first survey. The final sample consists of these 171 children.

Some exclusions had to be made based on the parental reports of children's diagnoses confirmed in Finnish medical evaluations. Parents were asked if children had been diagnosed as having deafness or a hearing impairment in both ears, blindness or poor vision in both eyes, intellectual impairment, mental retardation, cerebral palsy or autism. In Studies I and III a child was defined as disabled if he/she had deafness or a hearing impairment in both ears, blindness or poor vision in both eyes, intellectual impairment, mental retardation, or autism. In these studies the disabilities were taken into account as covariates in the last step of the multivariate analyses. In Study II, children who had been diagnosed with autism (n = 8), mental retardation (n = 21), cerebral palsy (n = 11) or deafness or hearing impairment in both ears (n = 4) were excluded from the analysis (total excluded n = 38). Children with autism and mental retardation were excluded because language delay is included in the diagnostic criteria of these disorders, whereas cerebral palsy (Hustad et al. 2012) and deafness or hearing impairment in both ears are known to affect a child's linguistic abilities. In this Study II, the number of children was large enough for the exclusions not to reduce statistical power. Here, the reported general developmental delay was taken into account in the statistical analysis. In Study IV the effect of each variable was studied separately and thus no exclusions had to be made. In this study, the associations with developmental delays were studied based on the birth country's reports because some of the disabilities may be difficult or even impossible to diagnose shortly after adoption and in infancy.

4.2 Refrence groups

As references for the prevalences of learning and language problems we used the mean scores of the reference group collected by the FTF study group along with the development of the questionnaire (see chapter 4.4.5) (Studies I and II). This population sample representing the general population comprises 1350 Swedish children born in 1986–1994 (n= 9 years x 150) and living in Sweden in 2001. At the time of the questionnaire study, these children were 6 1/2 – 14 1/2 years old. A total of 854 parental questionnaires were returned (63% of the targeted sample, 401 girls and 453 boys). The questionnaires were subdivided into three groups according to age: children of 6–8 years (n= 257, girls 122), 9–12 years (n= 385, girls 178), and 13–15 years (n= 212, girls 101) (Kadesjo et al. 2004) Based on the mean scores in this reference group, the demarcation lines corresponding to the percentages of children who score under that line

were calculated (Kadesjo et al. 2004) and thus, comparisons can be made between this reference group and the study groups.

A reference group for bullying or victimization experiences was derived form a large representative data set collected from Finnish schools in 2009 (KiVa koulu, Study II) (Karna et al. 2011). This group consists of 146,767 children (50.3% boys) in grades 3–9 (Karna et al. 2011).

For the attachment-related behavioural problems, we collected a reference group through well-baby clinics in the city of Espoo and the town of Loimaa (Study IV). Nurses in the well-baby clinics gave questionnaires to 900 parents of children aged from 2 to 6 years and the replies were returned direct to the researchers. The reference sample (response rate 27%) consists of these 244 children, of whom 112 were boys (46%), the mean age in the sample being 3.1 years, (*SD* 1.3). This reference group was assessed only once. For comparisons with the adopted children, we divided the group into two groups by the median age (3.3 years). In the younger reference group (*n*= 120) the mean age was 2.0 (*SD* 0.7) and in the older reference group (*n*=120) 4.1 (*SD* 0.8). Thus the mean age difference between these groups is 2.1 years whereas the mean age difference for adopted children at times 1 and 2 is 1.9.

4.3 Ethical considerations

Signed and informed written consent was obtained from parents and those children over 9 years of age who agreed to participate in the study. The study was approved by The Ethics Committee of the Hospital District of Southwest Finland. Permission for the FinAdo researchers to use the names and addresses of adopted children was obtained from the competent authority of all three legalised adoption organisations. The study design and ethical considerations were approved by The City of Helsinki, Interpedia r.a., and Save the Children Association Finland. There were nevertheless a few comments for the researchers about the ethics of the study. The comments were addressed accordingly and the ethical considerations were explained individually.

4.4 Measures

4.4.1 Variables related to the child's background

Information about the child's background and health was collected by means of a questionnaire developed for the FinAdo study. The child's background variables included gender, age at the time of the parents' responses and at adoption, country of birth, the type and number of preadoption placements and the child's developmental delay reported in the birth country's report. Parents were requested to report on a number of the child's potential medical conditions diagnosed in Finnish medical evaluations and on the child's grades at school.

4.4.2 Psychosocial characteristics of the adoptive family

The socioeconomic status (SES) of each parent separately was requested. For statistical analyses the parents' SES was placed into one of four categories (upper middle class, lower middle class, working class and other). The parents' age (Study III) and marital status (Studies I,II, III and IV) were recorded. The parents' experiences with the adoption were measured using a study-designed question asking if the arrival of the adopted child had been 1 = a much more positive experience than expected, 2 = a somewhat more positive experience than expected, 3 = as expected, 4 = somewhat more difficult than expected, 5 = much more difficult than expected (Studies III and IV).

To evaluate symptoms of parental depression, we used a five-item depression subscale derived from the General Health Questionnaire (GHQ) (Goldberg et al. 1997) (Studies II and III). Various versions of the GHQ-12 have been reported to be useful in determining the presence of depressive symptoms (Aalto et al. 2012) . The internal consistency (Cronbach's alpha coefficient) of the scale in the present data was .78 for the fathers' questionnaire and .80 for the mothers'. In this five-item questionnaire we asked whether the parent had recently been able to enjoy his/her daily duties, been thinking of himself/herself as a worthless person, felt unhappy and depressed, lost his/her self-confidence, or felt quite happy. The questions were answered on a 4-point scale: 1 = more than usual, 2 = as much as usual, 3 = less than usual, 4 = much less than usual. The first and last items were reverse coded and all items were summed.

4.4.3 Symptoms of RAD (Studies I, II and III)

Questions about the child's typical symptoms of RAD (six items) were included in the FinAdo parental questionnaire. The parents were asked to evaluate the severity of symptoms at arrival in the family and the persistence of symptoms. The behavioural symptoms to be assessed were whether the child: "readily went off with a stranger", "displayed a lack of checking back with the parent even in a stressful situation", "was distressed without seeking comfort from parents", "was scared and wary and did not calm down despite the parent comforting or soothing him/her", "withdrew from contact", or "seemed to be apathetic and without hope". In addition, we included two questions about a child's tendency to cling (Study I): "the child clings excessively to both parents" and "the child clings excessively to one of the parents". Respondents were asked to assess the severity and stability of each symptom on a scale where 0 = not present, 1 = present to some degree, 2 = present to a great degree and 3 = still present. Based on the severity and stability scores the symptoms were classified as follows: 1) no symptoms, 2) mild symptoms (at least one of the symptoms was reported to be present to some degree), and 3) severe symptoms (at least one of the symptoms was present to a great degree) (Studies II and III). In Study I the symptoms were classified as severe if at least one of the symptoms was present to a great degree or the symptom was persistent.

The FinAdo RAD scale is a valid survey measure of attachment-related symptoms in epidemiological studies (Elovainio et al. 2014). In a validation study reported elsewhere (Elovainio et al. 2014) the three-factor solution offered the best fit to the data in the exploratory factor analyses with varimax rotation following the eigenvalue > 1. All of the items had the strongest loading to their corresponding factors in the three-factor solution: inhibited RAD, disinhibited RAD, and clingy behaviour. In the confirmatory factor analysis testing the final structural validity of the attachment-related symptoms scale the three-factor model was found to fit the data significantly better than the null model and reached an acceptable level of fit (GFI > 0.90, AGFI > 0.90, RMSEA < 0.20). In NFI and CAIC (as measures of comparative and parsimonious fit) the loadings of items ranged from 1.00 to 0.69, also favouring the three-factor model (Elovainio et al. 2014).

4.4.4 Stereotypical or self-injurious symptoms at the time of the adoption (Study IV)

The parents were also asked to evaluate the child's stereotypical self-soothing symptoms shortly after adoption. The parents were asked whether the child had a tendency 1) to hit himself or bang his head, 2) to rock or 3) to masturbate in the first 12 months after adoption. The respondents were asked to assess the severity of each symptom on a scale where 0 = not present, 1 = present to some extent and 2 = present to an excessive degree.

4.4.5 Neurocognitive problems (Studies I, II and III)

Information about a child's neurocognitive problems was collected through a FTF parental questionnaire. FTF is a validated screening questionnaire concerning a child's behavioural or developmental problems. It comprises 181 items grouped into eight domains (memory, learning, language, executive functions, motor skills, perception, social skills, and emotional/behavioural problems). In a previous FTF validation study, analysis of variance across the domains yielded significant discriminant effects for motor skills, memory, language, learning and social skills, and the internal consistency for each domain was relatively high and acceptable (Kadesjo et al. 2004).

In the present study we evaluated 27 questions in the learning domain (Studies I and III), 27 questions in the social skills domain (Study III) and 21 questions in the language domain (Studies II and III). In a previous validation study the learning domain has been correlated with total IQ in the Wechsler Intelligence Scale for Children (WISC) III (WISC III) ($p< .01$). The internal consistency for this domain has been excellent with Cronbach's alpha .96, the test-retest Pearson r .88 and inter-parent Pearson r .83 (Kadesjo et al. 2004; Trillingsgaard et al. 2004). The FTF language domain and WISC III Verbal IQ and Verbal Comprehension Index (VCI) have been shown to be strongly correlated ($p \leq .01$) (Kadesjo et al. 2004; Trillingsgaard et al. 2004). The language section

can be further divided into three subdomains: comprehension (5 questions), expressive language skills (13 questions) and communication (3 questions) with Cronbach's alpha values in the previous validation study being .84, .84 and .75, respectively, and in our sample .86, .88 and .78, respectively.

The social skills domain of the FTF was included in the analyses of Study III. In the previous validation study, the social skills domain has significantly differentiated the diagnostic group of ASD from the others (Trillingsgaard et al. 2004).

In the questionnaire each item has three ratings: 0 = "does not apply", 1 = "applies sometimes or to some extent", 2 = "definitely applies". A mean problem score has been calculated for each domain to produce a demarcation line of clinical concern. The demarcation line of the 90th percentile (meaning that 90% of the general population score lower) is used to mark the beginning of clinical concern, and scores over the 98th percentile (98% of the general population score lower) are considered to correspond to severe problems in that area. Age-related developmental changes were accounted for because the percentiles within the child's own age group (6–8 years, 9–12 years and 13–15 years) were used as cut-off points.

4.4.6 Experiences of school bullying (Study III)

We chose the Olweus bully/victim questionnaire (OBVQ) (Olweus 1996) to assess child's experiences of victimization and bullying at school. This self-report questionnaire has been shown to be capable of differentiating between ''victims'' and ''non-victims'' and between ''bullies'' and ''non-bullies''. Bullying is defined here as repeated intentions to harm someone who has difficulty defending himself or herself. The questionnaire includes a global question assessing the overall frequency of victimization or bullying at school during the last few months, and nine specific forms of bullying experiences (physical, verbal, social exclusion, relational victimization, racist victimization, insults with sexual meaning, cyber-victimization, property damage, and threats). Children are asked if they have experienced bullying of each specific kind and the frequency of their experiences (0=not at all, 1=once or twice in the last few months, 2= 2 or 3 times a month, 3=about once a week, 4=several times a week). The global question is most commonly used to estimate the prevalence of bullying. If a child reports bullying others or being bullied at least twice or three times a month, he /she is typically identified as a bully or as a victim. The mean score of the questions about the nine specific forms of victimization/bullying has been recommended for use in analyses of bully/victim information against different sources of data (Olweus 1996; Solberg and Olweus 2003).

The Cohen's d values for being bullied varied between 1.05 for social disintegration and 0.62 for global negative self-evaluations in a previous validation study. For bullying others, both d values exceeded 1.0 for the aggression and antisocial behaviour scales. The cross-over correlations of the victim/bully variables with scales they were not expected

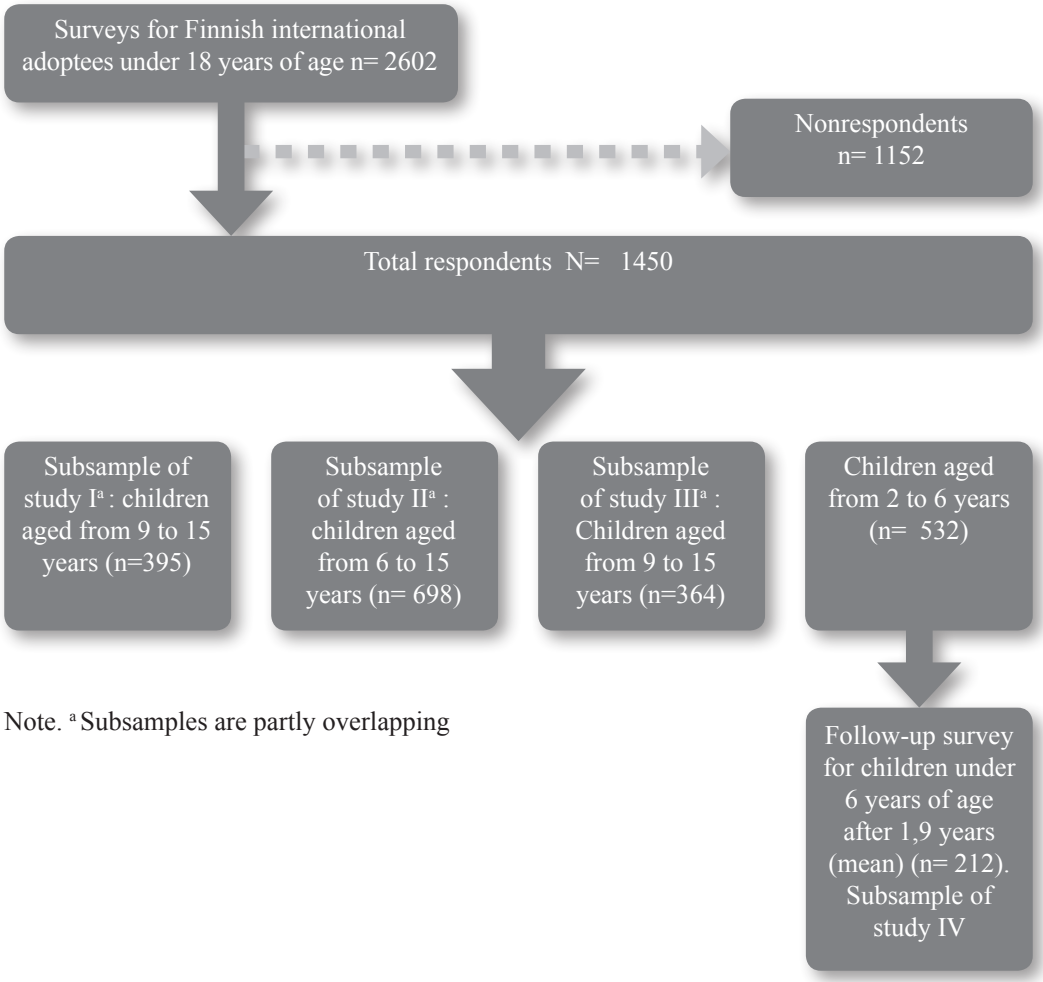
to correlate with were close to zero and considerably smaller than the comparable correlation values for the conceptually related pairs of variables (Solberg and Olweus 2003).

4.4.7 Child's attachment-related behavioural problems (Study IV)

We used The Kinship Center Attachment Questionnaire (KCAQ) to evaluate a child's attachment-related behavioural problems. The quantitative screening instrument KCAQ was developed in a foster and adoption placement agency to measure a child's behaviour related to attachment. The parental questionnaire assesses a child's behaviour such as "My child is very clingy"; "My child does not like being separated from me except on his/her terms"; "My child has an easy time making and keeping friends"; "If things don't go his/her way, my child gets very upset"; and "My child destroys or breaks things that belong to others". The KCAQ is appropriate for use with children younger than 6 years, whereas most self-report instruments of child attachment are for younger toddlers. It was developed specifically for measuring changes in a child's behaviour over time and thus is used by comparing change in scores over time. Its 20 questions are answered on a scale ranging from 0 = never/rarely to 6 = almost always with the alpha coefficient .75 in a previous validation study (Kappenberg and Halpern 2006). According to that study the KCAQ can discriminate between children referred for mental health services and children from a nonclinical sample with a strong effect of group membership on the KCAQ total score (Cohen's d = .79). In comparisons with another well-known instrument measuring a child's behavioural problems, CBCL (Child Behaviour CheckList), the KCAQ total score has been found to have a moderate positive correlation with the CBCL scales Emotional Problems, Anxious/Depressed, Somatic Problems, and Attention Problems and a moderate to strong correlation with the Aggression Problems and Total Problems scales (Kappenberg and Halpern 2006). In the FinAdo data Cronbach's alphas for the KCAQ total score were .74 at Time 1 and .83 at Time 2. Initially, the KCAQ was developed to include four dimensions, but the factors measuring these dimensions have not provided acceptable structural validity (Kappenberg and Halpern 2006). This finding was replicated in our sample. Thus, the measure was used only as a complete sum.

4.5 Study designs

The study designs are shown in Figure 2.



Note. [a] Subsamples are partly overlapping

Figure 2. The study designs and data flow chart.

4.6 Statistical methods

Statistical analyses were conducted using SAS for Windows (version 9.2), with *p*-values below .05 considered to be statistically significant.

FTF values in the domains of learning and language difficulties for adopted children and the general population (Studies I and II) were compared using the *t*-test for independent samples. In Studies I and II we used mean scores to calculate for the comparisons what percentage of the adopted children scored over the corresponding mean scores in the reference group.

To study the association between RAD symptoms or clingy behaviour and a child's learning difficulties (Study 1) we used multiple logistic regression analysis. First RAD symptoms/clinginess, age and sex were used as independent variables, then continent

of birth, age at adoption, the type and number of placements before adoption and SES according to the mother's vocation were added to the logistic regression model, and finally disabilities were added. These analyses were performed separately in both severity-based categories of learning difficulties and on both scales: symptoms suggesting RAD and clingy behaviour. In this study we used two separate two-class evaluations. Children with learning difficulties (mean scores over the 90th percentile line) were compared with children without learning difficulties, and children with severe learning difficulties (mean scores over the 98th percentile line) were compared with children without severe learning difficulties. The milder category included the more severe category.

Comparisons between two categorical variables were made using the chi-square test. The association between age and dichotomous outcome learning difficulties was studied using univariate logistic regression analysis. The association between age and a child's symptoms was studied using univariate multinomial logistic regression analysis. Pearson's correlation coefficients were calculated in order to examine the associations between the different items of the questionnaire.

The associations between language difficulties and the child's RAD symptoms (Study II) were studied separately in both severity-based subclasses of language difficulties with the demarcation line on either the 90th percentile or the 98th percentile. Univariate associations were studied with all the variables. The child's current age, age at adoption and parents' depressive symptoms were analysed as continuous variables. The other variables gender, continent of origin, placement before adoption, SES according to the higher SES of the family, parental marital status, child's developmental delay and child's symptoms of RAD were studied as categorical variables. The multivariate analyses were conducted in four steps in order to examine the independent associations between RAD symptoms and language difficulties. First the child-related background factors (gender, age at evaluation, age at adoption, continent of origin, and type and number of placements before adoption) were included in the same analysis as the RAD symptoms. In the second model, the familial background factors (SES, parents' depressive symptoms, parental marital status), and in the third model the developmental delays were studied in the same model as RAD symptoms. In the final model all the variables were included simultaneously. The analyses were performed using logistic regression analysis. The results for the comparisons were given as odds ratios (*OR*) with 95% confidence intervals (95% *CI*). Logistic regression was also used to test the potential interaction effects between age at evaluation and RAD symptoms or SES and RAD symptoms on language problems.

The associations between RAD symptoms and the subdomains of language difficulties (comprehension, expressive language skills and communication) were studied as described above. The scores defining the 90th and 98th demarcation lines were calculated using the mean score and standard deviation of the general population. The figures for the 98th demarcation line were not considered to be reliable because the number of

children scoring over that line was too small, thus the analyses for the subdomains were conducted with the demarcation line set at only the 90th percentile.

The OBVQ global question was used to evaluate the prevalence of bullying experiences (Study III). The comparisons between the control group and the sample of adoptees were made using Fisher's exact test. The child was categorized as a victim or a bully if he/she reported victimization/bullying others at least twice or three times a month. The bullying experiences of adoptees versus the reference group were compared in different school grades.

The main analyses between victimization/school bullying and RAD symptoms were performed using the sum of the scores of the nine items of different forms of bullying as a continuous variable separately for victimization and bullying others. The child's current age, age at arrival, parents' age and parents' depressive symptoms were included as continuous variables. The other variables gender, country of origin, placement before adoption, child's disabilities, socioeconomic status of family, parents' experience of adoption, child's symptoms of RAD, social skills, learning difficulties and speech delays were studied as categorical variables. The FTF domains included in the evaluation (language, learning and social skills) were studied in two categories: "no difficulties" (mean scores under the 90th percentile line) and "difficulties" (mean scores over the 90th percentile line).

Because the outcome measures were skewed, these analyses were performed using negative binomial regression with a log link (Long and Scott 1997) and expressed as rate ratios (*RR*) with 95% confidence intervals (95% *CI*). We used the logarithm of the number of questions answered as the offset variable. We studied separately the associations between a child's involvement in bullying, and other variables were studied separately for victimization and being a bully using a sum of the scores of the nine specific items as a continuous variable. The analyses were conducted in five steps. In the first step, we included all the background factors (age, gender, country of origin, age at arrival in Finland, placement before adoption, disabilities, familial socioeconomic status, parents' depressive symptoms, parents' age, parents' marital status and parents' experience of adoption) in the same analysis in order to examine their main effects on bullying involvement. In the following models, the explanatory variables – that is, the child's symptoms of RAD, social skills, learning difficulties and language skills – were added to the model one by one, while adjusting for potential confounding factors. All variables were included in the final model.

The evaluations of differences in mean scores for adoptees' attachment-related behavioural problems between time 1 and time 2 (Study IV) were studied using a dependent sample *t*-test with mean total problem score as a continuous variable. The six items for positive adjustment/development were reverse coded. Comparisons with the divided normative population were made by comparing the adopted children's mean problem scores at time 1 with the younger half of the reference group and the adopted children's mean scores at

time 2 with the older half of the reference group. Groups were compared using the *t*-test for independent samples.

In order to examine which factors in the child's background and adoptive family were associated with problem scores, the variables were dichotomized. The age at adoption was dichotomized by a demarcation line of two years. Here we categorized the child's country of origin according to continent. To study the type of placement, we compared only foster home placement with the others and, in an additional analysis, those children who had a foster home placement in their background with those without any foster home placement. Similarly, those children who had a placement in an orphanage in their background were compared with those without any orphanage placement. The effect of the number of placements was studied by comparing those with only one placement with those having more than one placement in their background. The lowest SES of the adoptive family (manual work/working class) was compared with others, and families with both parents were compared with single-parent households. We dichotomized the parents' experience of adoption by comparing those in which both had a positive experience with the others. Support from a family guidance clinic, where such existed, was also dichotomized.

We used mixed model repeated analysis to examine the association between dichotomized background and familial variables and mean KCAQ problem scores using time, the dichotomized variable and the interaction between the two as predictors. We presented the results separately for both time points. The associations with the child's stereotypical or self-injurious symptoms at the time of adoption were studied accordingly. Subject was used as a random effect in all mixed models.

In the final analysis, the interaction effects between problem behaviour at time 1 and problem behaviour at time 2 were tested using a linear model. In an additional analysis, the linear model was used to test the interaction between problem scores at first evaluation and self-soothing symptoms with problem scores at second evaluation as a response variable.

For this summary we conducted some extra univariate analyses between child-related and familial factors and outcome (learning problems, language problems, bullying experiences). These analyses are not included in the substudies. The univariate analyses were conducted in the same way as the former analyses in the substudies. The interaction effects of new variables and attachment-related behavioural problems were also studied in the same way as the analyses reported in the substudies.

For this summary too, we conducted some univariate analyses between the child's factors and familial factors and RAD symptoms as supplementary material. The analyses were conducted using Spearman's correlation coefficients.

5. RESULTS

5.1 Characteristics of the sample

The characteristics of the sample are shown in Table 2. Girls are slightly over-represented among the respondents in the samples in all the studies. Most of the children were approximately three years of age (mean) at adoption. The continent of origin varies depending on the age group, but most of the children in all the age groups came from Asia. Most of the children had orphanage placement in their background and most had only one placement before adoption. Among the adoptive parents, upper middle class background in the family was over-represented and only a minority of the parents were single. For most of the parents, the experience of adoption was positive.

5.2 Prevalence of socioemotional and neurodevelopmental problems and comparisons with the reference groups

5.2.1 RAD symptoms

In the FinAdo data 1427 parents responded to the questionnaire about the child's RAD symptoms at the time of adoption. 18.4% of the children (*n*= 262) had at least one severe symptom at the time of adoption, whereas up to 40.6% of the children (*n*= 580) had at least one mild RAD symptom.

5.2.2 Neurocognitive problems

The international adoptees had higher problem scores than the reference group in the Swedish validation study in the domains of learning and language problems. Of the adopted children, 33.2% (*n*= 131) had learning difficulties and 12.9% (*n*= 51) had severe learning difficulties. The corresponding figures for the reference group are 10% and 2% (Study I). Twenty-nine per cent (200/689) of the internationally adopted children had language problems (Study II) according to the parental questionnaire and 8% (53/689) had severe language problems compared with 10% and 2%, respectively, in the general population. The adopted children had higher problem scores, indicating greater difficulty in all areas of language problems measured in the present study – comprehension 24% vs. 10% (162/689), expressive language skills 24% vs. 10% (168/689), and communication 27% vs. 10% (187/689) – than their peers.

5.2.3 Experiences of school bullying

In Study III, 72 children (19.8%) in the sample reported having been bullied at school at least twice or three times a month. There was a negative linear association between age and victimization. In grades 3–4 (typically 9-10 year-old children), 25.4% (*n*= 31)

Table 2. Characteristics of the sample

	Study 1	Study 2	Study 3	Study 4
Number of participants	395	689	364	171
Response rate (%)	49.4	47.8	49.4	61.4[a] (80.6)[b]
Mean age (SD) (years)	11.6 (1.9)	9.4 (2.8)	11.6 (1.9)	2.8 (0.6)
Gender (boys) (%)	191 (48.4)	339 (49.2)	174 (47.8)	68 (39.8)
Mean age at adoption (SD) (years)	3.1 (2.3)	2.6 (2.1)	3.0 (2.3)	1.4 (0.7)
Continent of birth (Studies I and III)				
Asia	158 (40.0)	321 (46.7)		124 (73.4)
Eastern Europe	132 (33.4)	175 (25.4)		8 (4.7)
America	63 (16.0)	111 (16.1)		16 (9.5)
Africa	42 (10.6)	81 (11.8)		21 (12.4)
Country of birth (Study II)				
China			70 (19.2)	
Russia/Estonia			104 (28.6)	
Other			190 (52.2)	
Number and type of placements				
Only one foster home	32 (8.1)	53(7.7)	31 (8.6)	12 (7.1)
Only one orphanage	212 (53.8)	387 (56.3)	195 (53.9)	101 (59.8)
>2 placements	150 (38.0)	248 (36.1)	136 (37.6)	56 (33.1)
SES				
Upper middle class	147 (39.2)[c]	402 (59.6)[d]	230 (64.1)[d]	104 (61.2)[d]
Lower middle class	72 (19.2)[c]	138 (20.4)[d]	62 (17.3)[d]	31 (18.2)[d]
Working class	128 (34.1)[c]	117 (17.3)[d]	62 (17.3)[d]	32 (18.8)[d]
Single parent household	33 (8.6)[e]	103 (15.2)[f]	57 (15.8)[f]	17 (9.9)[e]
Father's age at adoption	39.4 (5.6)	39.4 (5.7)	38.8 (5.5)	37.8 (5.0)
Mother's age at adoption	37.7 (5.2)	37.6 (5.2)	37.6 (5.2)	36.6 (4.8)
Positive experience of adoption (%)	235 (74.4)	220 (75.3)	425 (78.0)	144 (84.7)
Disabilities	77[g]	38[h]	65[i]	-

[a] For the first questionnaire at time 1

[b] Mother's socioeconomic status

[c] The higher socioeconomic status in the family

[d] Parents' marital status at the time of adoption

[e] Parents' marital status at the time of the survey study

[f] Deafness or hearing impairment in both ears, blindness or poor vision in both eyes, mental retardation or intellectual disability, autism

[g] Deafness or hearing impairment in both ears, blindness or poor vision in both eyes, intellectual impairment, mental retardation, or autism.

[h] Autism, mental retardation, cerebral palsy, deafness or hearing impairment in both ears

reported being victims of bullying, whereas the corresponding figure for the comparison group is 18.0% (n= 8755); in grades 5–6, 18.3% (n= 20) reported victimization (12.9%, n = 6047 in the reference group), and in grades 7–9 only 12.5% (n= 13) (10.5%, n= 5395 in the reference group). The rate of victimization was statistically significantly higher for the adopted children only in the group of the youngest children (p= .04).

Of the 364 children, 29 (8%) had bullied others at least twice or three times a month. In the youngest age group (grades 3–4), the figure was 11.4% (n = 14) in the reference group, 6.5% (n = 7) in the middle group (grades 5–6), while in the oldest age group (grades 7–9) only 4.8% (n = 5) reported having bullied others. The rates of bullying in the reference group were 9.8% (n = 4782) in grades 3–4, 6.5% (n = 4522) in grades 5–6 and 12.2% (n = 6288) in grades 7–9. Eighteen of the adoptees (5.0%) reported both bullying others and being bullied themselves.

5.2.4 Attachment-related behavioural problems

In comparison with the younger reference group collected by the well-baby clinics, the problem scores were significantly higher for adoptees at time 1 (p for the difference = .02). At time 2 the problem score difference between adoptees and the older comparison group was not statistically significant (p = .06).

5.3 Associations with the covariates

5.3.1 Associations with the child-related factors

Univariate associations with the covariates are listed in Table 3.

Table 3. Associations with child-related background factors

	Study 1		Study 2		Study 3		Study 4	
	Learning difficulties	Severe learning difficulties	Language difficulties	Severe language difficulties	Victimization	Being a bully	Attachment-related behavioural problems Time 1	Attachment-related behavioural problems Time 2
Age at evaluation	ns	++	ns	ns	ns	ns	ns	ns
Gender, boy vs girl	+	ns	+++	ns	++	+++	ns	ns
Age at adoption	+++	++	+++	+++	ns	ns	++	+++
Disabilities	+++	+++			+	+		
Developmental delay			+++	+++			+[a]	++[a]

Note. + < .05
++ < .01
+++ < .001
[a] reported in the birth country's record

The child's older age at the time of evaluation was associated with severe learning difficulties, while this was not the case with less severe learning difficulties or any other outcome variable. Older age at adoption, on the other hand, was associated with learning difficulties and severe learning difficulties. Correspondingly, older age at adoption was associated with language difficulties and with severe language difficulties. Children who had been adopted at 2 years of age or older manifested more attachment-related behavioural problems than those who were younger than 2 years at the time of adoption. This applies to the association both at time 1 (p= .001) and at time 2 (p= .0008). The child's age at adoption, on the other hand, was not associated with victimization or being a bully.

Male gender was associated with learning and language difficulties but not with severe learning or language difficulties. It was also associated with victimization and with being a bully. The child's gender was not associated with attachment-related problem behaviour at time 1 or 2, but in the interaction analysis with time we found an association indicating that boys' problem behaviours diminished less than those of girls (p= .006).

The child's continent of origin was associated with learning difficulties (p< .0001) and severe learning difficulties (p< .0001). Those children who came from Eastern Europe and Africa had more learning problems than the others. Eastern European continent of origin was further associated with language difficulties (Eastern Europe vs. Asia *OR* 3.02, 95% *CI* 2.03–4.50, p< .001), and with severe language difficulties (*OR* 3.55, 95% *CI* 1.75–7.44, p< .001). The child's country of origin was associated with victimization (Russia/Estonia vs. China *RR* 2.62, 95%*CI* 1.57 4.37, p< .001; Other vs. China *RR* 1.68, 95%*CI* 1.05–2.68, p= .03) and with being a bully (Russia/Estonia vs. China *RR* 3.14, 95%*CI* 1.77–5.58, p < .001; Other vs. China *RR* 2.04, 95% *CI* 1.19–3.51, p= .001). Problematic attachment behaviour diminished less for children coming from Eastern Europe (p= .04), although it was not associated with continent of origin at either time 1 or time 2.

Number and type of placements was associated with learning difficulties (p= .045) but not with severe learning difficulties. Children with more than one placement had a higher risk of learning difficulties than children with only one placement before adoption, but this was not associated with the other outcome variables: either of the two severity-based subclasses of language difficulties, victimization or being a bully or attachment-related behavioural problems. Neither number of placements nor type of placement was associated with attachment-related problem behaviour even when studied separately.

A child's disabilities were associated with learning difficulties and severe learning difficulties. A child's developmental delay was associated with language difficulties and severe language difficulties. Children with disabilities had more experiences of both victimization and being a bully. Those children who had a developmental delay according to the birth country's report had more attachment-related problem behaviour at time 1 and at time 2 than those without developmental delay.

5.3.2 Associations with the psychosocial characteristics of the adoptive family

Table 4. Associations with factors related to the adoptive family.

	Study 1		Study 2		Study 3		Study 4	
	Learning difficulties	Severe learning difficulties	Language difficulties	Severe language difficulties	Victimization	Being a bully	Attachment-related behavioural problems time 1	Attachment-related behavioural problems time 2
SES	ns[a]	ns[a]	ns[b]	ns[b]	ns[b]	ns[b]	ns[b]	ns[b]
Single parent household	ns	ns	ns	ns	ns	ns	ns	ns
Father's age	ns	ns	ns	ns	ns	ns	ns	ns
Mother's age	ns	ns	ns	ns	ns	ns	ns	ns
Experience of adoption[c]	++	ns	+	ns	ns	+++	ns	+
Mother's depressive symptoms	ns	ns	ns	ns	ns	ns	++	+
Father's depressive symptoms	ns	ns	ns	ns	ns	ns	ns	ns

Note. + < .05
++ < .01,
+++ < .001
[a] Mother's SES
[b] The higher SES in the family
[c] Negative experience of adoption on the part of one or both parents vs positive experience of both parents

Negative experience of adoption on the part of one or both parents was associated with the child's learning difficulties, language difficulties and the child being a bully. It was further associated with attachment-related problems at time 2 (p= .002) and with an increase in attachment-related problems (p= .01). In addition, the adoptive mother's depressive symptoms were associated with attachment-related problems at time 1 and 2, but no other familial factors were associated with the outcome.

5.3.3 RAD symptoms

The adoptive parents' report of a child's RAD symptoms at the time of adoption was not significantly associated with the child's age at the time of evaluation. Male gender (p=

.004) and older age at adoption ($p < .0001$) were associated with RAD symptoms. The number and type of placements before adoption was associated with RAD symptoms ($p= .005$), with those children who had many placements having more RAD symptoms than the others. The child's continent of origin was also associated with RAD symptoms ($p < .0001$): 61.0% of the children from Latin America did not have RAD symptoms at all, whereas the proportion for Asia was 41.7%, for Africa 35.9 % and for Europe 28.5%. Children with disabilities had more RAD symptoms (p< .0001).

Neither the adoptive family's SES nor the parents' marital status was associated with the prevalence of RAD symptoms. The mother's older age at adoption was associated with RAD symptoms ($p= .03$), whereas the father's age was not. The parents' satisfaction with adoption was associated with the child's RAD symptoms ($p< .0001$). Those children whose both parents had positive experience of adoption had fewer RAD symptoms. The mother's and father's depressive symptoms were associated with the child's RAD symptoms ($p= .01$ and $p= .03$, respectively).

5.4 Associations with RAD symptoms

Univariate and adjusted associations between RAD symptoms and learning difficulties, language difficulties, victimization and being a bully are presented in Table 5.

5.4.1 Associations between RAD symptoms and learning difficulties (Study I)

The symptoms suggesting RAD were associated with both severity-based subclasses of learning difficulties. Children with severe RAD symptoms or persistent symptoms in particular ran a higher risk of having learning difficulties ($OR = 4.6$) and severe learning difficulties ($OR = 7.4$). These associations were robust to adjustments for age, gender, mother's SES and child-related factors such as continent of birth, age at adoption and number and type of placements before adoption. The adjustments with covariates, however, attenuated the associations between mild RAD symptoms and both severity-based subclasses of learning difficulties.

5.4.2 Associations between RAD symptoms and language difficulties (Study II)

The child's RAD symptoms were associated with both language difficulties and severe language difficulties, and the associations were robust to adjustments for all other variables (Table 5). Familial SES or the child's age at evaluation had no significant interaction effects on the association between RAD symptoms and language difficulties ($p = .45$ for familial SES and $p = .17$ for the child's age at evaluation) or between RAD symptoms and severe language difficulties ($p = .58$ and $p = .18$, respectively). All the subdomains measured in the present study were associated with RAD symptoms at the time of adoption (Table 6).

5.4.3 Associations between RAD symptoms and school bullying (Study III)

Children with severe symptoms of RAD at the time of adoption reported more experiences of being bullied than children with no symptoms (rate ratio 3.12). The univariate associations between victimization and a child's severe RAD symptoms remained significant after adjustments for background factors and other explanatory variables (age, gender, country of origin, age at arrival in Finland, placement before adoption, disabilities, familial socioeconomic status, parents' depressive symptoms, parents' age, parents' marital status, parents' experience of adoption, and the child's learning and language difficulties and social skills)

Children with mild symptoms of RAD reported being a bully more often than those without these symptoms, the rate ratio being 1.6. This also applied to children with severe RAD symptoms, the rate ratio in this case being 2.8. However, after adjustment with covariates (age, gender, country of origin, age at arrival in Finland, placement before adoption, disabilities, familial socioeconomic status, parents' depressive symptoms, parents' age, parents' marital status, parents' experience of adoption, and the child's learning and language difficulties and social skills) the association between being a bully and mild symptoms of RAD was no longer statistically significant. The association between being a bully and severe symptoms of RAD remained significant after all adjustments.

Table 5. Univariate and adjusted associations with mild and severe RAD symptoms

	Mild RAD symptoms, univariate		Mild RAD symptoms, adjusted		Severe RAD symptoms, univariate		Severe RAD symptoms, adjusted	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Learning difficulties	1.85	1.12–3.06	1.23 [a]	0.69–2.19	4.57	2.57–8.13	2.06 [a]	1.01–4.19
Severe learning difficulties	2.42	1.05–5.58	1.47 [a]	0.56–3.83	7.38	3.24–16.84	4.12 [a]	1.41–11.47
Language difficulties	2.64	1.78–3.91	2.15 [b]	1.39–3.31	4.08	2.56–6.51	2.82 [b]	1.66–4.81
Severe language difficulties	5.60	2.28–13.75	4.33 [b]	1.57–11.98	8.77	3.41–22.56	6.23 [b]	2.08–18.67
	RR [d]	95% CI	RR [d]	95% CI	RR [d]	95% CI	RR [d]	95% CI
Victimization	1.44	<1.00–2.09	1.32 [c]	0.89–1.96	3.12	1.93–5.03	2.68 [c]	1.50–4.77
Being a bully	1.61	1.08–2.42	1.40 [c]	0.92–2.15	2.75	1.66–4.56	2.08 [c]	1.17–3.69

Note. [a] Adjusted for age, sex, continent of birth, age at time of adoption, type and number of placements before adoption, mother's vocation and disabilities

[b] Adjusted for child's gender, age at evaluation, age at adoption, continent of origin, type and number of placements, family's socioeconomic status, parents' depressive symptoms, parental marital status, and child's developmental delay

[c] Adjusted for age, gender, country of origin, age at arrival in Finland, placement before adoption, disabilities, familial socioeconomic status, parents' depressive symptoms, parents' age, parents' marital status, parents' experience of adoption, and the child's social skills and learning and language difficulties

[d] Rate Ratio

Table 6. Univariate and multivariate associations between RAD symptoms and subdomains of the language difficulties

	Univariate association			Adjusted association[a]		
	OR	95% CI	p	OR	95% CI	p
Comprehension						
Mild RAD symptoms	2.54	1.65–3.91	<.001	2.21	1.37–3.56	.001
Severe RAD symptoms	4.15	2.55–6.86	<.001	2.92	1.64–5.19	<.001
Expressive language skills						
Mild RAD symptoms	2.25	1.50–3.40	<.001	1.80	1.15–2.83	.01
Severe RAD symptoms	2.94	1.80–4.78	<.001	1.93	1.10–3.37	.02
Communication						
Mild RAD symptoms	2.95	1.96–4.45	<.001	2.38	1.52–3.73	<.001
Severe RAD symptoms	4.57	2.82–7.39	<.001	3.41	1.98–5.87	<.001

Note. [a] Adjusted for child's gender, age at evaluation, age at adoption, continent of origin, type and number of placements, family's socioeconomic status, parents' depressive symptoms, parental marital status, and child's developmental delays

5.4.4 Associations between learning difficulties and clingy behaviour (Study I)

A child's tendency to be clingy was also associated with learning difficulties. The risk of learning difficulties was twice as high for children with marked clingy behaviour than for those without it (*OR* 2.10, 95% *CI* 1.24–3.55, $p = .0005$). This association was robust to all adjustments (in the fully adjusted model *OR* 2.12, 95% *CI* 1.12–4.01, $p = .02$). The association between a child's tendency to be clingy and severe learning difficulties was curvilinear, however. Children presenting with mild clinginess had the lowest risk of severe learning difficulties (in the fully adjusted model *OR* 0.31, 95% *CI* 0.10–0.88, $p = .03$).

5.4.5 Associations between school bullying experiences and social skills, learning and language difficulties (Study III)

The associations between school bullying experiences and social skills, learning and language difficulties are shown in Table 7. Victimization was associated with a concurrent lack of social skills, learning difficulties and poor language skills. The univariate associations between victimization and a child's lack of social skills remained significant after adjustments for other variables. The association with learning difficulties or poor language skills was attenuated after the other variables were included in the same model.

The child's lack of social skills, learning difficulties and poor language skills were also associated with being a bully in the univariate analysis. However, in the fully adjusted model, the association between being a bully and having learning difficulties and poor language skills was not significant.

Table 7. Univariate and adjusted associations between school bullying experiences and social skills and learning and language difficulties

Social skills		Learning difficulties		Language difficulties		
OR	95% CI	OR	95% CI	OR	95% CI	
Victimization, univariate	2.40	1.66–3.46	1.64	1.12–2.39	1.86	1.30–2.68
Victimization, adjusted[a]	1.74	1.06–2.85	1.05	0.65–1.71	1.09	0.65–1.81
Being a bully, univariate	2.49	1.71–3.62	1.53	1.03–2.28	2.00	1.38–2.91
Being a bully, adjusted[a]	1.50	0.91–2.45	0.94	0.59–1.50	1.19	0.73–1.93

Note. [a] Models adjusted for age, gender, country of origin, age at arrival in Finland, placement before adoption, disabilities, familial socioeconomic status, parents' depressive symptoms, parents' age, parents' marital status, parents' experience of adoption, and the child's social skills and learning and language difficulties

5.4.6 Variables associated with attachment-related behavioural problems and their change over time

The associations with variables are shown in Table 8. The child's younger age at adoption was associated with fewer behavioural problems, while his/her developmental delay in the report by the country of birth was associated with more problems at times 1 and 2. In the final interaction analysis with time the association was not statistically significant with either of these two, indicating that these variables did not explain the positive change over time. Those children who had more problems at time 1 had received more support for the family from the family guidance clinics, but the association was not significant at time 2. The interaction test with time showed that the psychosocial support for the family did not explain the behavioural change over time, however.

Neither the child's gender nor Eastern European background was associated with problem scores at time 1 or time 2, but in the interaction analysis girls' problem scores decreased significantly more than those of boys (Figure 3 and Table 8). Accordingly, the interaction analysis with time revealed that the problem scores for children from Eastern Europe increased significantly, whereas the scores for children from the other countries tended to decrease (Figure 3 and Table 8). Of the familial factors, both parents' positive experience of adoption was associated with a decrease in problems (Figure 3 and Table 8). The scores of these parents tended to decrease and the scores of the others increased slightly during the follow-up period.

Table 8. Associations between child-related and familial factors and attachment-related behavioural problems (score differences between factors, their probabilities at times 1 and 2, and probabilities for the score difference)

	Time 1		Time 2		*p* (Interaction between factor and time)
	Score difference	*p* (Score difference)	Score difference	*p* (Score difference)	
Child-related factors					
Gender (boy vs girl)	-.73	.63	2.65	.08	.006
Age at adoption (≥2 years vs. <2 years)	6.15	.001	6.32	.0008	.92
Number of placements (>1 vs. 1)	.22	.89	-.05	.97	.83
Type of placement (only foster home vs other)	-5.29	.07	-3.78	.19	.52
Foster home placement in background vs other	-2.13	.19	-2.28	.15	.91
Orphanage placement in background vs other	3.77	.15	2.59	.52	.32
Continent of origin (Asia vs others)	.88	.60	-1.27	.45	.11
Continent of origin (Africa vs others)	.40	.86	.34	.88	.97
Continent of origin (Americas vs others)	-2.79	.27	-.84	.74	.34
Continent of origin (Europe vs others)	.50	.89	6.27	.07	.04
Developmental delay vs no delay	3.70	.03	4.98	.005	.38
Familial factors					
Both parents working class SES vs neither parent working class	-.52	.83	1.92	.44	.22
Both parents vs single parent	-3.28	.18	-2.02	.41	.53
Parents' experience of adoption (both positive vs others)	-2.11	.29	-6.30	.002	.01
Support from family guidance centres (yes vs. no)	9.33	.03	3.05	.49	.08

5.4.7 Interactions with stereotypical self-soothing symptoms at the time of adoption

Symptoms of children hitting themselves/banging their heads, rocking and masturbation at the time of adoption were associated with more problems at both times 1 and 2 (Table 9). None of the self-soothing symptoms was associated with a decrease in attachment-

related behavioural problems over time. In an additional analysis of the interaction between high problem scores at first evaluation and self-soothing symptoms, we found an interaction with masturbation ($p = .03$). Of those children who had high scores at time 1 and presented masturbation, the scores at time 2 were significantly higher than those who did not present masturbation.

Table 9. Associations between self-soothing symptoms and attachment-related behavioural problems (score differences between factors, their probabilities at times 1 and 2, and probabilities for the score difference)

	Time 1		Time 2		*p* (Interaction between factor and time)
	Score difference	*p* (Score difference)	Score difference	*p* (Score difference)	
Child's symptoms at the time of adoption					
Hitting themselves or banging head vs neither	7.53	.0002	8.80	<.0001	.45
Rocking vs no rocking	4.52	.02	6.49	.0006	.20
Masturbation vs no masturbation	10.95	.001	11.26	.0009	.91

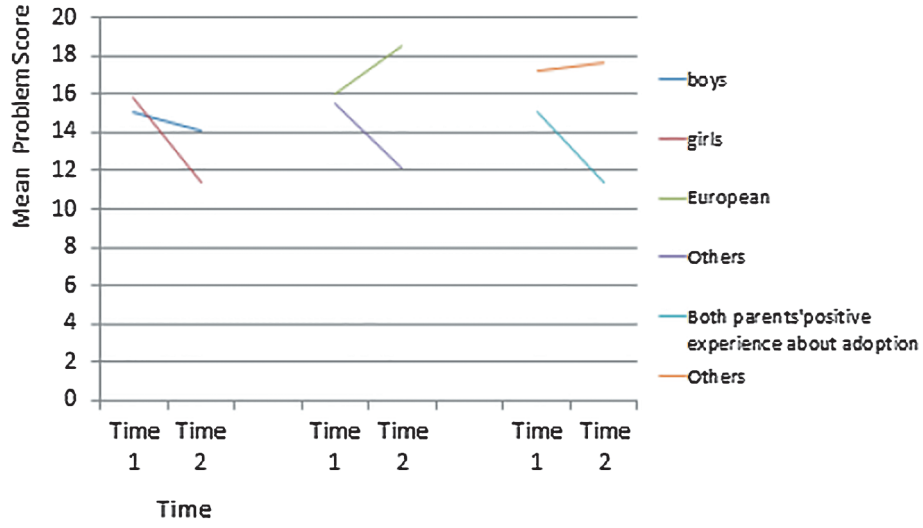


Figure 3. Mean problem scores of adopted boys versus girls, adopted children from Eastern European background versus others and adopted children with both parents reporting positive experience of adoption versus others at times 1 and 2

6. DISCUSSION

6.1 Main findings

In this study, which is based on a large volume of survey data, we examined features of attachment disorders among internationally adopted children in Finland. The study samples were various age groups derived from the comprehensive FinAdo cohort including all children adopted via three Finnish legal adoption organisations since 1985. We studied the associations of children's symptoms of RAD at the time of adoption and their associations with later learning difficulties, language problems and school bullying experiences. The change in attachment problems was studied by repeating a questionnaire covering attachment-related behavioural problems after a period of two years for preschoolers. In addition, we compared the outcome with a reference group collected from well-baby clinics in southern Finland.

The main findings in this study are:

- Internationally adopted children in Finland had more learning and language problems than their age-mates
- Symptoms of RAD at the time of adoption were associated with a child's learning and language problems at preschool and school age
- The adopted child's severe RAD symptoms at the time of adoption were strongly associated with both victimization and bullying others at school
- Internationally adopted children presented more attachment-related behavioural problems two years after adoption than their non-adopted age-mates, although the difference was no longer noticeable four years after adoption

6.2 Discussion of methodology

6.2.1 Study design

The FinAdo study is the first study to be conducted among Finnish international adoptees on psychological development and psychiatric issues. It is also the first study to include all children adopted via the official routes. In order to reach the total sample, the study was mainly conducted as a cross-sectional survey.

Because of the cross-sectional design in most of the sub-studies, a child's symptoms at the time of adoption were requested retrospectively. Knowing that the parents' memories can be distorted over time, this should be regarded as one of the main limitations in this study. The time after adoption is, however, quite a unique time for the parents and

they may remember facts about it quite accurately. In addition, Finnish adoptive parents receive a lot of information about attachment problems before adoption and thus they tend to pay special attention to attachment-related issues. Although it was not feasible to test all the adopted children, the study would have benefited from clinical assessments of at least some of them to confirm the attachment or cognitive problems. In the future, the findings will be supplemented by the ongoing clinical follow-up study FinAdo 2.

A multi-informant approach would have generated a great deal of additional information. Both parents were requested here to reply separately only to questions about their personal experiences. The questionnaires about the child's socioemotional issues were asked to be filled in only once, by the parents together or by the parent spending more time with the child. The idea was to limit the number of questions for the parents. Any information from teachers or day-care nurses would have added to our knowledge about the adopted children's socioemotional and cognitive development, in particular learning difficulties or language delays. However, gathering information from anyone outside the family would have needed a lot more work from the participants, such as written consents from parents and older children themselves, as well as delivering the information and questionnaires. In addition, a request to reveal personal information to outsiders might have reduced willingness to participate in the study. Our aim was to reach as many Finnish adoptees as possible, and thus we did not want to take the risk of lowering the participation rate.

The longitudinal analysis of the attachment-related problems (Study IV) revealed the positive effect of time on the child's behavioural problems. A follow-up survey of socioemotional and developmental outcomes of all the participants would definitely have added to our knowledge and this is being considered for inclusion in the ongoing FinAdo study.

The relatively low response rate in the current study may have affected the prevalence estimates. Nevertheless, the differencies between respondents and non-respondents in the current study were small, at least regarding the gender or country of origin, and thus over-representation of children with or without problems among respondents is not likely to be great. The main findings, i.e. the associations between RAD symptoms and the outcome and change of problematic behaviour, are not likely to be seriously biased due to selective attrition.

The reference group collection using the child's classmates in the day-care group would definitely have been scientifically the most reliable way to make the comparisons with reference groups. However, from the ethical point of view, it would not have been acceptable to let outsiders know about the adoption background of one of the children in the group. In Studies I and II we used as reference values the FTF mean problem scores that were calculated based on a Nordic sample collected mainly in Sweden as a reference group for the validation study. Thus, its role as a reference group for this study is limited. There may be some differences compared with the Finnish sample. However,

FTF scores are also widely used in Finland because the differencies between Nordic countries may not be that crucial. The Swedish reference group for the validation study was collected in 2001 and our sample was collected in 2007 and 2010. Changes in school system and parents' potentially increased awareness of the children's development may have affected these numbers as well. The OVBQ of school bullying experiences was supplied for the children in the reference group at school, whereas the children in our sample filled in the questionnaire at home. To minimize the parents' influence on the replies, we instructed the children to return the questionnaires straight to the researchers in a closed envelope. Finally, the attachment-related behavioural problems were assessed in the reference group only once. The comparisons with normative children had to be conducted by dividing the group by mean age into younger and older reference groups. Thus, all the comparisons between the prevalence numbers should be interpreted with caution.

6.2.2 Measures

We preferred to use validated questionnaires which were supplemented by questions developed for the FinAdo study. Although many studies have been conducted in the field of international adoption, there is a lack of validated survey measures in specific issues in this population, such as factors before adoption, problems related to early institutionalisation or RAD.

The information available about the adopted child's background before adoption is very limited. Although it would be crucial, it is a limitation in almost all adoption research. Thus, the parents may have had misleading impressions about the child's history before adoption. Information about the adoptive family, on the other hand, can be considered to be reliable. In this study we used a short version of the GHQ although a more detailed questionnaires covering parents' potential anxiety or depressive symptoms might have been beneficial. In addition, assessments of parental stress or parents' perceptions about their child would have been informative. However, short versions have been shown to have acceptable psychometric properties and have been reported to be applicable (Aalto et al. 2012).

The RAD questionnaire was developed by us because of to the lack of a short instrument suitable for a survey study. The FinAdo study group aimed to formulate the items according to clinical presentation of RAD rather than diagnostic criteria because it was designed to be a parental instrument. The results in structural equation modeling suggest that the model is identified and it provided a good fit to the data and to have good concurrent validity. Thus, it has been shown to be reliable for this kind of large survey study (Elovainio et al. 2014). The parental questionnaire can be regarded as acceptable measuring RAD symptoms because the symptoms of attachment disorders are particulary clear in the most intimate relationships. However, the questionnaire indicates only the presence of symptoms, not a disorder.

The methods used to evaluate the outcomes (child's psychological and developmental problems/ adjustment), such as FTF and OBVQ, are widely used and tested (Kadesjo et al. 2004). The use of parental reports for the child's problems in the FTF may lead to overestimation of difficulties. The prevalence of problems should not be misunderstood as the prevalence of disorders. However, the use of the same method in the reference group increases the reliability of the comparisons. The children themselves replied to the OVBQ and the questionnaires were returned in a closed envelope to reduce the effect of parents on the child's replies. It is one of the most widely used methods to evaluate the existence of school bullying.

In the follow-up study, we preferred to use a method to evaluate children's attachment-related behavioural problems. The KCAQ has been specially developed to estimate the change of problematic attachment behaviour of children in custody. It can therefore be considered to be well suited for tracking change in longitudinal analyses. Some of its items such as "my child is very clingy" or "my child does not like being separated from me except on his/her own terms" may measure real change towards a more secure attachment but some other items, such as "my child steals things" or "my child teases, hurts, or is cruel to other children" refer rather to behavioural problems in general. Thus, we preferred to use the questionnaire as a measurement of more general "attachment-related behavioural problems" than attachment itself. Initially the KCAQ included four dimensions, but due to the unacceptable structural validity in the validation study and in our sample the KCAQ finding was used as a complete sum. (Kappenberg and Halpern 2006)

The child psychiatric survey questionnaires are validated in different age groups. In this study, we had to create different sets of questionnaires for each age group. The statistical analyses had to be conducted separately in each age group according to the questionnaires provided in each group. This lowered the number of participants in each sub-study. The number of participants, however, was high enough for reliable multivariate analyses.

6.3 Prevalence of RAD symptoms, learning and language problems, school bullying experiences and attachment-related behavioural problems

This large sample study showed that, as evaluated by the parents, a considerable proportion of internationally adopted children in Finland manifest symptoms suggesting RAD at the time of adoption. The prevalence figures of 40.6% of overall RAD symptoms and 18.4% of severe RAD symptoms at the time of adoption in our sample can be considered to be in line with other studies: 19.4% among children in foster care (Lehmann et al. 2013) and up to 40% in a sample of severely deprived children adopted from Romanian orphanages (Smyke, Dumitrescu, Zeanah 2002).

According to parental evaluations, 33% of the internationally adopted children had learning difficulties and 13% had severe learning difficulties. These figures indicate,

on average, at least three-fold prevalence of learning difficulties and and six-fold prevalence of severe learning difficulties than in the Nordic population in the same age group (10% and 2%, respectively). However, it is important to bear in mind that this does not unambiguously indicate a lower IQ for the adopted children. Although for some children the catch-up of IQ after adoption may be incomplete due to biological factors, in a meta-analytical study adopted children's IQ did not differ from their environmental peers or siblings although their school performance lagged behind and they had more learning problems (van Ijzendoorn, Juffer, Poelhuis 2005). The potential gap between an adopted child's cognitive ability and school performance might be due to socioemotional problems and problems related to attention impairing the ability to concentrate on school work. Adoptive parents may also be more likely to notice the child's problems knowing the less favourable circumstances for cognitive development in the infants' history. However, there are contradicting results as well. Among a group of Swedish adoptees the adopted children performed even better in school than could have been expected from their cognitive competence. Thus, an adopted child's poor school performance should not be attributed to emotional issues only unless his/her cognitive competence has been properly assessed (Lindblad et al. 2009).

In line with previous studies (Scott, Roberts, Glennen 2011; van Ijzendoorn and Juffer 2006), internationally adopted children in Finland also had almost three-fold prevalence of language difficulties (29% of the children) and four-fold prevalence of severe language difficulties (8% of the children) than their peers. The difficulties were evident in comprehension, expressive language skills and communication. Previous studies have indicated that despite their delayed language skills at the time of adoption, adopted children are able to gain good language skills after placement in a home environment (Neiss and Rowe 2000; Scott, Roberts, Glennen 2011).

In terms of peer relationships at school age, the adopted children seemed to do better in their evaluations of school bullying experiences. Although nearly 20% of international adoptees aged 9–15 reported experiences of victimization at least twice or three times a month, in the comparisons with the reference group the figures were statistically higher for adopted children only in grades 3–4. Moreover, 8% of the adopted children reported having bullied others equally often and the figures for bullying others differed significantly only in the group of the oldest children (grades 7–9) in which the adoptees reported a lower rate of bullying others than the reference group.

A positive outcome was also found in attachment-related behavioural problems. Our findings of the adopted toddlers' attachment-related behavioural problems indicated a decrease in the adoptees' behavioural problems during the two-year follow-up. The adopted toddlers manifested more problems than their non-adopted age-mates two years after adoption but the difference with the age-mates was not notable four years after adoption. The positive change after placement in a home environment has been documented in several studies (van Ijzendoorn and Juffer 2006). In our study the positive change was not explained by special support for the families, which emphasizes the healing effect of a stable home

environment on human development. Although we did not evaluate attachment security here, the finding can also be encouraging in the field of attachment security. According to an earlier meta-analysis, attachment insecurity in the Strange Situation Procedure (SSP) was associated more consistently with externalizing problems when externalizing problems were assessed at older ages than at younger ages (Fearon et al. 2010).

6.4 Learning and language problems and their associations with RAD symptoms

Our study has clearly indicated that an adopted child's symptoms of RAD at the time of adoption are associated with learning and language problems at school age. Neither the child-related variables nor any of the factors related to the adoptive family explained these associations. A child's disabilities attenuated this association somewhat, but after adjustments it remained significant. Lately, parallel findings have been published in some clinical studies regarding disinhibited symptomatology, in particular (Kocovska et al. 2012; Sadiq et al. 2012). Our study was conducted before DSM V criteria were released and thus these two symptomatologies were not separated here.

The present findings lend support to the hypothesis that the symptoms of RAD harm a child's ability to gain new skills. Our results, in which neither the child's background factors nor the familial factors attenuated the association between learning or language difficulties and symptoms of RAD, may support this hypothesis. RAD is a disorder of social reciprocity, and difficulties in social relatedness may harm a child's ability to learn new skills (Bonini and Ferrari 2011; Kuhl 2010). For a number of adoptees, school performance is worse than expected in light of their cognitive ability. It has been speculated that socioemotional demands increase at school age, partly because the group setting itself may harm a child's performance (van Ijzendoorn, Juffer, Poelhuis 2005). Children with difficulties in intimate relationships, like children with RAD, may experience the group setting as even more demanding. Thus, the RAD may have complicated the early learning processes as well as concurrent performance.

However, the causality of the association cannot be evaluated here. A child's neurocognitive difficulties may also have been underlying the clinical presentation of attachment disorder symptoms in toddlerhood. The antecedents of both learning/language problems and RAD symptoms may lie in the deprived environment in which many adopted children have spent the first years of their life. A deprived environment, with its lack of cognitive stimulation (Kaler and Freeman 1994; Rutter 1998), obviously lacks consistent social interaction as well (Muhamedrahimov et al. 2004). In addition, the early lack of social interaction may harm a child's development of cognitive abilities, particularly language development (Kuhl, Tsao, Liu 2003; Rafferty, Griffin, Lodise 2011; Tamis-LeMonda, Bornstein, Baumwell 2001). Recent research confirming the association between RAD and developmental problems supports the hypothesis that the disinhibited variety of RAD, in particular, might be part of the so-called ESSENCE symptomatology (Early Symptomatic Syndromes Eliciting

Neurodevelopmental Clinical Examinations) (Gillberg 2010; Pritchett et al. 2013). ESSENCE is a term that has been coined to refer to children younger than 3 or 5 years of age presenting with symptoms of impairment in development (general development, communication and language, social interrelatedness, motor coordination, attention, activity, behaviour, mood, and/or sleep) (Gillberg 2010). The complex symptomatology of children with RAD is considered to fit well within the ESSENCE group of disorders (Pritchett et al. 2013). In maltreated children with this symptomatology, the early adversity might predispose them to neurological processes that lead to neurodevelopmental problems in which the indiscriminate variety of RAD is included (Miellet et al. 2014). The role of stress hormones, cortisol in particular, may play a role in these processes but so far the evidence is mixed (Kocovska et al. 2012). Earlier findings among children from Romanian orphanages indicated the presentation of deprivation-specific patterns (DSP) after severe deprivation in infancy. This symptomatology includes disinhibited attachment together with neurocognitive problems, cognitive impairment, inattention and quasi-autistic features (Kumsta et al. 2010; Rutter et al. 2012). The ESSENCE symptomatology presenting in children with less profound deprivation experiences might be a less severe clinical presentation of the same phenomenon.

6.5 School bullying experiences and their association with RAD symptoms and developmental problems

Attachment disorders are typically present in the most intimate relationships, e.g. with parents (Boris, Zeanah, Work Group on Quality Issues 2005). When a child grows older, little is known about how an attachment disorder affects other relationships, such as those with peers. Our study showed that the child's severe RAD symptoms at the time of adoption strongly explained both victimization and bullying others at school. Although attachment disorders in young children are typically present with caregivers (Boris, Zeanah, Work Group on Quality Issues 2005), these disorders may later interfere with the child's peer relationships, in many ways shedding light on the later course of the RAD. Accordingly, regarding attachment security, a recent meta-analytic study indicated an association between attachment insecurity or disorganisation and a child's later problems in social competence (Groh et al. 2012).

The increased number of internalizing or externalizing symptoms which are associated with attachment insecurity or disorganisation in infancy (Fearon et al. 2010; Groh et al. 2012) might explain some of the association between RAD symptoms and victimization or bullying others. Children with anxiety or depressive symptoms might be more prone to experience victimization, whereas children with externalising symptoms might be regarded as bullies. Unfortunately these associations were not evaluated here. However, the meta-analytic findings by Groh and colleagues (2014) suggested that a child's attachment insecurity or disorganisation had a greater effect on his/her social competence than on the internalising symptoms, pointing to the strongest implication of early parent-child interaction for the subsequent interpersonal relations. The meta-

analytic association between attachment security and social competence, on the other hand, was not significantely greater than the association between attachment insecurity / disorganisation and externalising symptoms (Groh et al. 2014).

In our study, we also found an association between a child's lack of current social skills and victimization but, after adjustments, not with being a bully. In another recent study, the eye movements of 10 maltreated children with disinhibited RAD and 10 age and gender-matched typically developing control children were recorded while they made social judgments from faces. The results indicated that children with disinhibited RAD may use the same facial information sampling strategy as control children, whereas their social judgments were atypical. This may result from a specific problem with processing the visual information available for social judgment (Miellet et al. 2014). Thus a maltreated child with attachment disturbance may misinterpret other children's behaviour, making him or her more vulnerable to victimization or likely to bully others. The development of a sense of trust and the ability to discriminate rapidly between trustworthy and untrustworthy people is thought to develop in toddlerhood through a child's experiences. Maltreated children with attachment disorders are insecure about relationships, lack trust and appear unable to make correct judgments about who they should and should not trust (Miellet et al. 2014).

The method used here to measure lack of social skills refers to a cognitive inability to understand other people's mental states and emotions, as in ASD (Trillingsgaard et al. 2004). A lack of social skills may make a child more vulnerable to victimization. Bullying behaviour, on the other hand, requires a cognitive understanding of other people's minds and emotions, and bullies have difficulty in sharing their emotions and a poor capacity for empathy (Caravita, DiBlasio, Salmivalli 2010).

6.6 Clingy behaviour

A child's tendency to be clingy at the time of adoption signified an increased risk of later learning difficulties. However, children presenting with only mild clinginess had the lowest risk of developing severe learning difficulties. A child's clinginess may indicate his/her emotional distress and this may later be reflected as learning difficulties. A child's disability may also increase clingy behaviour due to his/ her inability to express needs in a more sophisticated way. However, clinginess might also be an indication of a developing relationship with a child's new caregiver. The curvilinear association with more severe learning difficulties supports the twofold role of clinginess, with mild clinginess having a supportive role for later development.

6.7 Associations with the child's variables and variables in the adoptive family

Male international adoptees in Finland had more problems with learning or language in the less severity-based subclass, victimization and bullying others at school, and

boys' attachment-related behavioural problems decreased less than those of girls. In addition, boys had more symptoms of RAD shortly after adoption. However, these associations were unadjusted and can thus be explained by other factors related to the child's background, such as country of origin. Children come from different countries for different reasons: as an example, children from China have been mainly girls because of China's one-child policy (Selman 2012). Children adopted from Eastern Europe, instead, are reported to be over-represented in terms of foetal alcohol exposure and minor developmental delays related to it (Landgren et al. 2006). In our Finnish sample, too, children from Eastern Europe had more difficulties in learning and language. The stability of symptoms (the minor decrease in attachment-related problems) in children adopted from Eastern Europe, although Eastern European background was not associated with degree of problem behaviour, may also suggest underlying neurodevelopmental aetiological factors. Contrary to our hypothesis, children from Eastern Europe also had more experiences of victimization and of being a bully than children who did not have a typical European appearance.

The over-representation of children having orphanage placement in their background (87%) may have distorted our finding that those children with only an orphanage background were not at increased risk of later developmental or social problems, although it is a well-known risk factor (Rutter et al. 2012; Tottenham et al. 2010). The number of placements (more than one), on the other hand, increased the risk of later RAD symptoms and learning difficulties. The lack of a permanent caregiver naturally increases the risk of RAD symptoms and the association between many placements and learning problems may be explained by RAD symptoms as well. In our sample, the role of unfavourable circumstances can be seen in the effect of adoption age. The longer the child has had to spend in unfavourable circumstances, the bigger risk of later problems. Children's older adoption age was associated with RAD symptoms, both severity-based learning and language problems and with attachment-related behavioural problems at both times of assessment. Age at adoption, on the other hand, was not associated with either victimization or being a bully. In support of our findings, the ERA study did not find institutional deprivation to be associated with an increase in other forms of psychopathology that were not accompanied, or developmentally preceded, by one of the cognitive problems of DSP (Rutter et al. 2012). Recent research has thrown light on some of the biological effects of deprivation on children's developing neural systems. An older age at adoption is associated with larger amygdala volumes (Tottenham et al. 2010).

In its investigation of the age limits for developmental risks the ERA study found that children adopted before the age of 6 months did not have later developmental problems. No other cut-off point for the increasing risk of adoption age was detectable in the ERA sample (Rutter et al. 2012) but the findings in other studies among children from less deprived environments have been mixed (Juffer and van Ijzendoorn 2005; Zeanah and Gleason 2014). In our study of attachment-related behaviour we set the age limit at two

years because otherwise the number of children would have been too low for reliable analysis. The later-adopted children exhibited more problematic behaviour at both times of evaluation but not with the change over time. Thus, we cannot set a specific age limit for the increased risk associated with adoption age based on our study.

Turning to the adoptive family, the adoptive mother's depressive symptoms were found to be associated with attachment-related problems two and four years after adoption and both parents' depressive symptoms with the child's RAD symptoms at the time of adoption. The child's problematic behaviour may cause parental distress, or the parents' depressive symptoms may exacerbate the child's socioemotional symptoms. The parents' depressive symptoms were not associated with the child's cognitive problems. The adoptive family's SES, parents' marital status, and father's age were not associated with any of the outcomes. Finnish adoptive parents may be quite homogeneous irrespective of their socioeconomic status. Although parental education may influence the child's cognitive outcome in some other countries, it has been found to have only a modest shared environmental effect, explaining no more than 3%–4% of the variation in adopted children's verbal intelligence (Neiss and Rowe 2000). It should be noted that information about the quality of the emotional interaction between adoptive parents and the child was not included in the variables in our study.

The effect of familial factors was seen in the parents' experience of adoption. Those children whose both parents had positive experiences of adoption had less difficulty in learning and language, bullying others and attachment-related problems four years after adoption as well as less child's symptoms of RAD shortly after adoption. The child's problems may have affected the parents' experience of adoption. However, the association was revealed in relation to severe learning and language difficulties. At least some of the severe cognitive difficulties may already have been noted in the birth country's report (Lapinleimu et al. 2012), and in these cases parents may have been prepared to receive a child with special needs. An earlier study indicated that the parents' realistic expectations of the adoption, including awareness of child's potential problems may increase their satisfaction after adoption (Reilly and Platz 2003). In our follow-up of attachment-related behavioural problems, this association emerged only in the later analysis (four years after adoption). The parents' negative experience of adoption was associated with an increase in problematic attachment-related behaviour. These findings seem to suggest that among Finnish adoptive families it may not be a high family income as such but the parents' commitment and desire to provide a stable home environment that is beneficial for the child. Thus, special attention should be given during preadoption counselling to giving parents a realistic picture of the child's potential difficulties and to providing them with tools to meet the challenges of a child with developmental and socioemotional problems.

Adoption itself is known to be an effective intervention leading to massive catch-up of growth, development and attachment (van Ijzendoorn and Juffer 2006). Thus, it might be expected that the longer the child has stayed in the adoptive family, the better

the developmental and socioemotional outcome. The child's older age at the time of assessment was associated with an increase in severe learning difficulties, while no association with assessment age emerged with less severe learning difficulties or any other outcome variable. As children grow older, their genetic predisposition for cognitive delays may become more evident, whereas it has less effect on the child's school performance (van Ijzendoorn, Juffer, Poelhuis 2005). Language problems also seem to be more evident at older ages than when these children were toddlers, presumably because of the increased need for higher linguistic skills (Scott, Roberts, Glennen 2011). Their sentence comprehension abilities, in particular, seem to lag behind at school age (Desmarais et al. 2012). Our study also found that older children had more problems in comprehension. However, the minor effect of age seems to further support our findings concerning the minor effect of superficial familial factors such as SES or parents' marital status.

6.8 Associations with stereotypical self-soothing symptoms

In our study, the parents evaluated the presence of three symptoms, i.e. head banging and/or hitting himself/herself, rocking, and masturbation, shortly after adoption. These self-injurious or stereotypical self-soothing symptoms were associated with attachment-related behavioural problems both two and four years after adoption.

Although the causes and developmental pathways of an infant's self-injurious and stereotypical behaviour are not well known, both of these behaviours are reported to be present among typically developing children as well as in children with developmental delays or children with a background of deprivation (Beckett et al. 2002; Symons et al. 2005). Either developmental delay or deprivation may play a role in the aetiology of stereotypes in internationally adopted children. Stereotyped repetitive movements, especially rocking, can be considered a characteristic feature of individuals with intellectual disability in long-term residential institutions. Such movements are associated with a low level of responsiveness to the environment and are most marked when individuals are placed in a new, restrictive and barren environment (Rutter et al. 2012). A common element underlying these behaviours may be the absence of social interaction due either to a child's inability to maintain contact, as with children with developmental inability, or to a lack of social interaction on the part of caregivers (Symons et al. 2005).

The lack of soothing may also harm the development of an infant's sensory processing skills (Beckett et al. 2002). In a pilot study of 37 internationally adopted preschoolers, the prevalence of atypical sensory-seeking behaviours was as high as 48% (Pace, Zavattini, D'Alessio 2012). These sensory processing problems may affect a child's later development of regulatory skills, including emotion and behavioural regulation (Cermak and Daunhauer 1997; Jacobs, Miller, Tirella 2010; Lavigne et al. 2012; Wilbarger et al. 2010) and thus play a role as a mediating factor between attachment insecurity and behavioural problems (Lavigne et al. 2012).

In our study, the adopted children's stereotypical or self-injurious behaviour shortly after adoption was not associated with the change over time, although such behaviour was associated with behavioural problems two and four years later. Those children who had high problem scores at the first evaluation and who had manifested masturbation at the time of adoption showed a smaller decrease in behavioural problems than those with no reports of masturbation. We therefore conducted an additional analysis, which showed that problem scores decreased least for those children who had both high problem scores at the first evaluation and masturbation at the time of adoption. Together with the finding that the other self-soothing symptoms were not associated with the outcome in this analysis, this may indicate that masturbation is a more worrisome symptom than the others. Future research may shed more light on the aetiology of self-soothing symptoms or stereotypes of internationally adopted children.

7. SUMMARY/CONCLUSIONS

This study has produced some clear clinical implications for the evaluation and treatment strategies of adopted children in Finland. First, the adopted children with RAD symptoms shortly after adoption are at risk of later cognitive and emotional difficulties. Thus, the symptoms of RAD should be carefully screened shortly after adoption and families should be offered effective treatment. Second, the association between RAD symptoms and neurodevelopmental problems indicates that children's developmental problems should be carefully screened if they display symptoms of RAD, and symptoms of RAD should be carefully screened if an adopted child has developmental problems.

Third, another sign of an increased risk of future problems is the child's stereotypical self-soothing symptoms. Adopted children with these symptoms should be carefully evaluated, including a cognitive evaluation and evaluation of sensory processing.

In terms of treatment, effective strategies should be developed which take into account the child's developmental needs and attachment disorders. However, the basis of rehabilitation of neurodevelopmental problems as well as the treatment of attachment disorders are part of everyday activities and of secure and structured interactions between caregivers and a child. Thus, future and current adoptive parents should be offered realistic information about the child's potential developmental problems and issues related to attachment and they should be offered tools to cope with potential problems.

Finally, although this study revealed that the adopted children run an increased risk of later neurocognitive problems, it also indicated positive outcomes. Most of the adopted children had no learning problems later at school age (67%), language problems (71%) or symptoms of RAD (60%). The figures for the children without severe problems were even higher (87%, 92% and 82%, respectively for severe learning problems, severe language problems and severe RAD symptoms). Their experiences of school bullying differed from the reference group only in the 3rd-4th grade age group regarding victimization. This, together with the reduction in attachment-related behavioural problems during the four-year follow-up, support the finding that most of the adopted children are well adjusted in Finland. At the same time it underlines the importance of identifying the high-risk children and developing treatment strategies for them.

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