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ADHD-like symptoms and attachment in internationally adopted children¹

Internationally adopted children seem to be more likely to show ADHD-like symptoms than non-adopted children. The aims of this study were to explore the existence of ADHD-like symptoms and/or diagnosis in a sample of internationally adopted children depending on their country of origin and to describe the links that may exist between the display of these symptoms and observed narrative-based attachment patterns. A Catalan sample of 58 adopted children aged 7-8 (24 from Eastern Europe, 23 from China and 11 from Ethiopia) was assessed with *The Behavioral Assessment System for Children* to identify ADHD-like symptoms, and the *Friends and Family Interview* (FFI) to identify children's attachment patterns. Results indicated that children adopted from Eastern Europe showed a trend toward more hyperactivity and significantly more attention problems than girls adopted from China. Children with a secure attachment showed significantly less attention problems and a trend toward less hyperactivity. More studies focusing on the etiology and treatment of these symptoms in adopted children are needed.

Key words: international adoption, ADHD, attachment

Introduction

International Adoption: the case of Catalonia (Spain)

The purpose of the adoption, defined as a childhood protection measure, is to provide a family to abandoned children or those whose biological families are not able to care for them. Since the end of the nineties, about 40.000 children born in foreign countries have been adopted in Spain. From this total 10.832 were adopted in Catalonia, a north eastern region in Spain and the place with the highest world rate of international adoption. This sharp rise in the number of adoptions has been promoted by the appearance of new family structures and a higher participation of women in the working world. Without the development of policies supporting the family and

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working life conciliation, women postpone their motherhood and as a consequence their fertility decreases (Marre, 2009).

The existence of prenatal (lack of prenatal control and substance exposure) and perinatal complications (low birth weight and prematurity) is quite frequent in internationally adopted children (Johnson, 2002; Miller, 2005). Besides, the environment where these children have been raised is not always the most adequate to promote the child's development, including unstructured families with limited economic resources and/or overcrowded institutions with great deprivations including low physical and emotional attention, lack of hygiene, with exposure to infectious diseases, and absence of vaccination (Brinich, 1995; Everett, 1999; Gunnar & Van Dulmen, 2007; Harlow, 1958; Hughes, 2007). Furthermore, the importance of appropriate child-environment interactions during the first years of life for the healthy development of the brain has been highlighted by several authors (Gunnar, Bruce, & Grotevant, 2000).

All of these pre-adoptive conditions could have consequences in the later physical and/or mental health of these children, with immediate (e.g. rickets and malnutrition) and longer-term consequences (post-adoption) including deficits in emotional functioning, cognitive impairment, and developmental delays (Gunnar & Van Dulmen, 2007; Juffer & Van IJzendoorn, 2005).

Attention deficit hyperactivity disorder (ADHD)

ADHD is a behavioral disorder characterized by hyperactivity, impulsiveness and a lack of attention. Its estimated prevalence ranges from 3 to 10% in school-aged children (Barkley, 1998) and some authors have described the prevalence of ADHD around the world as homogenous (Polanczyk, de Lima, Horta, Biederman, & Rohde,

2007). Even though it has been deeply studied in developed countries (Faraone, Sergeant, Gillberg, & Biederman, 2003); less is known about its prevalence in other regions of the world. No studies of ADHD in African and Eastern European populations were identified in the meta-analytic study by Faraone et al., (2003); and in the meta-analytic study by Polanczyk et al. (2007) lower ADHD prevalence rates were observed in Africa and the Middle East, compared with North America.

The core symptoms of this disorder must appear before the age of 7 and be observed in at least two different situations (for example, at home and at school). Children with ADHD tend to have a lower school performance and poor social relationships. In spite of all the existent studies focusing on the ADHD etiology, no direct causes of this disorder have been identified and gene-by-environment interactions appear likely to explain the etiology of this disorder (Nigg, Nikolas, & Burt, 2010)

As neurobiological factors, structural and functional differences have been found in different cerebral regions such as the pre-frontal lobe, the cerebellum and the basal ganglia (Castellanos et al., 2002). Concerning ADHD and genetic heredity, most studies show evidence supporting the existence of a genetic influence in the display of this disorder (Faraone et al., 2005; Hudziak, Derks, Althoff, Rettew, & Boomsma, 2005). However, others have disouted these results. In one study they found no significant influence of genetic factors for activity, attention, and impulsivity (Heiser et al., 2006). Also, Joseph (2000) examined the evidence cited in favour of the operation of genetic factors in ADHD and concluded that a role for a genetic factor is not yet supported and that future research should be directed toward psychosocial causes.

In reference to the environmental factors, the influence of some prenatal (tobacco and/or alcohol consumption by the mother during pregnancy, high level lead exposure, etc.) and perinatal factors (birth complications) in the appearance of the disorder has been observed (Eubig, Aguiar, & Schantz, 2010; Purper-Ouakil, Lepagnol-Bestel, Grosbellet, Gorwood, & Simonneau, 2010).

Finally, pathogenic environments generated by social factors (socioeconomic status, disorganized family dynamics, family psychopathology) are considered to favor the appearance of the disorder. At the same time, they can lead to an increase of the severity of the symptoms and its associated impairments in multiple domains (Biederman et al., 1995; Biederman, 2005).

Attachment theory

Even though the origin of the attachment theory was in its origins focused on the relationship with the main caregiver during the early stages of life (Ainsworth, Blehar, Waters & Wall, 1978; Bowlby, 1969), Bowlby (1973) maintained that attachment is a lifespan process, and so attachment research came to focus on how best to observe or assess attachment beyond infancy and into adulthood. This venture began, it may be said, with the development of the Adult Attachment Interview (George, Kaplan & Main, 1985, and an associated method of discourse analysis, Main, Goldwyn & Hesse, 2008) and since then, many methods to assess attachment in middle childhood and early adolescence have also been developed including interviews focused on the identification of important attachment figures (e.g. *Important People Interview*, Kobak et al., 2003) scales or questionnaires (e.g. *Avoidant and Preoccupied Scales*, Finnegan et al. 1996), methods to analyze drawings (e.g. *Family Drawing*, Fury et al. 1997), and several narrative discourse measures (e.g. *Doll Story Completion Task*, Granot & Mayseless, 2001).

For this study, the *Friends and Family Interview* or FFI, (Steele & Steele, 2005) was selected to analyze the narrative discourse of the children. This is an interview modeled after the AAI specifically for children aged 8-15 years that allows both the observation of the quality of the relationship with a specific person relevant to the child as well as to observe the general child's state of mind towards attachment. It was considered that with a sample of adopted children it would be difficult to assess the attachment of the child with the main carer, because the figure of the main carer might have changed many times along the life of these children. Therefore it was decided that it would be interesting to have information regarding the quality of the relationships of these children with different important people in their life, such as friends and teachers which are a central focus of the FFI questioning.

According to Steele & Steele (2005), school-age children with a secure attachment are considered to have the capacity for missing, needing and depending on others, to show openness to explore important relationships and to have an ease with imperfections of self. On the other hand, children with an insecure/ambivalent attachment tend to be inflexible in their relationships, appear in need of constant confirmation from their caregivers, and show excessive blaming of parents or self. Finally, in the case of insecure/avoidant children, the self is portrayed as strong, with minimal articulation of being hurt, distressed, or needing others and negative experiences are minimized. The FFI coding system also asks of the rater to consider the relevance of the disorganized/disoriented category, typified by fearful, anomalous, bizarre affects and cognitions.

Main & Solomon (1990) initially created this disorganized category of attachment in order to classify children who did not fit easily in any of the existing other categories (secure, resistant, avoidant). This new category was labeled as

disorganized-disoriented Attachment (after Bowlby's words to describe the normative response to loss), and included children who showed contradictory or incompatible strategies with the adult (AAI) correlate being lapses in monitoring of reasoning or discourse (Main et al, 2008). This notion can also be applied to certain FFI responses governed by apprehension, fear and signs of dissociation.

Links between ADHD and attachment patterns

ADHD-like symptoms have been related in different ways and by several studies with the inability to establish and maintain a secure attachment (e.g. Niederhofer, 2009). According to attachment theory, the relationship between the child and his main caregiver during the first stages of infancy allows him to acquire self-regulation abilities (Ainsworth et al., 1978; Main & Solomon, 1990), skills that are lacking in children with ADHD.

Furthermore, having low emotional regulation skills could affect the early development of attention processes and behavioral inhibition in pre-school aged children, leading them to show hyperactivity and attention deficit during their primary school years (Franc, Maury, & Purper-Ouakil, 2009).

Finally, attachment patterns and ADHD have been linked to children's temperament. A difficult temperament is considered as a risk factor for ADHD and for the development of an insecure attachment (e.g., Franc et al., 2009). Also, Finzi-Dottan, Manor, & Tyano (2006) found that children with ADHD are characterized by a difficult temperament manifested in high emotional reactivity and difficulties in self-regulation. According to these authors, parents of these children might try to manage their behavior by employing either intrusive control or permissive parenting. These strategies would contribute to the consolidation of insecure attachment patterns.

In contrast, a secure attachment pattern and the consequent development of self-regulation skills, which allow children to deal with increased levels of arousal, would be promoted by an optimal parental style including flexible emotional responsiveness, consistency, and sensitivity to the full range of the child's emotions. These authors suggest the inclusion of parent training as an essential component in the treatment of children with ADHD.

ADHD symptoms in internationally adopted children

Several authors have stated that internationally adopted children are more likely to show ADHD-like symptoms than non-adopted children.

In California, the existence of ADHD-like symptoms was examined with parent's reports in a sample of 808 adopted children and 21.8% of them met symptoms cutoffs for ADHD (Simmel, Brooks, Barth, & Hinshaw, 2001).

Likewise, in the United States, a sample of 37 internationally adopted children was assessed with the *Conners' Parent Rating Scale* completed by parents (Conners, 1997). "Significant problem" scores for hyperactivity were found for 14% of children and Attention regulation parameters scored as "atypical" for inattention, hyperactivity and ADHD traits, respectively in 26, 42 and 28% of the children (Jacobs, Miller, & Tirella, 2010). In the same study, the age at arrival was found to be a very strong predictor of many of the outcome measures tested, including Hyperactivity and Attention deficit, with children who were younger at arrival scoring better in each of these areas.

More specifically, this higher presence of ADHD symptoms seems to be more frequent in children adopted from Eastern Europe, which is the place of origin for 34% international adoptees in Catalonia. In Minnesota, Gunnar & Van Dulmen

(2007) found that being adopted from Eastern Europe was related to the existence of several behavioral disorders, like aggressive behavior, attention problems and social problems, according to the parent's opinion.

In reference to the ADHD label, to the best of our knowledge three studies have examined the proportion of children to have received an ADHD diagnosis among children adopted from Eastern Europe. Knowing that the prevalence of this disorder is 3-10% in general population, a higher proportion of this label was observed among children adopted from Eastern Europe in these studies: 25% (Glennen & Bright, 2005), 42% (Beverly, McGuinness, & Blanton, 2008) and 46% (Miller, Chan, Tirella, & Perrin, 2009). Unfortunately none of these three studies included a sample of children adopted from other countries, in order to compare the results of children adopted from Eastern Europe countries. However Jacobs et al. (2010) in the United States, assessed a sample of 37 internationally adopted children and found no relation between the country of origin and scores in executive function and attention skills.

One of the main suggested reasons to explain the possible presence of more difficulties in the adaptation process of children coming from Eastern Europe is the high rate of alcohol consumption during pregnancy by mothers of children institutionalized in these countries (Gunnar & Van Dulmen, 2007; L. Miller et al., 2009). In the former Soviet Union countries, an increase in the consumption of substances has been observed in all age groups (Davis, 1994) and more specifically, in Russia, there is a high prevalence of alcohol consumption among women of childbearing age - 1 in 3 consumes alcohol regularly- (*World Health Organization Global Database on alcohol use*). Furthermore, an increase of adolescent pregnancies has been observed. These problems are compounded by the inaccessibility of abortion

and the absence of programs providing information about the effects of the alcohol consumption during pregnancy in these countries. In this regard, 45% of children institutionalized in Russia show facial phenotypes compatible with prenatal alcohol exposure (Miller et al., 2006).

Despite the frequent lack of information about the pregnancy period and birth of many of these children, Johnson (2000) reports that more than 50% of the children institutionalized in Eastern European countries present low birth weight. In many cases they are premature, and some of them have been exposed to alcohol during pregnancy. In Canada, some authors found that 33% of the children adopted from Eastern European countries had alcoholic mothers (Feshbach, 2001; Landgren et al., 2006). Other authors concluded that 69% of children adopted from these countries showed physical parameters and/or neurological anomalies compatible with Fetal Alcohol Spectrum Disorder (FASD) (Robert et al., 2009).

ADHD and Attachment in internationally adopted children

Several studies have assessed attachment patterns and the presence of inattention/over-activity among children adopted from Romania (Colvert et al., 2008; Kreppner, O'Connor, Rutter, & English and Romanian Adoptees Study Team, 2001; Rutter et al., 2007; Sonuga-Barke & Rubia, 2008; Stevens et al., 2008) but no studies assessing both the presence of ADHD-like symptoms and attachment insecurity in samples adopted from other countries were found.

Results from the English and Romanian Adoptees (ERA) study (Colvert et al., 2008; Kreppner et al., 2001; Rutter, Kreppner, & O'Connor, 2001; Rutter et al., 2007) yielded the hypothesis that inattention/overactivity (I/O) could constitute a specific deprivation syndrome and that it could also involve attachment difficulties. They

assessed a sample of 165 children adopted into the UK from Romania following severe early deprivation and were compared with 52 UK adoptees (from within) who did not suffer deprivation.

Against this background, the aims of this study are:

- To explore the existence of ADHD-like symptoms and /or diagnosis in a sample of internationally adopted children depending on their country of origin.
- To describe the relationship between the display of these symptoms and their observed attachment patterns identified in their FFI-responses.

Methodology

Participants

Fifty-eight Catalan children aged between 7 and 8 and adopted from Eastern Europe, China or Ethiopia were assessed. To meet inclusion criteria, children must have been living with their adoptive families for more than two years in order to avoid the influence of the adaptation period. The characteristics of the sample are presented in Table 1.

INSERT TABLE 1 ABOUT HERE

Table 1 shows that 24 children (12 male, 12 female) were adopted from Eastern Europe, 11 (5 male, 6 female) from Ethiopia and 23 girls from China. The group of children adopted from China had the lowest mean age at adoption ($M =$

13.17, SD = 3.713) and the group of children adopted from Ethiopia had the highest (M = 49.91, SD = 19.445).

Three children of the whole sample had received a diagnosis of ADHD at the moment of the assessment and all of them were from Eastern Europe. Two out of these three diagnosed children were receiving some kind of treatment (one of them was attending weekly psychology sessions and receiving homeopathic treatment and the other one was receiving methylphenidate).

Measures

ADHD symptoms were analyzed using the Spanish version of the Behavioral Assessment System for Children checklist (BASC; Reynolds & Kamphaus, 1992). The BASC was designed to evaluate various aspects of behaviour and personality, including positive (adaptive) as well as negative (clinical) dimensions. This assessment measure is multidimensional and information can be gathered and analyzed from the perspectives of the parent, teacher, and child. It consists of five components that can either be used in combination or separately: the Teacher Rating Scales, the Parent Rating Scales, the Self-Report of Personality (for children over 7), the Structured Developmental History form, and the Student Observation System. However, only the Self-Report of Personality and the Parent Rating Scales (PRS) were administered to this sample and only the Attention problems and Hyperactivity subscales of the PRS were used for this study. The PRS is composed of 134 items and provides separated punctuations for 12 subscales. T-Scores for each subscale can be obtained according to the BASC scales (M = 50, SD = 10). T-Scores over 70 are considered *clinical scores*, and T-Scores between 60 and 69 are considered *risk scores* (Reynolds & Kamphaus, 1992). The information obtained from this scale is not

enough to make a diagnosis, but it gives information about the presence and extent of hyperactivity symptoms and/or attention problems.

Further details about the family data and the mental health of the child were collected with an *ad hoc* questionnaire, which included questions about the existence of an ADHD diagnosis and/or treatment.

Attachment was assessed using the Spanish version of the *Friends and Family Interview* (FFI; Steele & Steele, 2005), which is an open-ended interview for children and adolescents that asks children a series of questions about themselves and their relationships with the most significant persons in their live. This interview (as reported in Steele & Steele, 2005) yields a four-point rating of coherence based on the Grice's 4 maxims (1) truth, (2) economy, (3) relation, and (4) manner; and a 4-point rating for safe/haven secure base with father/mother.

The FFI coding system (Steele, Steele & Kris, 2009) also allows for the classification of overall interview-responses into one of four categories, based on the highest four-point rating assigned to each of the four patterned types of response: Secure attachment, Insecure-dismissing attachment, Insecure-preoccupied attachment, or Insecure-disorganized attachment. Interviews were video-recorded and transcribed. To the best of our knowledge, this is the first study assessing a Spanish sample with the *Friends and Family Interview*.

Procedure

The total sample was recruited from the database of the pediatric service of the Hospital *Sant Joan de Déu*, in Barcelona. It is a general pediatric service that conducts the general pediatric follow-up of healthy children. Therefore, children who were

invited to participate did not have any specific disorder; the one thing they had in common was the fact they were adopted 1-2 years before.

Invitation letters were sent from the Hospital to all the families having adopted children aged 7 and 8. Parents of 58 children gave their agreement to participate in the study and they were given a 45 minute appointment in the hospital offices, in order to take part in the assessment. As a first step of the assessment, the details of the procedure were explained by a psychologist and the informed consent form was signed by the parents. Then, a short and private interview was conducted with the parents to explore any relevant information about the child and/or the family. Finally, the child was interviewed by another psychologist (blind to the comments of the parents) while parents filled in the questionnaire in a separate office. In order to obtain the results of the assessment, T-Scores for the BASC scale were obtained.

Videos of the FFIs were transcribed verbatim and these were studied independently by two psychologists (trained by Dr. H. Steele) to code the interviews. Both coders were blind to the parental responses regarding the ADHD diagnosis and symptoms. Afterwards, a psychological report with the results of the assessment was delivered to the family and treatment orientations were given if required.

Apart from the attachment pattern of each child, results of the following dimensions are reported in this study: (1) coherence, (2) reflective functioning – developmental perspective, theory of mind, diversity of feelings – (3) evidence of safe/haven secure base.

In order to assess the inter-raters agreement all the interviews were double-coded. The inter-raters reliability was assessed by calculating the Spearman's RHO for each dimension (Table 2).

INSERT TABLE 2 ABOUT HERE

Table 2 indicates moderate to strong inter-rater agreement (range=.67-.82; median=.69). Ratings by the two coders were averaged for the resulting single scores, and classifications, relied on in the results below.

The statistical analysis of the data was conducted with the 19.0 version of the Statistical Package for Social Science (SPSS).

In order to compare the effect of the country of origin on the display of Attention problems and Hyperactivity symptoms, a one-way between subjects ANOVA was conducted.

We also compared the group of children adopted from each country of origin with regard to the scores on the FFI subscales using the Kruskal-Wallis test.

To compare the degree of hyperactivity and attention problems depending on the attachment pattern, independent-samples t-tests were conducted.

Also, knowing that the ADHD prevalence is higher in boys and given the absence of boys in the group of children adopted from China, independent-samples t-tests were conducted to compare the degree of hyperactivity and attention problems depending on the sex of the child.

Finally, as the age at adoption seems to be related with the display of hyperactivity and attention problems and there were inter-group differences regarding the mean age at adoption, a Pearson's correlation coefficient was computed to assess the relationship between the degree of attention problems and hyperactivity symptoms and the age at adoption.

Results

A one-way between subjects ANOVA was conducted to compare the effect of the country of origin on the display of Hyperactivity and Attention problems symptoms in children adopted from Eastern Europe, China and Ethiopia (Table 3).

INSERT TABLE 3 ABOUT HERE

Table 3 reveals that there was a significant effect of the country of origin on the display of both hyperactivity symptoms [$F(2) = 3.239, p = .047$] and attention problems [$F(2) = 3.404, p = .04$] for the three conditions.

Post hoc comparisons for the display of hyperactivity using the Bonferroni test indicated that the mean score for the children adopted from Eastern Europe ($M = 54.50, SD = 9.031$) was trended toward being higher ($p = .09$) than the mean of children adopted from China ($M = 48.04, SD = 10.93$). However, the mean of children adopted from Ethiopia did not significantly differ from the mean of children adopted from China or from Eastern Europe.

Regarding the display of Attention problems, post hoc comparisons using the Tamhane test indicated that the mean score for the children adopted from Eastern Europe ($M = 56.83, SD = 8.63$) was significantly higher ($p = .02$) than the mean of children adopted from China ($M = 49.13, SD = 9.86$). However, the mean of children adopted from Ethiopia did not significantly differ from the mean of children adopted from China or from Eastern Europe.

Descriptive analysis regarding the attachment pattern of the children are presented in Table 4.

INSERT TABLE 4 ABOUT HERE

Table 4 shows that 60% (n = 35) of the sample was considered to have a secure attachment and the remaining children were considered to have some type of insecure attachment, 26% (n=15) dismissing, 12% (n=7) preoccupied, and only 2% (n=1) disorganized). The group of girls adopted from China was the group with the highest proportion of children with secure attachment - 82.6% vs. 54.4% for Ethiopia and 41.7% for Eastern Europe. Table 4 further reveals that children adopted from Ethiopia had the highest proportion of children with an insecure dismissing attachment - 45.5% vs. 29.2 for Eastern Europe and 13% for China.

We compared the group of children adopted from each country of origin with regard to the scores on the FFI subscales (Table 5).

INSERT TABLE 5 ABOUT HERE

As Table 5 shows, Statistical analyses using Kruskal-Wallis tests revealed significant differences between the countries of origin for the coherence, $\chi^2(2, N = 24) = 7.91$ ($p = .02$)m though not for secure base/safe haven.

Post hoc testing of contrasts using Mann-Whitney was done for the Coherence scale and revealed significantly higher scores for the group of girls adopted from China when compared with the group of children adopted from Eastern Europe $U(N = 58) = 160.5$, $p = .013$ and Ethiopia $U(N = 58) = 66$, $p = .026$. No significant

differences were observed between the group of children adopted from Ethiopia and Eastern Europe. In other words, the girls adopted from China showed a higher coherence when interviewed regarding their important relationships than children adopted from Eastern Europe or Ethiopia. Independent-samples t-tests were conducted to analyze if the higher scores in Coherence for the group of girls adopted from China were related to their gender, but no significant differences were found between boys and girls for this scale.

Given the small proportion of children with insecure-preoccupied and insecure-disorganized attachment, all children having insecure attachment were grouped in the same category in order to make comparisons with children showing a secure attachment, permitting an independent samples t-test comparing mean values for ADHD scores.

In order to compare the degree of hyperactivity and attention problems in children with secure and insecure attachment two independent-samples t-tests were conducted (Table 6).

INSERT TABLE 6 ABOUT HERE

Table 6 reveals that children with an insecure attachment trended toward higher hyperactivity scores ($M = 55.17$, $SD = 10.04$) than children with a secure attachment ($M = 50.14$, $SD = 10.26$) [$t(56) = 1.843$, $p = .071$]. Regarding the degree of attention problems, children with an insecure attachment obtained significantly higher attention problems scores ($M = 58.13$, $SD = 11.28$) than children with a secure attachment ($M = 50.20$, $SD = 9.13$) [$t(56) = 2.943$, $p = .005$].

In reference to the diagnosis of ADHD, all the children who had received an ADHD diagnosis before the assessment were from Eastern Europe, (i.e. 12.5% of the

general population of Eastern Europe). This percentage is lower than the percentage observed by other authors - 25% (Glennen & Bright, 2005), 42% (Beverly et al., 2008) and 46% (Miller et al., 2009) - but it is higher than the prevalence for ADHD in the general population (3-10%).

Regarding the effect of the sex of the child on the display of the ADHD-like symptoms, independent-samples t-tests were conducted to compare the degree of hyperactivity and attention problems depending on the sex of the child and no significant differences were found between boys and girls.

A Pearson's correlation coefficient was computed to assess the relationship between the degree of attention problems and hyperactivity symptoms and the age at adoption, but no correlation was found.

Discussion

The existence of a higher presence of attention problems and hyperactivity among internationally adopted children compared to the general population has been suggested by several authors (Simmel, Brooks, Barth, & Hinshaw, 2001; Jacobs, Miller, & Tirella, 2010; Lindblad, Ringbäck Weitoft, & Hjern, 2010). In this regard, our results showed that the scores for the Hyperactivity and Attention problems scales obtained by the group of children adopted from Ethiopia and Eastern Europe were higher than expected, but lower for the group of girls adopted from China. However, the comparison of these results with the scores obtained by a sample of Catalanian and non-adopted children assessed with the same instrument would be required.

Our findings also showed possible differences in the existence of ADHD-like symptoms depending on the country of origin. In our sample the group of children

adopted from Eastern Europe showed significantly higher attention problems scores and a trend toward significantly higher hyperactivity scores than the group of children adopted from China. These results were consistent with other studies where the children adopted from Eastern Europe were showing more ADHD-like symptoms (Gunnar & Van Dulmen, 2007) and were receiving more ADHD medication (Lindblad et al., 2010).

However, no differences were observed between the group of children adopted from Eastern Europe and the group of children adopted from Ethiopia, but the small sample of the children from Ethiopia makes it difficult to draw any conclusions.

Knowing the higher incidence of ADHD among boys (especially for the Hyperactivity/impulsivity subtype), the absence of boys in the group of children adopted from China could be considered as one possible reason for the lower hyperactivity scores in this group. However, no relation was found between sex and the existence of these symptoms in our sample, and therefore, the distribution of sex regarding the ADHD-like symptoms in our sample of internationally adoptees does not show a male predominance as has been suggested by the ERA studies (Kreppner et al., 2001; Stevens et al., 2008). The current results suggest that attachment status, rather than gender, may be a more significant factor in the occurrence of ADHD symptoms among internationally adopted children.

The fact that the group of girls adopted from China had a significant lower age at adoption than the group of children adopted from Eastern Europe was considered as another possible reason for the lower display of ADHD-like symptoms among the group of girls adopted from China, but no relation was found between the display of these symptoms and the age at adoption in our sample. Consequently, the age at adoption could not justify the differences observed between these two groups.

The length of the institutionalization period has been linked to the child's behavioral outcomes by several authors, proposing a "sensitive period" after which institutionalization is particularly detrimental. This period ranges from two months (Groza & Ryan, 2002) to 24 months (Gunnar & Van Dulmen, 2007) and has been related to the appearance of difficulties in many areas, including frustration tolerance, adaptation to change, establishment of affective bonds, attention, executive functions, self-motivation, self-regulation, etc. (Bimmel, Juffer, Van IJzendoorn, & Bakermans-Kranenburg, 2003). Studies of the ERA sample stated that the effect of the institutionalization was significantly higher after 6 months (Colvert et al., 2008; Kreppner et al., 2001; Stevens et al., 2008). In contrast to these studies (and in agreement with our results) other studies found that the age at adoption had no effect on behavioural outcomes (Groza & Ryan, 2002; Juffer & Van Ijzendoorn, 2005).

It is important to bear in mind that the age at adoption is not the same as the time of institutionalization, given that some children have spent time with their biological families or in foster care before they were adopted. Also differences in the quality of the care given in each institution may account for some of the disparities in these results. Therefore, the effect of the age at adoption is modulated by the different events experienced by each child during the pre-adoptive period. Unfortunately this information could not be analyzed in this study because the majority of the families had very little information about their children's life before they were adopted. In this regard, the existence of more studies comparing institutionalized children with children who lived with their biological or foster families is required.

Furthermore, differences in the background of the adoption process in each country of origin are considered as another factor influencing the hyperactivity scores of each group:

In the case of children adopted from Eastern Europe, outcomes in many areas are related with the alcohol consumption by their mothers during pregnancy. In Russia, 899 women were interviewed about their alcohol consumption habits and their findings showed that nearly all pregnant women drank during the year before they became pregnant; of these, 60% reported drinking when they knew they were pregnant, and 34.9% drank in the 30 days before the interview (Kristjanson, Wilsnack, Zvartau, Tsoy, & Novikov, 2007). Knowing the high level of alcohol consumption by pregnant women in Russia, the higher risk of some difficulties during their children's development is assumed, including more hyperactivity and attention problems.

In the case of China, the increase of the international adoption was justified by the abandonment of girls in orphanages, as a result of the government's one child per family policy, which penalizes families for having more than one child. Therefore, institutionalized children in China are more likely to be associated with political reasons and less likely to be associated with a low socioeconomic status, in comparison with the situations given in other countries of origin. In this regard, it is assumed that biological mothers of children adopted from China may take more care of themselves during pregnancy than mothers from other countries of origin, as it is not the child that is unwanted, but the gender. Therefore a better health status of the child is hypothesized.

In Ethiopia, the adoption process is more often associated with poverty, parent illness or death. Biological families tend to keep their children for a longer time than in China or Eastern Europe, and in many cases, for as long as possible children live with their extended family or neighbors. Consequently, the mean time of institutionalization tends to be shorter than in other countries, with many children

living with their families until a few months before the adoption moment. In this way, it is suggested that these children must receive a more individualized and higher quality care during the pre-adoptive period.

However, the prenatal information about institutionalized children and the life-events they experienced before the moment they were adopted is unlikely to be available after adoption because in many cases adoptive families cannot provide detailed information about the pre-adoptive period of their children. Even though the direct assessment of these pre-adoptive variables is highly complicated, it is important to take them into consideration.

As for the observed narrative-based attachment patterns of the children, it is interesting to mention that when children adopted from Ethiopia were insecure, they were always categorized as dismissing. Cultural differences in child rearing practices between Europe and Africa should be further explored and considered a useful route to understanding the way these children relate to their adoptive families. Interestingly, no differences in secure base/safe haven availability were observed across all groups, and only one child fit with the disorganized group, highlighting the non-clinical nature of the sample, albeit that they all shared the status of being adopted.

Girls adopted from China seem to show higher narrative coherence when describing their relationships with friends and family. Again, differences in their pre-adoptive experiences and the quality of the institutionalization period might explain some of these differences but more pre-adoptive information would be needed to allow further analysis.

Regarding the second hypothesis of the study, it referred to the relation of the attachment pattern with the appearance of ADHD-like symptoms. Our findings confirm the results obtained by other authors (Niederhofer, 2009): children with a

secure attachment showed less attention problems than children with an insecure attachment. The same tendency could be observed for the Hyperactivity scale, although differences were only trending toward significance.

Despite the observation of the relationship between the ADHD-like symptoms and an insecure attachment, the difficulty falls on the determination of which disorder is the origin of the symptoms or if there are other factors mediating the relation between these two disorders. The development of an insecure attachment during the first period of childhood can generate the appearance of ADHD-like symptoms later during the school age, and vice versa, children with an ADHD diagnosis can have more difficulties in the establishment of a secure attachment pattern with their caretakers. Also, as suggested by other authors (Colvert et al., 2008; Kreppner et al., 2001; Stevens et al., 2008), the existence of a deprivation syndrome including attachment difficulties, inattention and hyperactivity should be considered. In any case, the promotion of family bonds and parenting strategies to deal with their children's behavior would help these children to regard their parents as secure bases and to improve their self-regulatory abilities. Thus, this increase in the security of their attachment to their parents may facilitate their capacity to deal with anxiety. This, in turn, it can hoped would be followed by a decrease in hyperactivity and attention problems, enhancing the wellbeing of the child and his family.

The emergence and/or severity of ADHD symptoms have been linked to the absence of parental skills thought to be vital in promoting a secure attachment pattern with their children (Pinto, Turton, Hughes, White, & Gillberg, 2006). These authors found that the existence of maternal unresolved mourning during pregnancy was related with the appearance of ADHD symptoms in the child. These authors concluded that "*a vicious cycle may be set up where a mother who is dissociating*

(because of her unresolved mourning status) is inadvertently frightening to her child, who then becomes more demanding and difficult (ADHD-like behavior)” (p. 89). In the same vein, it is important to consider that in the case of adoptive parents the existence of some kind of unresolved mourning related with parenthood is quite a common phenomenon (e.g. over fertility issues and the inability to conceive a child). In this regard, the possibility of impoverished parenting skills to promote a secure attachment among adoptive parents due to their unresolved mourning should be considered, as well as its possible influence on the display of ADHD-like symptoms among adopted children. It is a limitation of the current work that the AAI was not administered to the adoptive parents and a suggestion for further work to take this valuable informative step.

Limitations

The limitations of this study reach beyond this absence of the AAI, and contribute to difficulty in interpreting the results. First of all, the characteristics of the sample should be discussed given that only 208 out of 1,700 invited children gave their agreement to participate in the study and this could produce a considerable bias in the sample. Many families had their last appointment with the pediatrician more than 5 years ago, so the address on their database records was not their current address. Consequently we assume that some of the invitation letters were not received by the families. Also, there were many families who were living more than 200 kilometers far from the hospital and they might have not accepted to participate given the substantial distance to travel. Regarding the families that participated in the study, we are aware that some of the parents were motivated to participate in the study because they were having troubles with their child and it was a good opportunity to

seek help. Still, the motivation to participate by of some other families was to demonstrate that the adoption of their child was a very successful one. In this regard, even though the sample is not randomized, there is a representation of both healthy and unhealthy children.

Additionally an increase of the sample size would be required, especially for the group of children adopted from Ethiopia, in order to obtain a higher similarity of the groups. Moreover, there is a need of the comparison of these findings with the results obtained by a sample of non-adopted children.

Conclusions

The display of attention deficit and/or hyperactivity in internationally adopted children might be related with different factors when compared with the display of these symptoms in the general population, such as the health conditions of the mother during pregnancy, their history of different placements, the length of institutionalization, etc.

In our study, these ADHD-like symptoms were mostly related with being adopted from Eastern Europe and with having an insecure attachment. More studies focusing on the etiology of these symptoms in adopted children is needed.

Furthermore, more research assessing the effectiveness of the first line ADHD treatments in adopted children who show inattention, hyperactivity and attachment difficulties is required. This will allow for the provision of the best diagnosis and treatment for these children, according to their specific needs and taking the characteristics and their vital history into account.

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Table 1: *Descriptive Analysis of the Sample*

	<i>Eastern Europe</i>		<i>Ethiopia</i>		<i>China</i>		<i>TOTAL</i>	
Sex of the child	No.	%	No	%	No	%	No	%
Masculine	13	54.2	7	63.6	0	0	20	34.5
Feminine	11	45.8	4	36.4	23	100	38	65.5
TOTAL	24	100	11	100	23	100	58	100
	μ	DS	μ	DS	μ	DS	μ	DS
Age at assessment	7.46	.509	7.45	.688	7.52	.511	7.48	.538
Age at adoption	25.88	14.19	49.91	19.45	13.17	3.73	25.40	18.15
	Yes	No	Yes	No	Yes	No	Yes	No
ADHD diagnosis	3	21	0	23	0	11	3	55
ADHD treatment	2	22	0	23	0	11	2	56

Table 2: *Correlation between Rater 1 and Rater 2.*

Friends and Family Interview subscales	Rho
Coherence	.73**
Evidence of safe/haven secure base	.69**
Secure attachment	.82**
Insecure dismissing attachment	.67**
Insecure preoccupied attachment	.67**
Insecure disorganized attachment	N/A because there is only one case

** p<0.01

Table 3: Between subjects ANOVA for Hyperactivity and Attention Problems depending on the Country of Origin

	Eastern Europe			China			Ethiopia			Total			F	df	p	
	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev				
BASC P2																
Hyperactivity	24	54.5	9.031	23	48.04	10.9	11	55.55	9.95	58	52.14	10.38	2	3.239	.047	
Attention Problems	24	56.83	8.631	23	49.13	9.859	11	54.55	13.92	58	53.34	10.68	2	3.404	.040	

Attachment pattern	Eastern Europe		China		Ethiopia		Total	
	No.	%	No.	%	No.	%	No.	%
Secure	10	41.7	19	82.6	6	54.5	35	60.3
Insecure	14	58.3	4	17.4	5	45.5	23	39.7
Insecure dismissing	7	29.2	3	13	5	45.5	15	25.9
Insecure preoccupied	6	25	1	4.3	0	0	7	12.1
Insecure disorganized	1	4.2	0	0	0	0	1	1.7
TOTAL	24	100	23	100	11	100	58	100

Table 4: *Distribution of the Attachment Patterns Depending on the Country of Origin*

Table 5: Kruskal-Wallis comparisons of scores on the Friends and Family Interview depending on the Country of Origin.

Friends and Family Interview	Eastern Europe			China			Ethiopia			Total			χ^2	df	p
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.			
Coherence	24	2.65	.739	23	3.21	.821	11	2.67	.608	58	2.88	.787	2	7.906	.019
Safe haven / Secure base.	24	2.27	.737	23	2.58	.703	11	2.31	.643	58	2.4	.710	2	2.353	.308

Attachment pattern

	Secure (n = 35)		Insecure (n = 23)					
	M	SD	M	SD	<i>t</i>	<i>df</i>	<i>Sig.</i> (2-tailed)	<i>Mean</i> <i>difference</i>
Hyperactivity	50.14	10.26	55.17	10.04	1.84	56	.07	5.03
Attention problems	50.20	9.129	58.13	11.279	2.946	56	.005	7.93

I suggest you remove the 'obs' column and put (n= next to the country of origin as this column includes so much repetitive information.

Table 6: *Hyperactivity and Attention Problems Depending on the Attachment Pattern*