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Predictors and Correlates of Inattentive/Overactive Behaviors in Internationally Adopted Children

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Children adopted internationally following deprived early care have an elevated risk for difficulties with inattention/overactivity (Kreppner et al., 2001). The current study sought to identify predictors of inattention/overactivity and child and adoptive family challenges that co-occur with inattention/overactivity difficulties in a sample of internationally adopted children. Forty-eight children (mean age at adoption = 57.98 months, SD = 47.7 months) were examined at 3 yearly assessments, which included semistructured interviews, parent ratings, and neuropsychological assessment with children. Results revealed that older age at adoption, longer time in the adoptive home, and smaller family size were associated with greater parent-rated difficulties with inattention/overactivity. Additionally, greater inattention/overactivity difficulties were associated with poorer expressive language and reading performance, poorer child emotional-behavioral outcomes, and poorer adoptive family functioning. Given the increase in difficulties over time in the adoptive home, longer-term follow-up may be helpful to ensure appropriate intervention. Additionally, interventions may need to be more comprehensive given the connection between inattentive/overactive behaviors and other areas of functioning.

**Key words:** attention, hyperactivity, impulsivity, international adoption

Children who have been adopted internationally following early neglect or deprivation (i.e., resulting from orphanage care) are at increased risk for cognitive, behavioral, emotional, and social challenges, even though many of them demonstrate remarkable resilience and catch-up (see MacLean, 2003, for review). One frequently reported set of symptoms in children with histories of institutional rearing includes difficulties with attention, impulse control, and hyperactivity—sometimes referred to as inattentive/overactive syndrome (Kreppner, O’Connor, Rutter, & the English and Romanian Adoptees Study Team, 2001). This set of symptoms, similar to what is characterized as attention-deficit hyperactivity disorder (ADHD), has been reported at significantly
higher rates in postinstitutionalized children compared with several different control groups, including domestic adoptees in developed countries (Kreppner et al., 2001; Merz & McCall, 2010; Stevens et al., 2008, 2009), children adopted internationally in early infancy (Audet & Le Mare, 2010; Gunnar, Van Dulmen, & the International Adoption Project Team, 2007; Kreppner et al., 2001; Loman et al., 2013; Pollack et al., 2010; Stevens et al., 2008, 2009; Wiik et al., 2011), children currently in or adopted from foster care (McDermott, Westerlund, Zeanah, Nelson, & Fox, 2012; Roy & Rutter, 2006; Roy, Rutter, & Pickles, 2000, 2004), and typically developing, nonadopted peers (Audet & Le Mare, 2010; Barcons-Castel, Fornicles-Deu, & Costas-Moragas, 2011; Behen, Helder, Rothermel, Solomon, & Chugani, 2008; Cardona, Manes, Escobar, López, & Ibáñez, 2012; Lindblad, Weitoft, & Hjern, 2010; Loman et al., 2013).

Prevalence estimates for clinically significant problems with attention, impulsivity, and hyperactivity in this population range from 16% (Stevens et al., 2009) to 58% (Roy et al., 2000), depending on the methods used for measuring symptoms, clinical cutoffs chosen, and sample characteristics (i.e., age at adoption, assessment while in an orphanage vs. after adoption). In addition to this relatively high prevalence of inattention/overactivity symptoms in internationally adopted children, several longitudinal examinations have shown persistence of these symptoms over time (Audet & Le Mare, 2010; Kreppner et al., 2001, 2010; Merz, McCall, & Groza, 2013; Stevens et al., 2008).

Research examining which children are at increased risk for these difficulties is important in targeting prevention and intervention services appropriately. Additionally, understanding whether inattention/overactivity tends to be an isolated problem or whether it is accompanied by other challenges in cognition, behavior, emotional adjustment, and family functioning is key to delivering effective interventions. The current study sought to examine both risk factors and accompanying difficulties in a diverse group of internationally adopted children, including children adopted at school age (see Figure 1). Assessments of family functioning, parenting variables, cognitive functioning, and behavioral, emotional, and social adjustment were conducted yearly for 3 consecutive years with a group of internationally adopted children and their families.

**FIGURE 1** Hypothesized model of predictors and correlates of inattentive/overactive behaviors in internationally adopted children.

**PREDICTORS OF INATTENTIVE/OVERACTIVE BEHAVIORS AMONG INTERNATIONAL ADOPTEES**

Previous research has emphasized an array of potentially relevant characteristics, such as adoption demographic predictors, child-specific characteristics, and adoptive family factors, that might predict the presence or absence of inattentive/overactive behaviors.

Adoption demographic predictors, such as institutional caregiving as opposed to foster care (Loman et al., 2013; McDermott et al., 2012; Merz & McCall, 2010; Roy & Rutter, 2006) and adoption from countries with profoundly depriving orphanage care, such as Eastern Europe and Russia (Abrines et al., 2012; Barcons-Castel et al., 2011; Gunnar et al., 2007, 2012; Lindblad et al., 2010), are consistently linked to a greater risk for inattentive/overactive difficulties.

Child-specific factors have also been investigated as they relate to inattention/overactivity. Older age at adoption is related to greater risk for inattentive/overactive difficulties across a wide range of studies (Audet & Le Mare, 2010; Barcons-Castel et al., 2011; Behen et al., 2008; Colvert, Rutter, Beckett, et al., 2008; Gunnar et al., 2007, 2012; Jacobs, Miller, & Tirella, 2010; Kreppner et al., 2001; Lindblad et al., 2010; Merz & McCall, 2010; Merz et al., 2013; Pollack et al., 2010; Stevens et al., 2008; Wiik et al., 2011). Research examining age at adoption suggests that neglect and deprivation that coincide with sensitive periods may “developmentally program” the brain in atypical ways, negatively affecting later development (Julian, 2013; McLaughlin et al., 2013). Previous research has shown a threshold-type relationship between length of deprivation and inattentive/overactive symptoms, with depriving experiences lasting longer than 6 months (Stevens et al., 2008), 18 months (Merz & McCall, 2010), or 24 months (Gunnar et al., 2007) linked to a greater risk for inattention/overactivity. These cutoffs vary because of an interaction between severity of deprivation and age at adoption, such that severely depriving
circumstances have a lower age-at-adoption cutoff for increased risk for difficulties (Merz & McCall, 2010). Other child-specific factors have also been linked to inattentive/overactive behaviors. For example, delays in developmental level at the time of adoption have been associated with greater parent-rated inattention/overactivity or poorer performance on cognitive measures of attention and executive functioning (Colvert, Rutter, Kreppner, et al., 2008; Jacobs et al., 2010; Kreppner et al., 2001). Additionally, longer time in the adoptive home (and thus older age at testing) has also been associated with greater difficulties in several cross-sectional studies (i.e., Merz & McCall, 2010). Also, multiple studies have shown that boys are at increased risk for developing inattentive/overactive behaviors after institutional care (Gunnar et al., 2012; Lindblad et al., 2010; Miller, Chan, Tirella, & Perrin, 2009; Roy et al., 2004; Sonuga-Barke & Rubia, 2008; Wiik et al., 2011), and in longitudinal studies, boys have shown less recovery of inattentive/overactive behaviors over time (Stevens et al., 2008). However, other research has suggested that gender is not a significant predictor related to attention and hyperactivity (Abrines et al., 2012; Audet & Le Mare, 2010; Barcons-Castel et al., 2011; Colvert, Rutter, Kreppner, et al., 2008; Merz & McCall, 2010; Merz et al., 2013). In contrast, child-specific factors including birth weight and prenatal risk factors seem largely unrelated to inattentive/overactive behaviors in internationally adopted children. These predictors have been examined directly, with birth weight, prematurity, and prenatal exposures found to be unrelated to inattentive/overactive behaviors (Kreppner et al., 2001; Merz & McCall, 2010; Miller et al., 2009; Roy et al., 2004). Additionally, studies using control groups of children adopted during early infancy (i.e., thus being likely to share many genetic and prenatal risk factors but not to share postnatal deprivation) have revealed comparably low rates of attention and hyperactivity problems in these comparison groups (Audet & Le Mare, 2010; Loman et al., 2013; Pollack et al., 2010; Stevens et al., 2008).

Adoptive family demographics, the quality of the adoptive home, and adoptive parenting have also been investigated as predictors of inattentive/overactive difficulties. In several cross-sectional studies, longer time in the adoptive home (Gunnar et al., 2007; Merz & McCall, 2010) was associated with greater inattentive/overactive behaviors, despite studies showing improvement in many cognitive domains (i.e., van Ijzendoorn, Juffer, & Poelhuis, 2005). Higher parent education and socioeconomic status were found to predict lower child-rated ADHD symptoms in one study (Wiik et al., 2011) but were unrelated to outcome in other studies (Beckett et al., 2007; Kreppner et al., 2001). The presence of biological children (Kumsta, Kreppner, Rutter et al., 2010) and parent age (Kreppner et al., 2001) have not been found to be related to inattentive/overactive outcomes. Variables related to family structure, such as overall family size, have not been investigated as they relate to inattentive/overactive behaviors. However, larger family size was associated with greater parenting stress in one study examining internationally adopted children and their families (Viana & Welsh, 2010).

Regarding adoptive home quality and parenting approaches, adoptive homes characterized by high-quality stimulation and support were linked to fewer inattentive/overactive behaviors during middle childhood and adolescence (Audet & Le Mare, 2010). Also, authoritarian parenting styles were associated with greater inattentive/overactive behaviors for children adopted at younger ages but with less inattentive/overactive behaviors for children adopted at older ages (older than 48 months; Audet & Le Mare, 2010). Motivation to adopt (Kumsta, Rutter, Stevens, & Sonuga-Barke, 2010) was not associated with inattention/overactivity in one study.

In summary, a variety of adoption demographic, child-specific, and adoptive home quality factors have been identified as consistent predictors of outcome; in contrast, many adoptive family demographic characteristics have generally received little support as predictors of inattentive/overactive behaviors. Importantly, there is a gap in the literature examining adoptive family characteristics as very few studies (with the exception of Audet & Le Mare, 2010) have addressed parenting approaches, such as discipline practices, or family structure variables, such as family size, as they relate to inattentive/overactive behaviors. The current study is designed to address this gap in the literature as parents completed structured ratings regarding their parenting.

**ASSOCIATIONS BETWEEN INATTENTIVE/OVERACTIVE BEHAVIORS AND OTHER AREAS OF FUNCTIONING**

Challenges with attention and hyperactivity have been linked to lower performance on a variety of cognitive measures in children who have been internationally adopted. Miller et al. (2009) found that lower intelligence scores were correlated with greater difficulties with externalizing behaviors, such as hyperactivity. Additionally, Sonuga-Barke and Rubia, (2008) found that children with inattentive/overactive behaviors had significantly lower intelligence scores in comparison to internationally adopted children without inattentive/overactive behaviors as well as nonadopted children with ADHD. The English and Romanian Adoptee Study has suggested that there is overlap between lower intelligence scores and inattentive/overactive behaviors, though the investigators argued that this might be
related to older age at adoption affecting both outcomes (Beckett, Castle, Rutter, & Sonuga-Barke, 2010; Stevens et al., 2008). Within academic functioning, inattentive/overactive behaviors partially mediate the relationship between institutional care and reading skills (Roy & Rutter, 2006) and contribute significant, unique variance in predicting academic skills even after intelligence has been taken into account (Beckett et al., 2007).

The relationship between parent-rated inattentive/overactive behaviors and performance on cognitive measures of attention and executive functioning has also been examined, with significant relationships reported for tasks measuring inhibition, working memory, and theory of mind (Beckett et al., 2010; Sonuga-Barke & Rubia, 2008; Stevens et al., 2008). Additionally, children who have experienced orphanage care scored worse on sustained attention tasks—for example, they had more omissions errors and slower reaction times (Loman et al., 2013; McDermott et al., 2012)—and they displayed deficits in spatial working memory, planning, visual attention, and motor inhibition (Hanson et al., 2013; Pollack et al., 2010). Studies examining other executive skills, such as concept formation, have revealed conflicting results, with some studies showing worse performance compared with nonadopted peers (Cardona et al., 2012; Hanson et al., 2013) and other studies (Pollack et al., 2010) showing no significant difference.

In addition to cognitive outcomes, inattentive/overactive behaviors have been linked with disinhhibited attachment behaviors, even when controlling for factors such as intelligence or duration of deprivation (Abrines et al., 2012; Kreppner et al., 2001; Kumsta, Kreppner, et al., 2010; Roy et al., 2004; Stevens et al., 2008). This association has largely been examined by the English and Romanian Adoptees Study Group in looking at the overlap between several of their deprivation-specific psychological patterns (Kreppner et al., 2001; Kumsta, Kreppner, et al., 2010; Stevens et al., 2008). However, studies using alternative samples, such as Roy et al.’s (2004) comparison of institutionally reared versus foster care-reared children in the United Kingdom, have shown that 21% of the institutionally reared sample with no selective attachment to a caregiver had inattention scores almost three standard deviations higher than children who had selective attachments. Other researchers have suggested that disinhhibited social behaviors with unfamiliar adults are unrelated to attachment with the primary caregiver and instead represent an underlying deficit in inhibitory control more generally (Bruce, Tarullo, & Gunnar, 2009).

Within international adoption samples, inattentive/overactive behaviors have also been linked to more conduct problems (Sonuga-Barke, Schlotz, & Kreppner, 2010; Stevens et al., 2008), though in one study, fewer conduct problems were observed in comparison with nonadopted children with ADHD (Sonuga-Barke & Rubia, 2008). Longitudinal examination (Stevens et al., 2008) of the relationship between inattentive/overactive behaviors and conduct problems among internationally adopted children has suggested a reciprocal relationship between the two, rather than inattentive/overactive behaviors leading to later conduct behaviors (as is often observed in typical ADHD). Though very few studies have examined these links, greater emotional challenges were correlated with inattentive/overactive behaviors (Colvert, Rutter, Beckett, et al., 2008) as were peer problems in adolescence (Sonuga-Barke et al., 2010).

Internationally adopted children who displayed inattentive/overactive behaviors were also more likely to use mental health and education support services (Jacobs et al., 2010; Merz et al., 2013; Rutter, Sonuga-Barke, & Castle, 2010). These behaviors also tended to predict a greater presence of negativity in parents’ evaluations of the adoptions (Castle et al., 2009) and higher parenting stress (Miller et al., 2009).

In summary, inattentive/overactive behaviors have been linked with a variety of negative cognitive, attachment, emotional, social, and adoptive family-related outcomes. However, most of these studies have either focused on only one outcome (Merz & McCall, 2010) or have had samples composed only of children adopted in infancy and toddlerhood from Romania (English and Romanian Adoptees Study Group). The present study is uniquely positioned to comment on ways in which problems with attention, impulse control, and hyperactivity are associated with cognition, behavioral and emotional adjustment, attachment, and adoptive family functioning in a group of diverse international adoptees.

GAPS IN THE LITERATURE

While the studies reviewed have provided distinctive information regarding the impact of early deprivation on development, several gaps in the literature remain. The two most comprehensive sets of longitudinal studies (English and Romanian Adoptees studies, i.e., Kreppner et al., 2001, 2010; Stevens et al., 2008; and Canadian studies, i.e., Audet & Le Mare, 2010) have focused only on children adopted from Romania as infants and toddlers. Using research findings derived from children who experienced profound deprivation in Romania to draw conclusions about children adopted internationally from other countries is difficult as several studies suggest that outcomes differ when samples include children adopted from orphanages that have less severe deprivation (Gunnar et al., 2007; Merz & McCull, 2010, Merz et al., 2013). Additionally, focusing only on children adopted as infants and toddlers makes it difficult to draw conclusions about children adopted at older ages. The need to research children adopted at older ages is especially relevant as children
adopted at older ages have become a larger portion of international adoptions recently, with approximately 30% of children adopted at 5 years of age or older in 2011 (U.S. Department of State, 2013). Thus, studies that longitudinally assess a set of predictors of inattentive/overactive behaviors and co-occurring difficulties in children adopted at older ages from less depriving circumstances are needed to examine the generalizability of findings to children adopted from other countries and settings.

CURRENT STUDY

The current study had two primary aims: (a) to examine the association between various predictors and the prevalence of parent-rated inattentive/overactive behaviors; and (b) to examine whether inattentive/overactive behaviors tend to co-occur with other difficulties in child and family functioning.

To address the first aim, predictors with previous research support, including older age at adoption, longer time in the adoptive home, male gender, and adoption from countries with poorer-quality orphanage care (i.e., Eastern Europe and Russia; Abrines et al., 2012; Barcons-Castel et al., 2011; Gunnar et al., 2007, 2012; Lindblad et al., 2010), were examined. It was hypothesized that these factors would be significantly associated with more parent-reported problems with hyperactivity and attention. Predictors with equivocal support and those that had not previously been examined in relationship to inattentive/overactive behaviors (parent education, adoptive parent discipline techniques, and family size) were examined in an exploratory fashion.

To address the second aim, the relationship between parent-rated hyperactivity and attention problems and participants’ cognitive functioning and social/emotional functioning as well as the adoptive family functioning was examined. It was hypothesized that higher parent-rated difficulties would be associated with worse performance across these cognitive domains (sustained attention, language, intelligence, and academic tasks), worse social/emotional adjustment (more attachment disturbances, greater executive dysfunction, more internalizing symptoms, more conduct difficulties), and poorer adoptive family functioning (parents rating the adoption as less successful and indicated higher parenting stress and worse parent mood).

METHOD

Participants

Participants were recruited through several local adoption agencies and through local organizations that provide social opportunities for families who have adopted internationally. Potential participants who expressed interest in the study underwent phone screening to ensure that they met the following criteria: (a) adopted internationally within the previous 5 years, (b) younger than the age of 18 years at the beginning of the study, (c) no known evidence of alcohol or drug exposure prenatally based on parent and pediatrician report, and (d) no known medical condition that might independently affect the child’s performance on cognitive testing (i.e., epilepsy).

Forty-eight internationally adopted children met these criteria and were included in the study. At the beginning of the study, the mean age of the children was 77.43 (SD = 46.78) months, and they had been in their adoptive homes for an average of 19.44 (SD = 15.84) months. Age at adoption ranged from 6 months to 190 months, with a mean of 57.98 (SD = 47.7) months. Age at adoption and age at testing were not significantly correlated with length of time in the adoptive home (r = -.26, and r = .14, respectively). There were 16 boys and 32 girls, and 40 participants were right-handed, 4 were left-handed, and 4 were ambidextrous.

The children had been adopted into the United States from the following regions: East Asia (n = 23; including China and South Korea), Eastern Europe/North Asia (n = 11; including Russia, Kazakhstan, and Ukraine), Africa (n = 10; including Ethiopia and Ghana), and the Caribbean and Central/South America (n = 4; including Guatemala, Haiti, and Colombia).

In the sample, 88% of the children (n = 42) had experienced orphanage care. Of those who had spent time in orphanage care, the time ranged from 1 month to 145 months (M = 30.85, SD = 34.99 months). Time in orphanage care correlated significantly with age at adoption (r = .73, p < .001). Thirty-three percent of the sample had spent some time in foster care settings (range = 1–103 months, median = 17, interquartile range = 15 months). Fifty-four percent of the sample had spent some time with their biological parents (range = <1 month–115 months, M = 40.54, SD = 31.97 months).

Adoptive families ranged in size from one to seven children (M = 3.45, SD = 1.57), including the participant, and the majority of adoptive parents were college-educated (mother’s years of education, M = 16.42, SD = 1.93; father’s years of education, M = 16.63, SD = 2.08).

Of the 48 participants who completed Year 1 appointments, 42 participants had completed the Year 2 appointment at the time of manuscript preparation (5 participants discontinued their participation in the study and 1 participant joined the study late and was not yet due for their Year 2 appointment). Data for 40 participants were available for Year 3 (an additional 2
participants were not yet due for their Year 3 appointment. Participants who completed the study did not differ from participants who discontinued their participation with regard to gender, age at testing, age at adoption, length of time in the adoptive home, time spent in orphanages prior to adoption, or inattentive/overactive behaviors in the 1st year of the study.

Participants were included in analyses if they had nonmissing data for 1 year or more. Given that a mixed-models approach was used, no imputation was necessary. Most analyses done to identify demographic predictors of inattention/overactivity had a sample size of 46 (2 participants were too young at Year 1 of the study for parents to complete the inattentive/overactive behavior measure). Sample sizes when estimating associations between inattentive/overactive behaviors and co-occurring difficulties (Study Goal 2) were smaller in some cases (ranging from $n = 32$ to $n = 46$) as some constructs were not appropriate for younger participants.

**Procedure**

After approval from the Calvin College Institutional Review Board, participants and an adoptive parent (46 mothers and 2 fathers) completed three yearly appointments (mean time from Year 1 appointment to Year 2 appointment = 11.61 months, $SD = 1.59$ months; mean time from Year 2 appointment to Year 3 appointment = 11.82 months, $SD = 1.48$ months). Following consent and assent procedures, appointments consisted of a semistructured parent interview, a battery of cognitive tests administered by a member of the research team, and structured ratings completed by the parent. Appointments ranged from 2 hr to 3.5 hr in length, depending on the age of the child. The 1 participant who was taking medication for attention difficulties was tested when off of their medication at all study visits. No financial incentives were offered for participation.

The semistructured interview at the Year 1 appointment gathered information regarding preadoptive care, age at adoption, adoptive family characteristics, developmental milestones, medical history, children’s educational information, service use, and any concerns parents had regarding behavioral, emotional, and/or social functioning. The Year 2 and Year 3 parent interviews consisted of updating information regarding developmental milestones, educational progress, medical history, service use, and parent concerns. Additionally, the Disturbances of Attachment Interview (DAI; Smyke & Zeanah, 1999) was administered as part of all three interviews.

Yearly cognitive testing with participants included assessments of intelligence (Wechsler Preschool and Primary Scale of Intelligence-Third Edition [WPPSI-III], Wechsler, 2002; or Wechsler Intelligence Scale for Children-Fourth Edition [WISC-IV], Wechsler, 2003), attention (Kiddie Continuous Performance Test [KCPT], Conners, 2006; or Conners’ Continuous Performance Test-Second Edition [CCPT-II], Conners, 2006), language (Clinical Evaluation of Language Fundamentals-Preschool-Second Edition [CELF-P2], Wiig, Secord, & Semel, 2004; or Clinical Evaluation of Language Fundamentals-Fourth Edition [CELF-IV], Semel, Wiig, & Secord, 2003), and academic skills (Wide Range Achievement Test-Fourth Edition [WRAT-IV], Wilkinson & Robertson, 2006). The age-appropriate instrument was administered each year, and raw scores were converted to standardized scores based on age-based norms for each test.

Each parent also completed yearly structured rating forms assessing emotional and behavioral adjustment (Behavior Assessment System for Children-Second Edition [BASC-2], Reynolds & Kamphaus, 2004), parenting and relationship factors (Parenting Relationship Questionnaire [PRQ], Kamphaus & Reynolds, 2006), and executive functioning (Behavior Rating Inventory of Executive Function [BRIEF], Gioia, Isquith, Guy, & Kenworthy, 2000; or Behavior Rating Inventory of Executive Function-Preschool Version [BRIEF-P], Gioia, Espy, & Isquith, 2003), as well as measures designed for the study assessing adoption success (Appendix).

A more detailed discussion of the way that cognitive testing and parent report measures were used to operationalize conceptual variables is presented in the Measures section.

**Measures**

Descriptive statistics for inattentive/overactive behaviors and associated outcomes are presented in Table 1.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Year 1 M</th>
<th>Year 2 M</th>
<th>Year 3 M</th>
<th>Year 1 SD</th>
<th>Year 2 SD</th>
<th>Year 3 SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inattention/Overactivity</td>
<td>52.6</td>
<td>9.35</td>
<td>52.14</td>
<td>11.47</td>
<td>53.04</td>
<td>11.3</td>
</tr>
<tr>
<td>Full-Scale Intelligence</td>
<td>86.55</td>
<td>16.71</td>
<td>91.68</td>
<td>17.94</td>
<td>94.58</td>
<td>17.54</td>
</tr>
<tr>
<td>Sustained Attention</td>
<td>56.17</td>
<td>8.4</td>
<td>55.05</td>
<td>8.58</td>
<td>52.03</td>
<td>10.58</td>
</tr>
<tr>
<td>Expressive Language</td>
<td>5.84</td>
<td>4.23</td>
<td>7.4</td>
<td>4.32</td>
<td>8.24</td>
<td>3.2</td>
</tr>
<tr>
<td>Receptive Language</td>
<td>6.39</td>
<td>4.08</td>
<td>8.05</td>
<td>3.8</td>
<td>8.42</td>
<td>3.87</td>
</tr>
<tr>
<td>Reading</td>
<td>87.21</td>
<td>21.16</td>
<td>94.38</td>
<td>17.72</td>
<td>99.65</td>
<td>15.62</td>
</tr>
<tr>
<td>Mathematics</td>
<td>89.28</td>
<td>19.09</td>
<td>90.41</td>
<td>13.96</td>
<td>94.19</td>
<td>14.91</td>
</tr>
<tr>
<td>Spelling</td>
<td>83.7</td>
<td>18.49</td>
<td>92.34</td>
<td>18.32</td>
<td>95.52</td>
<td>13.83</td>
</tr>
<tr>
<td>Attachment Disturbance</td>
<td>4.19</td>
<td>3.14</td>
<td>3.48</td>
<td>3.93</td>
<td>2.81</td>
<td>2.77</td>
</tr>
<tr>
<td>Executive Functioning</td>
<td>53.68</td>
<td>9.66</td>
<td>55.16</td>
<td>11.99</td>
<td>56.14</td>
<td>12.1</td>
</tr>
<tr>
<td>Conduct Problems</td>
<td>56.05</td>
<td>13.55</td>
<td>55.7</td>
<td>13.06</td>
<td>53.73</td>
<td>13.7</td>
</tr>
<tr>
<td>Internalizing Problems</td>
<td>48.26</td>
<td>10.78</td>
<td>50.89</td>
<td>12.22</td>
<td>47.95</td>
<td>11.23</td>
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<tr>
<td>Parenting Stress</td>
<td>51.75</td>
<td>9.15</td>
<td>52.84</td>
<td>11.14</td>
<td>51.3</td>
<td>12.65</td>
</tr>
<tr>
<td>Adoption Success</td>
<td>44.11</td>
<td>5.4</td>
<td>43.99</td>
<td>5.49</td>
<td>43.38</td>
<td>6.47</td>
</tr>
<tr>
<td>Parent Mood</td>
<td>n/a</td>
<td>n/a</td>
<td>14.18</td>
<td>4.5</td>
<td>13.73</td>
<td>3.66</td>
</tr>
</tbody>
</table>
Inattentive/Overactive Behaviors

The Parent Rating Scale of the BASC-2 (Reynolds & Kamphaus, 2004) was utilized to assess inattentive/overactive behaviors at each time point of the study. Following the conversion of raw scores to age-standardized scores (scales have $M = 50, SD = 10$), a composite was calculated by averaging the Attention Problems and Hyperactivity subscales. Therefore, there were three inattentive/overactive scores, one for each year of the study. This method was chosen due to the high correlation between the two scales in the standardization sample (average of 0.70, Reynolds & Kamphaus, 2004) and in the current study ($r = .61, .68, .76$ for Years 1, 2, and 3, respectively).

Predictors of Inattentive/Overactive Behaviors

Adoption demographic and child-specific predictors. Country of adoption was assessed by parent report and was coded dichotomously, with children adopted from Eastern Europe and North Asia compared to children adopted from all other regions. Age at adoption and gender were also assessed by parent report.

Adoptive home predictors. The time in an adoptive home at study onset, number of years of formal schooling completed by adoptive parent(s), and number of children in the home were assessed via parent report. To assess parent-rated discipline techniques, the Discipline Practices scale of the PRQ was used (Kamphaus & Reynolds, 2006). This nine-item scale assesses the degree of consistent application of consequences and punishments as well as the value that parents place on establishing and following rules in the household. Scores were standardized based on age-based norms (normative $M = 50, SD = 10$), with higher scores indicating a high degree of consistency and strong support for rules. Low scores indicate a more permissive and less consistent discipline approach. The parents’ scores from the Year 1 assessment ($M = 49.28, SD = 10.11$) were used as a predictor of inattentive/overactive behaviors.

Co-occurring Child and Family Difficulties

Child cognitive functioning. A variety of domains were assessed to examine the association between inattentive/overactive behaviors and cognitive functioning outcomes. Intelligence was operationalized as the full scale intelligence score at each study visit on either the WISC-IV (Wechsler, 2003) or WPPSI-III (Wechsler, 2002), depending on the age of the child. Research examining the relationship between the WISC-IV and WPPSI-III showed that the correlation between the Full-Scale IQ scores of these tests was very high ($r = .89$), thereby supporting the use of either test to operationalize intelligence (Wechsler, 2003). Scores were standardized based on age-based norms ($M = 100, SD = 15$).

Given previous research suggesting that $d'$ (detectability) is strongly related to ADHD symptoms (Epstein, 2003), the detectability $T$ score from the CCPT-II or KCPT (Conners, 2006) was used to operationalize sustained attention. Higher detectability $T$-scores reflect more difficulty distinguishing between targets (i.e., signal) and nontargets (i.e., noise). Conners (2006) provides the following guidelines for interpretation of $T$ scores: $< 40 =$ very good performance; $40$ to $44 =$ good performance; $45$ to $54 =$ within the average range; $55$ to $59 =$ mildly atypical; $60$ to $64 =$ moderately atypical; $> 65 =$ markedly atypical.

Expressive and receptive language were operationalized as performance on the Formulating Sentences (expressive language) and Concepts and Following Directions (receptive language) subtests of the CELF-IV (Semel et al., 2003) or the Word Structure (expressive language) or Sentence Structure (receptive language) subtests of the CELF-P2 (Wiig et al., 2004). Age-standardized subtest scaled scores were calculated ($M = 10, SD = 3$).

Performance on the WRAT-IV Word Reading, Spelling, and Math Computation subtests (Wilkinson & Robertson, 2006) was used to examine the impact of inattentive/overactive behaviors on academic achievement. Age-based standardized scores were utilized ($M = 100, SD = 15$).

Child Social-Emotional-Behavioral Functioning

Attachment disturbances were assessed using the DAI (Smyke & Zeanah, 1999), a 13-item semistructured interview that addresses a range of attachment-related behaviors relevant to internationally adopted populations. The DAI includes questions addressing whether the child seeks comfort when distressed, is overly friendly with strangers, or displays hypervigilant attachment behaviors. Each item is rated by the interviewer on a scale of 0 to 2 based on parent response to interview probes, and a total score is formed by adding the ratings together for all items (possible range $= 0$–26). Higher scores indicate a greater disturbance in attachment relationships. Research using this instrument and comparing it with other attachment interviews has demonstrated that the measure has good reliability and validity (Zeanah, Smyke, & Dumitrescu, 2002).

Parent-rated executive dysfunction was assessed utilizing the Global Executive Composite from either the BRIEF (Gioia et al., 2000) or BRIEF-P (Gioia et al., 2003), depending on the age of the child. This summary
score includes clinical scales assessing behavioral regulation and metacognitive aspects of executive functioning. It has a mean of 50 and a standard deviation of 10, with higher scores representing greater executive dysfunction.

The Conduct Problems subscale of the BASC-2 (Reynolds & Kamphaus, 2004) was used to assess the relationship between inattentive/overactive behaviors and conduct difficulties, such as lying and disobedience. Scores have a mean of 50 and a standard deviation of 10, with higher scores representing greater conduct problems.

The Internalizing Problems Composite from the BASC-2 (Reynolds & Kamphaus, 2004) was used to assess the relationship between inattentive/overactive behaviors and emotional adjustment. The Internalizing Problems Composite is composed of items from the Anxiety, Depression, and Somatization subscales. Scores have a mean of 50 and a standard deviation of 10, with higher scores representing greater internalizing symptoms.

Adoptive Parent/Family Functioning

Frustration and stress surrounding the parent–child relationship was examined through the Relational Frustration Index from the PRQ (Kamphaus & Reynolds, 2006). This 12-item scale addresses both overall parenting stress and stress related to specific difficult situations (e.g., arguments). The scale has a mean of 50 and a standard deviation of 10, with higher scores representing a greater amount of parenting stress.

Parent-rated success of the adoption placement was examined using a 10-item questionnaire specifically designed for the study (see the Appendix), which both directly and indirectly assessed success. Option choices were presented on a 5-point Likert scale, ranging from “strongly disagree” to “strongly agree,” and a total score was calculated by summing responses to all items (resulting in a possible total score range of 10–50), with higher scores indicating greater parent-perceived success. The internal consistency of the scale was good at all 3 years of the study (Cronbach’s α = .87, .87, and .89).

Parent mood was assessed at Years 2 and 3 of the study using a seven-item parent-report scale, including five items from the Center for Epidemiologic Studies Depression Inventory (Husaini, Neff, Harrington, Hughes & Stone, 1980) and two items that were added specifically for the study (“I felt helpless,” “I felt angry”). Parents were asked to reflect on the degree to which they had experienced certain feelings during the previous 2 months, with responses ranging from “never” (1) to “a lot” (5). After reverse-scoring the item “I enjoyed life,” parents’ responses across all seven items were summed to create a parent mood score, with higher scores indicating greater negative mood experienced. The internal consistency of the scale was good at both Year 2 and Year 3 of the study (Cronbach’s α = .85 and .82, respectively).

Data Analysis

Given the extensive quantitative and qualitative data collected on individual participants at three separate time points, it was not logistically feasible to have a very large sample size. Furthermore, different participants were first tested at a variety of different ages and at different times spent in adoptive homes. Theoretically, one can conceptualize each child as having an inattentive/overactive behavior curve as a function of time in an adoptive home, and the data collected can be treated as a snapshot at three points on that curve (see Figure 2).

Given that data were collected over time, an analysis method that allows for proper modeling of the covariance structure given the longitudinal (panel) nature of the data was needed. Furthermore, the method needed to include individuals even if they were not observed at all three time points and needed to allow flexibility, given that each participant’s time in an adoptive home at Year 1 was variable. The linear mixed-effects model allows for this flexibility and allows an individual to be included in the analysis if they have data for one time point or more without the need for imputation. A mixed-effects model includes a model for the mean that is similar to standard multiple regression while also allowing for proper modeling of the covariance by the inclusion of random effects and the availability of a variety of structures for the covariance matrix.

FIGURE 2 Inattentive/overactive (I/O) behaviors as a function of time in the adoptive home.
To evaluate the first aim regarding predictors of inattentive/overactive behaviors, a series of mixed models were fit to the data. The inattentive/overactive behavior measure was the outcome, and models were fit that all included time in an adoptive home at study onset and age at adoption as predictors. Thus, estimated effect sizes and associated \( p \) values for other predictors were collected after adjustment for time in an adoptive home and age at adoption. A random participant-level intercept term and slope term for time since adoption were also included in the model. These terms allow for correlation between observations taken on the same person to be modeled. See Little, Miliken, Stroup, and Wolfinger (1996) or Raudenbush and Bryk (2002) for more information. These models were fit using PROC MIXED in SAS 9.3\(^\text{®} \) (SAS Institute, Cary, NC).

To address the second aim regarding links between inattention/overactivity and other associated difficulties in child or family functioning, mixed models were used to estimate correlations and to test for statistically significant associations between Inattentive/Overactivity score and cognitive, behavioral and emotional, and adoptive family variables. An alternative approach here would be to simply average overactive behaviors and co-occurring difficulties. Their method involves estimating a mixed model, which includes a random and fixed effect for each variable and time (Years 1, 2, and 3 of the study) as a repeated measure for each participant. This model assumes that the correlations are equivalent over time (an assumption that was tested using the methods described in Wilcox (2009) and R Development Core Team (2008). The estimated covariance matrix for the outcome from the mixed model can then be used to obtain an estimate of the overall correlation between the two variables. These estimated correlations are given in Table 2. They are similar to what one would get if they were to simply average the three Pearson correlation coefficients from each year of the study, but they appropriately adjust for changes in sample size and missing values as well as differences in variability at different points in time. Furthermore, using a model-based method provides a means to test for statistical significance that accounts for the longitudinal nature of the data.

### RESULTS

#### Incidence and Persistence of Inattentive/Overactive Behavior

To provide a comparison with previous studies that have examined the incidence and persistence of clinically significant inattentive/overactive behaviors (Gunnar et al., 2007, 2012; Jacobs et al., 2010; Kreppner et al., 2001; Merz & McCall, 2010; Stevens et al., 2008; Wiik et al., 2011), the number of participants with a \( T \) score of 60 or greater (Reynolds & Kamphaus, 2004) across the 3 years of the study was examined.

Twenty percent of the sample scored above the established cutoff in Year 1 of the study, 26% scored above the cutoff in Year 2, and 32% of the sample scored above the cutoff in Year 3. No participants who scored above cutoff in Year 1 of the study scored below the cutoff in Year 2. One participant who had scored above the cutoff in Year 2 of the study scored below the cutoff in Year 3. In both Years 2 and year 3 of the study, four participants who had scored below the cutoff in the previous year were rated as scoring above the cutoff. As additional support for persistence of inattentive/overactive behaviors, the correlations between Year 1 and Year 2 inattentive/overactive behavior \( (r = .85, p < .001) \) and Year 2 and Year 3 inattentive/overactive behavior \( (r = .84, p < .001) \) were quite strong.

| Table 2: Relationship Between Inattentive/Overactive (I/O) Behaviors and Associated Child and Adoptive Family Factors | Overall Estimated Correlation Between I/O and Each Factor and Test of Statistical Significance |
| --- | --- | --- |
| Factor | \( r \) | \( Z \) | \( p \) value |
| Full-Scale Intelligence | \(-.17 \) | \(-1.12 \) | \(.2624 \) |
| Sustained Attention | \(.13 \) | \(.57 \) | \(.5681 \) |
| Expressive Language | \(-.17 \) | \(-1.75 \) | \(.0793 \) |
| Receptive Language | \(-.18 \) | \(-1.03 \) | \(.3041 \) |
| Reading | \(-.25 \) | \(-1.7 \) | \(.0897 \) |
| Mathematics | \(-.09 \) | \(-0.89 \) | \(.3758 \) |
| Spelling | \(-.19 \) | \(-1.54 \) | \(.1228 \) |
| Attachment Disturbance | \(.57 \) | \(3.56 \) | \(.0004^{***} \) |
| Executive Functioning | \(.82 \) | \(4.03 \) | \(.0001^{***} \) |
| Conduct Problems | \(.6 \) | \(2.94 \) | \(.0033^{*} \) |
| Internalizing Problems | \(.48 \) | \(2.7 \) | \(.007^{*} \) |
| Parenting Stress | \(.54 \) | \(3.11 \) | \(.0019^{*} \) |
| Adoption Success | \(-.53 \) | \(-3.09 \) | \(.002^{*} \) |
| Parent Mood | \(.38 \) | \(2.38 \) | \(.017^{*} \) |

\(^* p < .05. \quad ^{**} p < .01. \quad ^{***} p < .001.\)
Predictors of Inattentive/Overactive Behavior

Within the context of the base model, older age at adoption predicted significantly greater inattentive/overactive behaviors, $t(30)=2.97, p=.006$ (effect size = estimated increase of 0.084 points on the I/O Scale for each 1 month increase in age at adoption). Given that some previous studies have suggested that age at adoption may be associated with inattentive/overactive behaviors in a threshold fashion (i.e., Kreppner et al., 2001), we tested if there was evidence of nonlinearity for age at adoption by adding a quadratic term to the model. There was no evidence of nonlinearity, $t(31)=-0.09, p=.93$.

Time since adoption was not statistically significant at the .05 level after adjusting for age at adoption, though the nonsignificant trend suggested that increased inattentive/overactive behaviors were reported with longer time in an adoptive home, $t(38)=1.72, p=.094$ (effect size = 0.084 I/O points per month).

After adjusting for age at adoption and time in an adoptive home, there was a statistically significant effect for family size, with larger family size associated with fewer reported difficulties with inattention/overactivity, $t(31)=-3.4, p=.0019$ (effect size = for each one child increase in family size there was an estimated average drop of 2.7 I/O points).

There was no statistically significant gender effect on inattention/overactivity after adjusting for age at adoption and time since adoption, $t(31)=0.39, p=.70$. Regarding country of adoption, participants who were adopted from Eastern Europe/North Asia were adopted at significantly older ages compared with those adopted from other countries, $F(3, 44)=4.81, p=.003$. After adjusting for age at adoption and time in an adoptive home, there was also no statistically significant difference between participants adopted from Eastern Europe/North Asia and those adopted from other regions, $t(31)=1.64, p=.11$.

After adjusting for age at adoption and time in an adoptive home, exploratory data analysis failed to reveal statistically significant effects for parent education—for mother’s education, $t(31)=-0.71, p=.48$, and for father’s education, $t(31)=0.90, p=.37$—and the parent-rated discipline approach, $t(31)=0.97, p=.34$. Furthermore, there was no statistically significant interaction effect between parent discipline and age at adoption, $t(29)=-0.19, p=.84$.

Associated Outcomes Related to Inattentive/Overactive Behavior

With regard to cognitive outcomes, results revealed nonsignificant trends between greater inattentive/overactive behaviors and worse performance on expressive language and reading measures ($r=-.17, p=.08$, and $r=-.25, p=.09$, respectively). Inattentive/overactive behaviors were not significantly associated with measures of intelligence, sustained attention, receptive language, math, or spelling.

With regard to child attachment, emotional, and behavioral outcomes, greater difficulties with inattentive/overactive behaviors were associated with significantly more attachment disturbances, worse parent-rated executive functioning, more conduct problems, and more internalizing difficulties (see Table 2). The presence of worse inattentive/overactive behaviors was also associated with adoptive family functioning outcomes, such as greater parenting stress, worse parent self-rated mood, and lower ratings of adoption success (Table 2).

DISCUSSION

The current study sought to examine the predictors and associated outcomes of inattentive/overactive behaviors among international adoptees. By longitudinally examining a group of international adoptees who had been adopted at older ages and from a diverse range of countries, our study sought to add to previous findings and examine their generalizability to different samples.

Incidence and Persistence of Inattentive/Overactive Behavior

As has been reported in other longitudinal research of international adoptees (Audet & Le Mare, 2010; Kreppner et al., 2010), our study also showed a significant degree of persistence in inattentive/overactive behaviors. The vast majority of participants who had scored above clinical cutoffs initially continued to display inattentive/overactive behaviors in subsequent years of the study, and correlations for inattentive/overactive behaviors between the years of the study were quite high. The incidence of clinically significant inattentive/overactive behaviors was consistent with other studies (Gunnar et al., 2012; Kreppner et al., 2001; Wiik et al., 2011).

Predictors of Inattentive/Overactive Behavior

Our first set of hypotheses examined adoption demographic, child-specific, and adoptive family predictors of inattentive/overactive behaviors. As was hypothesized, older age at adoption was linked to a greater degree of difficulties for inattentive/overactive behaviors. This same link has been reported across studies examining inattentive/overactive behaviors (Audet & Le Mare, 2010; Barcons-Castel et al., 2011; Behen
In addition to age at adoption, consistent with predictions, greater time in the adoptive home was also found to be associated with increased difficulties with inattentive/overactive behaviors, though at a non-significant trend level after adjusting for age at adoption. This finding adds longitudinal evidence to cross-sectional studies (Gunnar et al., 2007; Merz & McCall, 2010) that initially reported this relationship. This increase in difficulties could be explained in a number of ways. For example, it may be that parents have lower expectations for their child’s attention and behavior control in the initial time in the adoptive homes, resulting in better behavior ratings. However, parents’ ratings may worsen over time given their changing expectations in the face of stable behavior difficulties. Alternatively, it may be that the depriving early care, experienced by most international adoptees, has an effect on brain structures that become increasingly more important for attention and behavior control with age. In partial support of this, previous research on international adoptees has shown that frontostriatal pathways important for attention and behavior control are altered in international adoptees (Behen et al., 2009; Govindan, Behen, Helder, Makki, & Chugani, 2010; Hanson et al., 2013). Essentially, the biological mechanisms for attention and behavior control are affected by deprivation at an early age, but the neuroanatomical alterations in these areas become more apparent as they are needed for age-expected development. Given that inattention/overactive behavior scores were age-standardized, it is less likely that this increase can be explained by age-typical increases in these behaviors.

Exploratory analysis of previously unexamined predictors of inattentive/overactive behaviors revealed a significant relationship between larger family size and fewer difficulties in the current study. The direction of the finding was unexpected, especially given previous research findings that larger family size was related to greater family stress in international adoptees (Viana & Welsh, 2010). Further examination of this finding with the current study data suggests that it may, at least partly, be due to differing reported motivations to adopt. In the current study, smaller family size was associated with greater endorsement of motivations to adopt for reasons of infertility, while larger family size was associated with greater endorsement of religious and/or humanitarian motivations. These motivations themselves were associated with parent-reported inattentive/overactive behaviors (i.e., being motivated by infertility was associated with greater inattentive/overactive difficulties, motivations for religious and humanitarian reasons were associated with fewer inattentive/overactive difficulties), though family size still retained unique predictive variance; thus, other explanations also need to be considered. One other possible explanation is that the presence of multiple siblings in larger families provides parents with a greater range of child behavioral outcomes for comparison, resulting in less stringent expectations for attention and behavioral control. Alternatively, inattentive/overactive behavior may not be noticed as much in the context of a large family. In the current study, family size was unrelated to family structure (i.e., presence of additional adopted children in the household), so it is unlikely that the family size relationship is driven by having more adopted children in the family. Further research that can more carefully compare competing explanations for this finding in larger samples will be helpful in developing a greater understanding about the association between family size and inattentive/overactive behaviors.

Contrary to what was hypothesized, country of adoption and gender were not significant predictors of inattentive/overactive behaviors once we controlled for age at adoption and time in the adoptive home. Our study is not alone in this respect as several other studies have also failed to show a relationship between country of adoption and inattentive/overactive behaviors (Jacobs et al., 2010; Wiik et al., 2011) or gender and inattentive/overactive behaviors (Barcons-Castel, 2011; Colvert, Rutter, Kreppner et al., 2008; Merz & McCall, 2010). Regarding the lack of a gender difference, this finding may be related to a sampling difference as the current study examined children in the first several years of their adoptive placement, while studies showing a gender difference in inattentive/overactive behaviors often demonstrated this finding after greater time in the adoptive home, as girls showed greater improvement over time compared with more stable difficulties in boys (Stevens et al., 2008).
Other exploratory analyses of predictors including parent education and discipline practices also did not yield significant relationships with inattentive/overactive behaviors. This nonsignificant finding may be attributed to the fact that these factors are unrelated to inattentive/overactive behaviors or it may be due to issues of insufficient power to detect a significant effect, given the small sample size. Very little research has been done on adoptive parenting as it relates to inattentive/overactive behaviors (exception is Audet & Le Mare, 2010). Thus, further research would be helpful in working toward understanding this finding more clearly.

Associated Outcomes Related to Inattentive/Overactive Behavior

Our second set of hypotheses examined other cognitive, behavioral, emotional, attachment, and adoptive family outcomes to see whether they were related to difficulties with inattention/overactivity. In general, cognitive performances were less strongly related to inattention/overactivity than were behavioral and emotional adjustment, attachment, and adoptive family outcomes. However, nonsignificant trends were found when examining the relationship between expressive language and reading and inattentive/overactive behaviors. Importantly, this is the first study to examine the relationship between the cognitive assessment of language performance and inattentive/overactive behaviors in internationally adopted children, though the link has been reported in nonadopted children with ADHD (for a review, see Bellani et al., 2011). Cognitive performances on intelligence, sustained attention, receptive language, spelling, and math tasks were not significantly associated with inattentive/overactive behaviors. Previous research with internationally adopted children that has shown links between cognitive performance and inattentive/overactive behaviors has largely focused on intelligence and academic achievement and has almost all been conducted with samples of children adopted from Romania (Beckett et al., 2007; Roy & Rutter, 2006; Sonuga-Barke & Rubia, 2008; Stevens et al., 2008). Thus, the less robust relationship between cognition and inattentive/overactive behaviors in this current study may suggest that this relationship is weaker when children have been adopted from less severely depriving circumstances, as is the case with many of the children included in the current study. Alternatively, this may also be explained by task choice, as the measures chosen may not have been sensitive enough to detect the association. For example, the sustained attention task is fairly structured and time-limited, while parent ratings of inattentive/overactive behaviors are based on situations with less structure and over long periods of time. Importantly, previous studies have also shown a lack of association between sustained attention tasks, similar to the task used in the current study, and parent ratings of attention and hyperactivity in nonadopted children with ADHD (Edwards et al., 2007).

The most robust relationships between co-occurring difficulties and inattentive/overactive behaviors were found for child emotional and behavioral adjustment, attachment, and family functioning. Consistent with our hypotheses, a greater number of reported inattentive/overactive behaviors was associated with more attachment disturbances, greater executive dysfunction, more conduct problems, more internalizing difficulties, more parenting stress, worse ratings of adoption success, and worse parent mood ratings. Many of these findings are consistent with what has been reported as part of the English and Romanian Adoptees Study Group (Castle et al., 2009; Colvert, Rutter, Beckett, et al., 2008; Kreppner et al., 2001; Sonuga-Barke et al., 2010; Stevens et al., 2008) and extend their findings to children adopted from less depriving circumstances and at older ages. Additionally, the current study adds to the literature by being the first to examine inattentive/overactive behaviors and parent mood outcome. It is important to note that our analysis approach, which assumed bidirectionality of the relationships between inattentive/overactive behaviors and associated outcomes, does not allow for inferences about the directionality of these effects.

Implications

The findings from this study point toward a number of clinical implications. Children who have been adopted at older ages have a significantly elevated risk for developing inattentive/overactive behaviors. These behaviors should be carefully described to prospective and newly adopting parents to manage expectations appropriately and allow for close monitoring as the child adjusts to the adoptive home. Additionally, given that greater inattentive/overactive behaviors were reported with more time in the adoptive home, longer-term follow-up and programming would be helpful for families and children to ensure that those who are struggling will be identified and provided with appropriate interventions, which is especially important given the connection between inattentive/overactive behaviors and parents’ ratings of their own stress, mood, and perceptions of adoption success.

Given that inattentive/overactive behaviors were associated with a variety of other outcomes, the present study’s findings provide support for the need for more comprehensive interventions that assess and intervene in a range of ways, instead of focusing narrowly on inattentive/overactive behaviors. For example, interventions may also need components
that focus on attachment difficulties, internalizing emotional difficulties, and parent mood functioning. Additionally, in educational settings, it will be important to examine associated difficulties (i.e., internalizing difficulties, attachment disturbances) in internationally adopted children even when the initial referral may focus on difficulties with inattention/overactivity.

Limitations

The current study has several limitations that are important to mention. First, the sample size was relatively small, which was intentional given the comprehensive and longitudinal nature of the study. However, it may have limited our ability to draw firm conclusions from some analyses because of insufficient power. Second, the noncognitive outcomes in the study were based solely on parent report, rather than including child self-report or teacher report. For some outcomes, such as internalizing difficulties, it may be difficult for a parent to accurately report this outcome for a child. Also, it would be helpful to gather information about inattentive/overactive behaviors from someone outside the family, such as a teacher, to provide insight into the child’s behavior in a different setting. Inclusion of child self-report is planned for future data collection with this sample. Third, the sample was followed for only 3 years during their initial adjustment to their adoptive family. Longer-term follow-up will be important in addressing the unfolding of inattentive/overactive behaviors and their associated difficulties as children continue to get older and have more time in their adoptive homes. Last, the exclusion criteria for fetal alcohol exposure relied on pediatrician report rather than the assessment of facial features, which may have resulted in some children being included in the study who had subtle signs of exposure not identified by their family physician.

Future research that examines the current sample after more time in the adoptive home is planned. Additionally, research that examines the new findings from the current study regarding the relationship between family size and adoptee outcomes, such as inattentive/overactive behaviors, is warranted. Also, given the dearth of literature on adoptive parenting approaches on outcome, more research with larger samples would be helpful. Last, to date, there are no intervention studies that have examined the treatment of inattentive/overactive behaviors for internationally adopted children after they have joined their adoptive families. Given the high incidence of clinically significant difficulties in this population, it would be important to investigate whether treatments developed for ADHD in nonadopted children are also effective for international adoptees, or whether different approaches would be more helpful.

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APPENDIX A
Assessment of Adoption Success Scale

How much do you agree or disagree with the following statements?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral/Not Sure</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adopting this child was the right decision.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>2. If I had to do it over again, I would.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>3. I am confident that I will be able to keep this child in my home until adulthood.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>4. Parenting this child has made me doubt my parenting ability. (REVERSE CODED)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>5. This child feels like my child.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>6. If close friends or relatives were considering adopting a child just like mine, I would advise them to do so.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>7. Raising this child is predominantly rewarding.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>8. This child’s affection for parents is consistent and genuine.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>9. This child prefers parents to other adults.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>10. This adoption is a success.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>