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To cite this article: Nora McCormick & Abbie Goldberg (11 Sep 2024): Social Competence, School Engagement, and School Performance Among US Children Adopted Through Private Domestic, International, and Foster Care Adoption, Adoption Quarterly, DOI: [10.1080/10926755.2024.2392735](https://doi.org/10.1080/10926755.2024.2392735)

To link to this article: <https://doi.org/10.1080/10926755.2024.2392735>



Published online: 11 Sep 2024.



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Social Competence, School Engagement, and School Performance Among US Children Adopted Through Private Domestic, International, and Foster Care Adoption

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ABSTRACT

We examined social competence, learning-related disorders, and school engagement in relation to grade point average (GPA) among three groups of children adopted by heterosexual and same-sex couples: 84 adopted privately, 29 internationally, and 20 from foster care. Structural equation modeling showed that increased school engagement predicts higher GPA, increased social competence predicts higher GPA via increased school engagement, and learning-related disorders predict lower GPA directly and via lower school engagement. Learning-related disorders had an equivalent or larger impact on GPA among children adopted privately than internationally or from foster care, potentially because diagnoses were made later. Learning needs should be considered regardless of adoption type.

ARTICLE HISTORY

Received 30 June 2023
Revised 8 January 2024
Accepted 9 August 2024

KEYWORDS

Adoption; school; early intervention; learning disorders; social competence

Introduction

Children who do not engage in school and complete a high school education are at risk for a number of events and circumstances that are associated with poorer quality of life, including under- or unemployment, living in poverty, incarceration, divorce or separation from a partner, early childbearing, and poor health (Koball et al., 2011; Morsy & Rothstein, 2015). Given the association between academic success and greater overall well-being, the National Institutes of Health have identified an urgent need to better understand academic outcomes among groups of children who tend to perform worse in school than the general population (National Institute of Child Health and Human Development, 2019). This includes adopted children, who are more likely than non-adopted children to have developmental concerns that can affect school performance, such as prenatal drug/alcohol exposure and preplacement physical and

socioemotional deprivation (Keyes et al., 2008; Nadeem et al., 2017; Prock et al., 2014).

According to a 2022 report by the National Council for Adoption, approximately 115,353 children were adopted in the United States in 2019 (94,793 excluding stepparent adoptions) and were adopted from the following contexts: 27% through private domestic adoptions, 70% through the U.S. foster care system, and 3% from outside the United States (Koh et al., 2022). This distribution is different from even a decade ago, when many more children were adopted from outside the United States (Vandivere et al., 2009). Historically, heterosexual couples adopted the majority of children, but same-sex couples are now up to seven times more likely to adopt children than heterosexual couples (S. K. Goldberg & Conron, 2018). Indeed, the number of adoptive homes with same-sex parents nearly doubled from 2000 to 2009 (Williams et al., 2014). In addition, female same-sex couples are more likely/open to adopt children via foster care and with special needs than either heterosexual or male same-sex couples (Gates et al., 2007; A. E. Goldberg, Tornello, et al., 2020). In turn, because of the high rates of adoption by same-sex couples (and especially of children with special needs), it is important to include same-sex adoptive families when studying academic outcomes.

Research on academic outcomes in adopted children has focused primarily on the comparison of adopted children and non-adopted children. Children are adopted within the United States via private domestic adoption, typically as newborns (i.e., adopted privately); via public domestic adoption (i.e., foster care); and from another country (i.e., internationally). Generally, adopted children are less engaged in school than their non-adopted peers (Harwood et al., 2013; National Household Education Surveys Program, 2016), but some work indicates that academic outcomes might vary depending on adoption type (Harwood et al., 2013). For example, children adopted internationally and from foster care tend to be adopted at older ages and to spend time in one or more caregiving situations (e.g., orphanages) prior to adoption. Such children have elevated levels of speech and language delays, learning disabilities, and attention-deficit/hyperactivity disorder (ADHD), all of which have been shown to affect school engagement and performance (Brown et al., 2017). Less is known about the academic performance of children adopted privately in the United States. A 2011 U.S. national survey of academic outcomes among adopted children showed that children adopted privately performed better in reading and in math than children adopted internationally or from foster care, but not at the level of non-adopted children (Bramlett, 2011). Yet little attention has been paid to how adoption type shapes

academic achievement or whether predictors of school performance may vary (i.e., be more or less salient) by adoption type.

Regarding predictors of academic functioning, longitudinal studies have demonstrated that low social competence, learning-related disorders, and a subsequent lack of engagement in school are all school-related dimensions that have been connected to poor academic outcomes (Hakkarainen et al., 2016). Broadly speaking, “learning-related disorders” refers to a set of problems interfering with the learning of academic and/or social skills (Pennington, 2009) that can create difficulties in adapting to society’s demands. Examples of learning-related disorders are verbal learning disabilities such as dyslexia; problems with executive functioning, such as ADHD; and nonverbal learning disabilities, such as dyscalculia (Hendriksen et al., 2007). In addition to being connected to poor academic outcomes, low social competence, learning-related disorders, and lack of school engagement reflect Vygotsky’s theory of cognitive development, which proposes that successful interaction among students and teachers (i.e., social competence) is paramount to school engagement and thus academic achievement, suggesting the need to account for learning-related disabilities because they disrupt learning (Vygotsky, 1978). Vygotsky’s theory of cognitive development has previously been used to guide research and school interventions among adopted children, specifically children adopted internationally. Drawing from his work, researchers have theorized that shared culture and understanding, learning abilities, and social abilities among adopted children, their teachers, and peers positively impacts school engagement and learning (Gindis & Lidz, 2022). Vygotsky’s work, in turn, stressed the importance of teaching based on a student’s zone of proximal development and ensuring, by tutoring if needed, that students were successfully building on their current level of understanding (Moll, 2013).

Research has often documented lower levels of social competence, school engagement, and academic performance and higher levels of learning disabilities among adopted children (Altarac & Saroha, 2007; Bramlett, 2011; Caprin et al., 2017; Sonuga-Barke et al., 2010; Vandivere et al., 2009), although some studies have not documented such differences (Glennen & Bright, 2005; Julian & McCall, 2016; Palacios et al., 2013; T. X. Tan & Camras, 2011). These inconsistent findings are likely due to the fact that adopted youth represent a diverse group, with varying levels of pre-adoptive risk factors that might impact their risk for poor academic performance, poor social skills, and learning disabilities. It is unclear how social competence, school engagement, learning disabilities, and academic performance may be different in the different populations of adopted children (e.g., do learning-related disorders impact academic outcomes differently among children adopted via private domestic, public domestic, and international adoption?).

This study attempts to fill these research gaps by using a mediation model to examine how social competence, learning-related disorders, and school engagement impact academic outcomes among U.S. adopted children and to determine whether the effects differ among children adopted through private domestic adoptions, from foster care, and internationally. Findings have implications for adoptive families and education professionals, potentially informing the tailoring of early childhood education to address children's specific needs and potential challenges.

Social competence and adoption

Social competence in childhood, expressed as the ability to build positive relationships and to behave effectively in social contexts, is often a powerful predictor of academic achievement (Lecce et al., 2017; Wentzel, 1991). It consists of several dimensions, including both interpersonal competence (i.e., behaviors that bring the child in close contact and communication with others) and self-regulatory processes (i.e., monitoring and regulating their behaviors toward others), both of which are required to build relationships and be successful in the school environment (Sheridan et al., 2010; Wentzel, 1991). Children with interpersonal and behavioral competence are more likely to engage with peers and teachers when they need help, participate in classroom activities, enjoy learning, and experience a positive transition as they move up in grade level, thus enhancing academic success (Raver & Knitze, 2002). Further, several cognitive skills involved in interpersonal and behavioral competence are also directly related to success in learning. These include the ability to understand that others have beliefs different from one's own and the ability to regulate one's behavior, abilities that facilitate the ability to participate in an activity like group reading (Blair & Razza, 2007; Cerda et al., 2014).

Early research about adopted children's social competence tended to focus on the comparison of adopted children versus non-adopted children (Palacios et al., 2013), while more recent research has aimed to account for the diversity among adopted children and thereby to explore differences in social competence and other outcomes by type of adoption. One consistent finding is that adopted children have a higher prevalence of problem behaviors than non-adopted children and, in particular, externalizing problems (e.g., behavioral challenges) as opposed to internalizing problems (e.g., depression, anxiety), which makes relationship-building (e.g., with peers and teachers) difficult (Askeland et al., 2017; Juffer & Van IJzendoorn, 2005). Research on adopted children's social skills and prosocial behavior, on the other hand, is inconsistent. Some studies, including one with children aged 8 to 14 years (Caprin et al., 2017), show that adopted children have lower levels of social skills than non-adopted children. One

longitudinal study of international adoptees, children in residential care facilities, and non-adopted children showed that in children aged between 4 and 8 years, there were no significant differences between international adoptees and their community peers in terms of social skills (Palacios et al., 2013); however, by a mean child age of 11, teachers reported a significant decrease in social skills and quality of peer relationships in the adopted group (Cáceres, Moreno, et al., 2021; Cáceres, Román, et al., 2021). Other studies have found higher levels of social skills among adopted children (T. X. Tan & Camras, 2011).

The discrepancies in the literature may be due both to methodological differences across studies as well as differences in sample characteristics. Regarding methodological differences, “social competence” may be measured differently across studies; for example, in some, the focus is on social skills (T. X. Tan & Camras, 2011), while others focus on trouble with peers (Sonuga-Barke et al., 2010). One meta-analysis of peer relationship in adopted children found that while adopted children had more trouble forming friendships as compared to non-adopted children, once the relationships were established, they were just as “close” as the friendships formed by non-adopted children (DeLuca et al., 2019). Regarding sample differences, older age at adoption and pre-adoption adversity (e.g., neglect, multiple placements) have been linked to greater social difficulties (Soares et al., 2019; T. X. Tan et al., 2020)—characteristics that are more common among children adopted via foster care or internationally than via private domestic adoption. To this point, where differences in social competence have been documented among internationally adopted children, children adopted from Asian countries such as China and South Korea typically fare better because these children have typically only lived in a single setting—family-based foster care—prior to their adoption (T. X. Tan et al., 2020). The Bucharest Early Intervention Project (BEIP) similarly found that among Romanian orphans, those who were placed in foster families—as opposed to remaining in an institutional setting with less one-on-one care—had better psychosocial outcomes, including social competence, over time (Nelson et al., 2014). Related to the BEIP findings, parent-child relationships have also been shown to impact social competence. A study of adopted children in middle childhood showed that having unsupportive parents exacerbated the effects of preadoption parental neglect on their social skills (Soares et al., 2019). Further exploration showed that having fathers who exhibited unsupportive parenting was associated with higher negative reactivity in children, which in turn was associated with lower levels of social skills (Soares et al., 2023).

To date, research on the impact of social competence on adopted children’s school outcomes has focused on their comfort with being adopted

(e.g., disclosing their adoption status, dealing with insensitive comments about adoption), their motivation and behavior in school, and their peer relationships (Dalen et al., 2020; Soares et al., 2017). Social competence has not yet been studied in relationship to their scholastic achievement, including grades, although existing work indicates that social competence impacts achievement through the ability to engage successfully with teachers and peers (Dalen et al., 2020).

Learning-related disorders and adoption

Learning-related disorders are another component related to school success that are more prevalent in adopted children than in non-adopted children (Altarac & Saroha, 2007). Learning-related disorders are associated with multiple cognitive weaknesses, particularly in the domain of executive functioning, which encompasses three core skills: inhibitory control, working memory, and cognitive flexibility (Diamond, 2013; Miyake et al., 2000). Lack of these skills and the inability to pay attention can affect children's success in school starting as young as preschool (Razza et al., 2012).

Adopted children are more likely to have learning-related disorders than non-adopted children. The lifetime prevalence of a learning disability in U.S. children is 9.7%, compared to 20.4% in the subset of children who are adopted (Altarac & Saroha, 2007). Further, 11% of non-adopted students have had a diagnosis of attention deficient disorder (ADD) compared to 36% of adopted students, and 6% of non-adopted students have had a diagnosis of a more specific learning-related disorder compared to 23% of adopted students (National Household Education Surveys Program, 2016). Learning-related disorders could be more common among adopted children due to early-life stressors (e.g., prenatal substance exposure and stimulus deprivation) (Prock et al., 2014). Early psychosocial deprivation has been shown to have a direct impact on executive functioning (Kopetz et al., 2019).

Most of the work on learning-related disorders in adopted children has focused on internationally adopted children, many of whom experienced at least part of their early lives in orphanages. Internationally adopted children (and any child adopted "late" post-infancy, including via foster care) often experience language-based delays and deficits (Helder et al., 2016; Rygvold & Theie, 2016); learning disabilities (Raaska et al., 2012), including executive dysfunction (Helder et al., 2016); and compromised academic functioning (Brodzinsky et al., 1984; Helder et al., 2016), all of which have been linked to poorer school performance (Brown et al., 2017). Relatively little research has examined the cognitive and academic functioning of children adopted domestically, either through foster care or private adoption (Harwood et al., 2013; Vandivere & McKlinton, 2010).

This is problematic given evidence that children adopted privately or through foster care in the United States can have higher rates of problems that could affect their learning in school than non-adopted children (e.g., exposure to physical abuse, emotional neglect, cognitive delays) (A. E. Goldberg, Frost, et al., 2020). Among privately adopted children, however, learning-related disorders may be identified later in life because their adoptive parents do not expect them as readily as parents adopting internationally or from foster care (A. E. Goldberg et al., 2023), who have often been counseled to “look out” for such problems (A. E. Goldberg, Frost, et al., 2020). In fact, one reason that prospective adoptive parents pursue private adoption of newborns is the perceived lower likelihood of later problems (Downing et al., 2009). Unfortunately, failure to identify learning problems is to the child’s detriment, given that early versus late diagnosis of learning-related disorders (e.g., at 8 vs. 14 years) is linked to greater perceived academic competence and better school performance (Battistutta et al., 2018).

Two known studies have examined cognitive and academic functioning of children adopted privately and domestically. Using data from the 2007 National Association of Adoptees and Parents (NASP) on children adopted via private domestic adoption, from foster care, and internationally, Harwood et al. (2013) it was observed that children adopted from foster care were more likely to be identified with special healthcare needs¹ and that internationally adopted children on average performed more poorly in reading and math. They determined that the presence of special healthcare needs and the quality of parent–child relationships had a mediating role on adopted children’s academic outcomes, but they did not look at learning-related disorders specifically, social competence, or school engagement. Vandivere and McKlindon (2010) also used data from NASP and found that children adopted via private domestic adoption had better health and school performance and fewer instances of ADD/ADHD diagnoses compared to children adopted from foster care. They posited that these differences were in part due to pre-adoption adverse experiences among children adopted via foster care. A 2022 survey of parents in the United States similarly found that post-adoption, 41% of children adopted from foster care, 22% of children adopted internationally, and 17% of children adopted privately received a ADD or ADHD diagnosis (Hanlon & Quade, 2022).

School engagement and adoption

School engagement is considered a multidimensional construct composed of behavioral engagement (i.e., the extent to which children participate in learning activities and nonacademic activities in school, attend school, and

display positive conduct), emotional engagement (i.e., the extent to which children feel connected at school and identify with school), and cognitive engagement (i.e., the extent to which children regulate their own learning and use metacognitive learning strategies) (Fredricks et al., 2004). Longitudinal research has shown that, on average, behavioral, emotional, and cognitive engagement in school decrease over time, but at different rates, with the emotional dimension declining the most (Wang & Eccles, 2012). Yet the three types of engagement are differentially related to academic outcomes. Children's relationships with teachers and peers affect their behavioral engagement in school (De Laet et al., 2015), and a lack of behavioral engagement has been linked to increased risk for academic failure, including a worse grade point average (GPA) (Casuso-Holgado et al., 2013; Chen et al., 2020; Virtanen et al., 2014). Emotional engagement is predictive of academic success in early years, whereas older students can become emotionally disengaged with school and still attain academic success (Wang & Peck, 2013). Studies of cognitive engagement and academic achievement have yielded mixed results, in part due to measurement validity issues (Wong et al., 2024). Yet generally, increased cognitive engagement is predictive of greater learning in school because cognitive engagement facilitates students' learning of complex material (Wang & Eccles, 2012; Wong et al., 2024).

Social competence and learning-related disorders are both integral to school engagement. Social competence facilitates both peer acceptance and high levels of teacher support, which predict greater engagement in school as well as with better academic outcomes (De Laet et al., 2015). Meaningful participation in class discussion and asking for help are tasks that require social competence and facilitate learning (Sahil & Hashim, 2011). Starting in elementary school, students with learning and behavior problems and students with poor teacher relationships are more likely to not engage with or disengage from and do poorly in school (Archambault & Dupéré, 2017; Brekke et al., 2023).

Research on school engagement among adopted children is limited. The few findings that exist show that adopted children tend to be less engaged than non-adopted children (Vandivere et al., 2009), but the researchers rarely distinguish by adoption type. Most existing research has explored social engagement in children adopted from foster care or in adopted children with adverse childhood and/or family experiences (Kasehagen et al., 2018; Pears et al., 2013) which, in non-adopted samples, have been linked to greater difficulties in school (Geenen & Powers, 2006). The effect of adverse experiences on school functioning may look different among adopted children, such as those adopted from foster care or institutional settings, because of the potentially mitigating impact of their adoptive environment (Van IJzendoorn & Juffer, 2005). To this point, children in

foster care who feel secure in their adoptive home are more engaged in school than those who do not, highlighting the potential diversity in engagement outcomes as a function of the caregiving environment (Mihalec-Adkins et al., 2020). The limited work on internationally adopted and privately adopted children in the United States shows that they tend to be more engaged in school than children adopted from foster care (Vandivere & McKlindon, 2010). Yet there may be unexplored meaningful differences within or across children adopted internationally and privately domestically.

The present study

The current study examines whether and how social competence, learning-related disorders, and school engagement impact academic success in children adopted by heterosexual and same-sex couples and then whether their effects on academics varies as a function of adoption route: privately and domestically, through foster care, and internationally. Learning-related disorders, reduced social competence, and reduced school engagement are potential factors that can hinder adopted children in school, but it is unclear how these factors operate alone and in tandem to impact academic performance—a predictor of later life successes. In addition, it is unclear how they may impact children adopted from outside the United States, from foster care, and from private domestic adoptions differently, even though some data suggest they do (Harwood et al., 2013). For example, the types of learning-related disorders or the timing of their diagnosis (early vs. late in life) may be different for children adopted through different contexts. ADHD is more common among children adopted from foster care and internationally than children adopted privately, but among children adopted privately, it may be diagnosed much later because their parents do not readily recognize it (e.g., based on expectations that adoption in infancy is associated with fewer problems later on) (Downing et al., 2009). The result could be that such learning-related disorders are more impactful on school outcomes for one group of adopted children versus another. This distinction is particularly important for educators in order to ensure that school-based learning interventions are as targeted as possible.

This study aimed to fill these research gaps by using structural equation modeling (SEM) to test a mediation model of academic performance among adopted children, and then test for group differences by running the same model among children adopted through private domestic adoptions, from foster care, and internationally. Specifically, drawing upon existing literature (e.g., Archambault & Dupéré, 2017; Brekke et al., 2023; Casuso-Holgado et al., 2013; Chen et al., 2020; Hakkarainen et al., 2015,

2016; Raver & Knitze, 2002; Virtanen et al., 2014), we tested the following hypotheses regarding the relationship of school engagement, social competence, and learning-related disorders in relation to GPA:

- H1: Increased school engagement predicts higher GPA (direct effect).
- H2: Increased social competence predicts higher GPA via increased school engagement (indirect effect).
- H3: The presence of learning-related disorders predicts lower GPA via lower school engagement (indirect effect).

In terms of group differences by adoption type, we ran exploratory analyses to determine whether:

- E1: The positive effects of social competence on school engagement would differ among the three groups of adopted children.
- E2: The deleterious effects of learning-related disorders on school engagement would be different among the three group of adopted children.

Research has established that children adopted by heterosexual and same-sex couples perform similarly in school, particularly when the families have similar financial resources (Mazrekaj et al., 2020; Rosenfeld, 2010). Factors such as parental stress, parent-child relationships, and preschool-age difficulties have been shown to be what impacts adopted children's psychosocial functioning when they reach school age—not their parent's sexual orientation (Costa et al., 2021; Farr, 2017). Yet at the same time, there is evidence that some same-sex couples, particularly same-sex female couples, are more willing to adopt "difficult-to-place" children who experience higher rates of problem behaviors that can impact their performance in school (Costa et al., 2021). Thus, we conducted exploratory analyses comparing the children of female same-sex, male same-sex, and heterosexual couples amid differences in financial resources and willingness to adopt children with special needs across these three groups. Specifically, gay men tend to be the least willing to adopt children with special needs, and men generally appear to have a more difficult time than women accepting different academic outcomes among their children than their own (A. E. Goldberg et al., 2021; A. E. Goldberg & Byard, 2020), both of which could moderate the effects of social competence and learning-related disorders on academic outcomes.

Method

Participants

Data for the present study came from 133 adoptive families of school-aged children who were assessed approximately 8 years after the couple was placed with their adopted child. The data were from this single time point.

The sample included 43 lesbian couples, 33 gay male couples, and 57 heterosexual couples. Most of the parent sample identified as White (92%), while the majority of the children were identified by their parents as non-white or of color (66%). Among privately adopted children, 41 (49%) identified as White, 26 (31%) were multiracial, 9 (11%) as Latinx, and 8 (10%) as Black. Among the children adopted from foster care, five (25%) identified as White, six (30%) as multiracial, six (30%) as Latinx, and three (15%) as Black. Among internationally adopted children, 18 (62%) identified as Asian, 8 (28%) as Latinx, 2 (7%) as Black, and 1 (3%) as multiracial; none were White. Nine of the 18 international Asian adoptees were Chinese (50%), 3 were Vietnamese (16.7%), 2 were Taiwanese (11.1%), and 1 each were Filipino, Korean, Kyrgyz, and Nepalese. All eight of the Latinx international adoptees and the multiracial adoptee were Guatemalan. One of the international Black adoptees was Ethiopian, and the other was South African.

The sample of parents was well educated (more than 90% had a college education or more) and affluent. The mean (SD) and median family income were \$157,557 (\$103,568) and \$140,000, respectively. At the time of the study, the mean (SD) age of parents was 47 (5) years (range: 37–62 years), while the mean age of the children was 9 (1) years (range: 7–14 years). Among the gay father families, the mean (SD) family income was \$241,182 (\$24,892), which was statistically significantly greater than both the lesbian mother families' (\$114,860 [\$8,036]) and the heterosexual parent families' (\$141,352 [\$10,025]) ($p < .001$).

The majority of children were in lower school (i.e., first through fifth grade; 93%, while the rest were in middle school (i.e., sixth through eighth grade; 7%). A little less than half (47%) of the children had learning-related disorders and, among those with learning-related disorders, 56% had either ADD or ADHD. The remainder were reported by their parents to have executive dysfunction, dyslexia, hearing and speech delays, sensory processing disorders, and unspecified learning disabilities and disorders. Characteristics of the sample broken out by adoption type are shown in [Table 1](#). The sample reflects similar characteristics to the 2007 NASP (Vandivere et al., 2009).

Recruitment

Data come from a larger, longitudinal study, launched in 2005, of the transition to adoptive parenthood among gay, lesbian, and heterosexual couples (A. E. Goldberg & Smith, 2011). Inclusion criteria for the original study were as follows: couples must be adopting their first child and both partners must be becoming parents for the first time. Participants were originally recruited before the adoption. U.S. census data were used to identify states with a high percentage of same-sex couples (Gates & Ost,

Table 1. Descriptive Statistics and Covariances for Variables Considered for the Path Model of Academic Performance.

Variable	Private (N = 84)		International (N = 29)		Foster care (N = 20)		1	2	3	4	5	6	7	8
	M (SD)	N (%)	M (SD)	N (%)	M (SD)	N (%)								
1. Social competence	2.22 (.69)	41 (49%)	2.46 (.86)	12 (60%)	1.96 (.86)	12 (60%)	—	—	—	—	—	—	—	—
2. Has a learning disability	3.32 (.60)	3.39 (.55)	3.39 (.73)	3.05 (.73)	3.05 (.73)	3.05 (.73)	-.0279**	—	—	—	—	—	—	—
3. School engagement	3.25 (.75)	3.58 (.52) ^a	3.58 (.52) ^a	3.08 (.79) ^b	3.08 (.79) ^b	3.08 (.79) ^b	.652***	-.0401***	—	—	—	—	—	—
4. GPA	41 (49%)	15 (52%) ^a	15 (52%) ^a	9 (45%)	9 (45%)	9 (45%)	.348***	-.0420***	.563***	—	—	—	—	—
5. Female	44 (52%) ^a	29 (100%) ^b	29 (100%) ^b	15 (75%)	15 (75%)	15 (75%)	.206*	-.0144	.278**	.080	—	—	—	—
6. Non-White	\$175,203 (\$120,801)	\$134,828 (\$56,517)	\$134,828 (\$56,517)	\$116,400 (\$46,001)	\$116,400 (\$46,001)	\$116,400 (\$46,001)	.230**	-.0085	.154	.227*	-.0032	—	—	—
7. Family income	.07 (.36) ^a	1.28 (.83) ^b	1.28 (.83) ^b	2.18 (2.2) ^c	2.18 (2.2) ^c	2.18 (2.2) ^c	.027	.045	.035	-.0071	.036	-.0069	—	—
8. Age at adoption (years)							-.0060	-.0061	-.0083	-.0011	-.0021	.175*	-.0182*	—

Note. For tests of differences between groups (either one-way analysis of variance for Chi-square test), superscript letters denote where there are significant differences ($p < .05$) between groups.

GPA = grade point average.

* $p < .05$, ** $p < .01$, *** $p < .001$ for tests of the strength of the correlation between variables.

2004); effort was made to contact agencies in those states. More than 30 agencies provided information to clients and then couples contacted the principal investigator for details. Initially, participants completed a questionnaire and telephone interview before and 3 to 4 months after they were placed with a child and were subsequently interviewed and/or completed a questionnaire at seven subsequent time points. All data are in reference to the couple's first adopted child. Participants signed consent forms at each stage of data collection. The study was approved by Clark University's internal human subjects review board.

Measures

All data were collected from parent reports. The data for this particular study were collected 8 years postadoption. In instances where both parents reported data, we confirmed that our results did not change no matter which parents' data we used.

Social competence

Social competence was assessed using the 12-item Social Competence Scale–Parent Version that assesses a child's prosocial behaviors (behavior that benefits others), communication skills, and self-control. The scale was created for the Fast Track Project, an intervention study examining components of antisocial development across 10 years of childhood among children at risk for conduct disorders, and it has been widely used (Dodge et al., 2015). To our knowledge, this scale has not been used or validated among adopted children but was selected based on its excellent psychometric properties (Conduct Problems Prevention Research Group, 1999) and its wide use in studies of youth's experiences with family and school (e.g., Miller-Johnson et al., 2002; Mills-Koonce et al., 2022; Penderi & Petrogiannis, 2018). Each item on the scale states a behavior that a child may display in a social setting, and parents assess how well each statement describes their child using a 5-point Likert scale (range: 0 [not at all] to 4 [very well]). Examples of statements include "Your child can give suggestions and opinions without being bossy" and "Your child can calm down when excited or all wound up." The total score is calculated as the mean of responses. The Cronbach's alpha for social competence was .92.

Learning-related disorders

The presence of learning-related disorders was assessed using questions informed by the Services Assessment for Children and Adolescents (SACA-C), which was also developed for the Fast Track Project by researchers at the National Institute of Mental Health (Fast Track Project, 2010).

The SACA-C assesses the frequency, duration, type, and cost of mental health and social services associated with a child's behavior, substance abuse, and delinquency. In the current study, parents were given the following prompt: "We are interested in learning about any help or services that your child has received for developmental delays or difficulties (e.g., speech impairment, learning-related disorders) as well as behavioral difficulties (e.g., intense emotions), emotional difficulties (e.g., shyness), and social difficulties (e.g., problems with peers)." Parents were then prompted to list any such difficulties their child had experienced along with (1) whether they had received an official diagnosis for the issue; (2) if so, what the diagnosis was; and (3) what, if any, type of support, intervention, or treatment the child had received for the issue. From these data, ongoing learning-related disorders were identified and represented as a binary (yes/no) variable. Parents did not provide data on the timing of the diagnosis (i.e., whether it was present at the time of adoption or later) or on the severity of the disorder, but they did indicate whether their child received services for their learning-related disorder (yes/no). To our knowledge, the measure has not been validated among adopted children but was deemed applicable to the adopted population given its excellent psychometric properties (Horwitz et al., 2001), as well as the fact that adopted youth represent a group at risk for learning disorders (Altarac & Saroha, 2007).

School engagement

School engagement was measured using the 16-item School Engagement Scale for parents (Fredricks et al., 2004, 2006). Parents were asked the degree to which they agreed or disagreed with items such as, "My child follows the rules at school" (behavioral engagement), "My child pays attention in class" (cognitive engagement), and "My child feels happy in school" (emotional engagement). Responses ranged from 1 (strongly disagree) to 5 (strongly agree). The Cronbach's alpha for school engagement was .91. To our knowledge, this measure has not been validated among adopted children but was deemed appropriate given its excellent psychometric properties, broad use, and application to a broad range of children, adolescents, and parents (Fredricks et al., 2004, 2006; Padilla-Walker et al., 2012).

School performance

School performance was measured via children's school grades. While we used parent-reported GPAs as an approximation of children's academic performance, it should be noted that the use of GPAs is uncommon in elementary school; rather, math and reading grades are more

commonly used to evaluate overall performance (Moser et al., 2012). As guided by previous research on children's grades based on parent report (E. Tan & Goldberg, 2009), parents were asked for each of four subjects (English, Math, Science, Social Studies) to indicate the grade category that best matched their child's performance that year: mostly A's (4 points), mostly B's (3 points), mostly C's (2 points), and mostly D's (1 point). The GPA was calculated as a mean of the four individual subject scores.

Analyses

Tests of mean differences (one-way analysis of variance with post hoc testing) as well as differences in proportions (Chi-square) were run on all variables of interest across the three groups of adopted children to better understand the sample, with statistically significant differences assessed based on an $\alpha < .05$. The proportion of children with learning-related disorders was not statistically significantly different by group, and there was an approximately equal number of girls and boys in each group. Children adopted internationally had statistically significantly higher GPAs than those adopted from foster care. The difference in age at adoption was statistically significantly different among all three groups, with children adopted from foster care having the highest mean (SD) [median] age of 2.18 (2.18) [1.5] years at adoption versus 1.28 (.83) [1.0] years for children adopted internationally and .07 (.36) [0] years for children adopted privately. Intercorrelations for all variables of interest are reported in [Table 1](#).

All models were analyzed using RStudio version 3.6.2. Path analysis within a SEM framework was chosen because it allowed us to assess model fit and examine direct and indirect effects, as well as group differences (Kline, 2016). Our sample size was deemed large enough to detect statistically significant paths given the ratio of observations to estimated parameters (Bentler & Chou, 1987; Kline, 2016; Schreiber et al., 2006); however, newer research shows that sample size requirements are sensitive to multiple factors, such that future research may need to consider larger samples (Wolf et al., 2013). Control variables considered for inclusion were child gender, child age at adoption, and parent income; however, only child gender was included in the model because in an exploration of bivariate analyses, only child gender was statistically significantly related to any of the variables of interest ($p < .05$) (see [Table 1](#)). The inclusion of child gender supports much prior research demonstrating the stable female advantage in school (Voyer & Voyer, 2014). We also confirmed that our final models did not change meaningfully if child age and parent income were included, which supported our decision to exclude them based on the bivariate analyses.

The final model of academic performance was tested for children adopted from private domestic adoptions (i.e., adopted privately), from foster care, and internationally and using a multi-group analysis. Child race was not controlled for, given that all children adopted internationally and most children adopted through foster care were of color, but it was considered in a sub-analysis within only the children adopted privately, of whom 48% were White and 52% were of color. This sub-analysis enabled us to consider the potential confound of race on our results. Several fit indices, including the Chi-square statistic, the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the standardized root mean square residual (SRMR), were used to assess our model of academic performance. Good model fit was assessed by using conventional cutoff scores for each model fit index as follows: a non-significant Chi-square statistic (meaning that the data support the proposed hypotheses/model), an RMSEA lower than .08, a CFI larger than .90, and an SRMR lower than .05 (Kline, 2016). RMSEA, CFI, and SRMR values outside these cutoffs would indicate that the proposed model is not supported by the data (i.e., is “mis-specified”) and alternative hypotheses/paths would have to be considered. An RMSEA of 0, CFI of 1, and SRMR of 0 would indicate a “perfect” or better fit, meaning that the proposed model perfectly explains the data and no other hypotheses or relationship need be considered.

Missing data ranged from 0% to 3.6%. The results for Little’s missing completely at random test were nonsignificant, $\chi^2(6, N=133) = 2.97, p = .812$, indicating the data were missing completely at random. As recommended by Enders and Bandalos, (2001) full-information maximum likelihood was used to estimate parameters in this model by using the imputed values of the missing data to calculate parameter estimates. Indirect effects were assessed using 95% bias-corrected confidence intervals using bootstrapping. As recommended (Preacher & Hayes, 2008), we requested 5,000 bootstrapped samples.

Results

Direct and indirect effects of the structural model for all adopted children

The effects of learning-related disorders, social competence, and school engagement on GPA were examined while controlling for the effects of child gender. First, the saturated structural model was run and had perfect fit, as expected. Second, the hypothesized model was run and was a statistically significantly worse fit to the data than the saturated model, $\chi^2(3, N=133) = 11.85, p = .008$, RMSEA = .149, 95% CI [.067, .243], CFI = .943, SRMR = .067. In other words, our hypothesized model was incorrect.

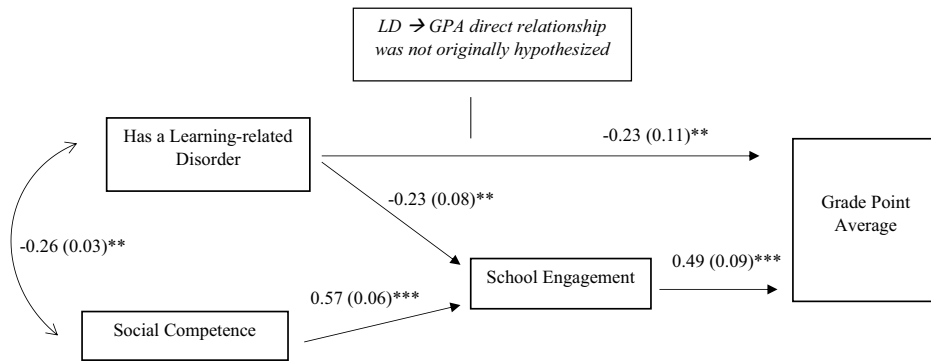


Figure 1. Results for the academic performance model for all adoptees.

Note. Standardized coefficients are shown with standard errors in parentheses. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 2. Parameter Estimates, Standard Errors, and Confidence Intervals for the Indirect Effects of Academic Performance ($N = 133$).

Indirect effects	β	SE	BC CI [LL, UL]
Social competence \rightarrow School engagement \rightarrow GPA	.28***	.06	[0.18, 0.39]
Learning disability \rightarrow School engagement \rightarrow GPA	−0.16**	.05	[−0.27, −0.06]

Note. B = standardized estimate; SE = standard error; BC CI = bias-corrected confidence intervals; GPA = grade point average; LL = lower limit; UL = upper limit.

** $p \leq .01$. *** $p \leq .001$.

Inspection of the saturated versus hypothesized model in tandem with knowledge of the literature prompted us to re-specify our hypothesized model with a direct path added between learning-related disorders and GPA. This path was supported by research showing that some learning disabilities impact GPA beyond their impact on school engagement (Brekke et al., 2023; Sunde et al., 2022). A direct path from social competence to GPA was not supported (i.e., was not statistically significantly related to GPA). The final model (our originally hypothesized model with the addition of a direct path from learning-related disorders to GPA; see Figure 1) was a very good fit to the data and was not statistically significantly different from the fully saturated model, $\chi^2(10, N = 133) = 2.67, p = .263$, RMSEA = .050, 95% CI [.000, .188], CFI = .996, SRMR = .044. It was also a statistically significantly better fit than the hypothesized model $\Delta \chi^2(1, N = 133) = 9.18, p = .002$.

In the final model, all hypothesized paths were significant, as well as the direct path from learning-related disorders to GPA (see Figure 1 for all direct effects using standardized path estimates). School engagement positively predicted GPA (H1). Consistent with H2 and H3, indirect effects showed that social competence positively predicted GPA through school engagement ($\beta = .28, SE = .06, 95\% \text{ CI } [0.018, 0.39]$), and the presence of learning-related disorders negatively predicted GPA through school engagement ($\beta = -0.16, SE = .05, 95\% \text{ CI } [-0.27, -0.06]$) (see Table 2 for indirect effects). Unexpectedly, learning-related disorders also had a

statistically significant direct effect on GPA (i.e., learning-related disorders affect children independent of and beyond how much they are able to engage in school).

Comparisons of children adopted from private domestic adoptions, from foster care, and internationally

Next, we investigated group differences by adoption type. The unconstrained model in which each structural path was allowed to vary was analyzed, and this model showed acceptable fit, $\chi^2(6, N=133) = 11.70$, $p = .069$, RMSEA = .146, 95% CI [.000, .271], CFI = .960, SRMR = .052. We observed across the three groups that the paths between learning-related disorders and school engagement and between learning-related disorders and GPA were no longer statistically significant among children adopted internationally and children adopted through foster care. The same direct paths were highly significant among the children adopted through private domestic adoption. The direct paths between social competence and school engagement and between school engagement and GPA remained highly significant across the three groups ($p < .001$). Based on these observations, we constrained all but the paths from learning-related disorders to school engagement and to GPA, and this partially constrained model showed equivalent or better fit than the unconstrained model, $\chi^2(14, N=133) = 20.18$, $p = .125$ (a non-significant χ^2 indicates good model fit), RMSEA = .100, 95% CI [.000, .189], CFI = .963, SRMR = .066 (still less than $<.08$), and the two models were not statistically different from one another, $\Delta \chi^2(8, N=133) = 8.48$, $p = .389$. Because the partially constrained model demonstrated equivalent or better fit and is more parsimonious than the unconstrained model (and is equivalent statistically), this model was interpreted. The standardized path estimates from the unconstrained and final partially constrained model are shown in Table 3.

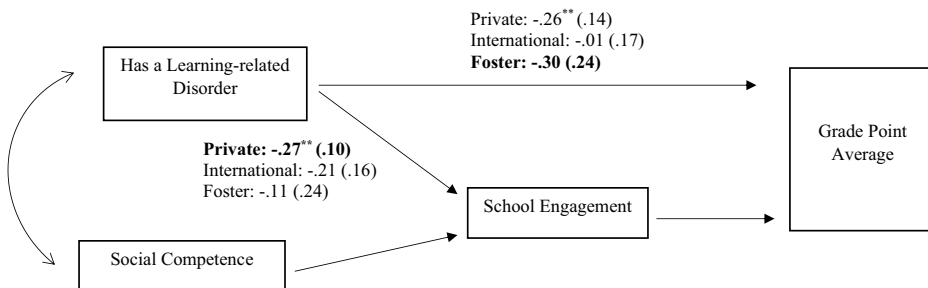
Regarding our first exploratory analysis (E1), the multi-group analysis showed that the effects of social competence on GPA do not meaningfully vary among children adopted internationally, from foster care, and from private domestic adoptions. Regarding our second exploratory analysis (E2), the multi-group analysis showed that learning-related disorders have an equivalent or even greater impact on GPA among children adopted through private domestic adoption as compared to children adopted internationally or from foster care. For example, the standardized path estimate from learning-related disorders to school engagement for children adopted from foster care ($\beta = -0.11$, $SE = .24$, $p = .525$) was not statistically significant and was smaller than the same path among children adopted privately ($\beta = -0.27$, $SE = .10$, $p = .001$), Wald's $\chi^2(1) = .048$, $p = .490$.

Table 3. Standardized Path Coefficients and Correlations for Models Predicting Academic Performance ($N=133$).

Path	Unconstrained						Final (only learning disability paths vary)					
	Private		International		Foster care		Private		International		Foster care	
	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE
Social → Engage	.55***	.07	.51***	.11	.60***	.15	.54***	.06	.59***	.06	.58***	.06
LD → Engage	−0.28***	.10	−0.14	.17	−0.10	.24	−0.27**	.10	−0.21	.16	−0.11	.24
Engage → GPA	.41***	.13	.61***	.17	.75***	.17	.45***	.09	.59***	.09	.57***	.09
LD → GPA	−0.27***	.15	−0.12	.19	−0.21	.23	−0.26**	.14	−0.01	.17	−0.30	.24
Correlation: Social/LD	−0.32**	.04	−0.03	.06	−0.22	.09	−0.32**	.04	−0.03	.06	−0.22	.09

Note. Social = social competence; engage = school engagement; LD = learning disability; GPA = grade point average.

* $p < .05$, ** $p < .01$, *** $p < .001$.

**Figure 2.** Results of the final partially constrained academic performance model by adoption type; learning-related disorder paths vary.

Note. Standardized coefficients are shown with standard errors in parentheses. * $p < .05$, ** $p < .01$, *** $p < .001$. Bold text identifies the group with the largest effect size of the impact of learning-related disabilities on school engagement and on grade point average, respectively. The differences in effect size among groups, however, were not statistically significant, likely due to lack of power. All parameter estimates for the model are shown in Table 3 under the "Final" column.

Similarly, the standardized path estimate from learning-related disorders to GPA for children adopted internationally ($\beta = -0.01$, $SE = .18$, $p = .953$) was not statistically significant and was smaller than the same path among children adopted privately ($\beta = -0.26$, $SE = .14$, $p = .006$), Wald's $\chi^2(1) = 2.72$, $p = .099$ (see Figure 2 for the standardized path estimates of the effects of learning-related disorders for the three adoption types). There was also no evidence of indirect effects of learning-related disorders on GPA among the children adopted internationally and from foster care ($p \geq 0.34$) while there was in the group of children adopted privately ($p = 0.01$). Although the differences in individual learning-related disorder paths in these examples were not statistically significant among groups, this was likely due to a lack of power given the difference in the size of the estimates.

Of note is that the size of the standardized estimates of the direct effect of learning-related disorders on GPA were similar for children adopted

privately ($\beta = -0.26$, $SE = .14$, $p = .006$) and from foster care ($\beta = -0.30$, $SE = .24$, $p = .070$). One reason this path may not have reached statistical significance for children adopted from foster care may be a lack of power. But this similarity in estimates between children adopted privately and those adopted from foster care still supports our overall conclusion that children adopted privately are equivalently or even more greatly impacted by learning-related disorders as compared to children adopted from foster care or internationally. This may in turn be connected to a relative lack of assistance privately adopted children were receiving in school for their disorders: Only 78% of privately adopted children were receiving school services for their disorders, as compared to 83% of children adopted from foster care and 100% of children adopted internationally.

Follow up analyses on privately adopted children and on the impact of race

In a sensitivity analysis comparing children adopted privately and domestically to all other children (i.e., children adopted internationally and from foster care grouped together), the learning-related disorder paths continued to be nonsignificant in the foster care and internationally adopted groups.

To ensure that the observed trends were actually related to adoption type and not to race (since all internationally adopted children and the majority of children adopted from foster care were of color), we ran a multi-group analysis of the final partially constrained model among privately adopted children of color and then among privately adopted children who were White. In these two models, all the learning-related disorder standardized path estimates were similarly sized and statistically significant, meaning that the decreased impact of learning-related disorders among children adopted internationally and from foster care appears to be unrelated to race ($p < .05$). In other words, the deleterious effect of learning-related disorders is equally impactful on children adopted privately regardless of whether they are White or of color.

Exploratory analyses based on family type

As expected from the literature, the mean GPAs of children of heterosexual ($M = 3.37$, $SD = .64$, $Mdn = 3.50$), gay father ($M = 3.20$, $SD = .82$, $Mdn = 3.50$), and lesbian mother families ($M = 3.27$, $SD = .75$, $Mdn = 3.50$) were statistically equivalent, $F(2, 132) = 0.66$, $p = .518$. Exploratory analyses showed that children of lesbian mothers ($N = 43$) were more impacted by learning-related disorders as compared to children of heterosexual ($N = 57$) and gay father families ($N = 33$). For example, the standardized path estimate from learning-related disorders to school engagement for children adopted by lesbian mothers ($\beta = -0.29$, $SE = .12$, $p = .004$) was larger and statistically

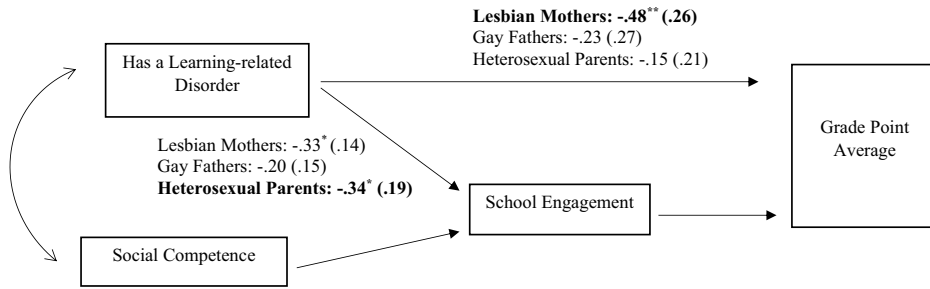


Figure 3. Results of the final partially constrained academic performance model by family type among privately adopted children; learning-related disorder paths vary.

Note. Standardized coefficients are shown with standard errors in parentheses. * $p < .05$, ** $p < .01$, *** $p < .001$. Bold type identifies the group with the largest effect size of the impact of learning-related disabilities on school engagement and on grade point average, respectively. The differences in effect size among groups, however, were not statistically significant, likely due to lack of power.

significant as compared to the same path among children adopted by gay fathers ($\beta = -0.15$, $SE = .16$, $p = .248$), Wald's $\chi^2(1) = 0.60$, $p = .440$.

Further analysis showed that the impact of learning-related disorders on GPA among children adopted by lesbian mothers was true regardless of adoption type but was strongest among the privately adopted children of lesbian mothers (LD \rightarrow school engagement: $\beta = -0.33$, $SE = .14$, $p = .012$; LD \rightarrow GPA: $\beta = -0.48$, $SE = .26$, $p = .002$). Only the path between learning-related disorders and school engagement was statistically significant among privately adopted children of heterosexual parents (LD \rightarrow school engagement: $\beta = -0.34$, $SE = .19$, $p = .011$) and neither learning-related disorder path was statistically significant among privately adopted children of gay fathers (see Figure 3 for the standardized path estimates of the effects of learning-related disorders for the three family types among privately adopted children). Thus, the privately adopted children of lesbian and heterosexual couples are driving our main finding that children adopted privately are more impacted by learning-related disorders than children adopted from foster care or internationally. Interestingly, 90% of privately adopted children of lesbian parents were receiving services for the disorder in school, compared to 78% of privately adopted children of gay fathers and 69% of privately adopted children of heterosexual parents, potentially indicating greater severity of disorders among privately adopted children of lesbian parents and late diagnosis among privately adopted children of heterosexual parents (and thus more of a negative impact on their learning).

Discussion

The purpose of the present study was to investigate a mediation model of school performance as measured by GPA, with special attention paid

to the role of social competence, learning-related disorders, and school engagement, among adopted children in the United States broadly. It was then assessed among children adopted from three different contexts: through private domestic adoptions, from foster care, and internationally. Of note is that, overall, there were no significant differences in mean GPA between children adopted privately (3.25) and children adopted from foster care (3.08) or internationally (3.58); however, children adopted internationally had a statistically significantly higher mean GPA than children adopted through foster care.

Main findings

Controlling for child gender, the final model showed that the impact of social competence on GPA is mediated by school engagement, while the impact of learning-related disorders is partially mediated by school engagement (Figure 1). The multi-group analysis, however, revealed important differences about the equal or greater impact of learning-related disorders on children adopted privately as compared to children adopted internationally and from foster care (Figure 2). Importantly and counter to expectations, children adopted privately, most often as infants, also have to be assessed for learning-related disorders early to ensure they can receive tailored services to help them succeed in school. Currently, early assessment for learning-related disorders is more common among children adopted through foster care and internationally given that their parents tend to anticipate how early-life adversity can lead to disorders that affect learning (Beverly et al., 2008; Brown et al., 2017; Haack et al., 2016; Harwood et al., 2013). This aligns with recent findings that parents of children adopted from foster care are more likely to talk about their child's adoption with their pediatrician than parents of privately adopted children (A. E. Goldberg, Frost, et al., 2020). Our study suggests that all children, regardless of adoption type, should be considered for early screening of potential learning-related difficulties. Our findings are also consistent with research showing that adoptive parents of privately adopted teenagers who have emotional and academic difficulties wish that they had received more guidance related to the potential for difficulties in their children, noting that they may have sought assessment and intervention earlier had they been better prepared for potential challenges (A. E. Goldberg et al., 2023).

Implications of social competence and school engagement on GPA

To our knowledge, our study is the first to assess the relationship among social competence, learning-related disorders, and school engagement on academic outcomes among adopted children and builds on existing work

among non-adopted children. Our findings support research showing that social competence is integrally linked to school performance in that it presumably facilitates children's ability to engage in school to the point that they can pay attention in class, cultivate helping relationships with teachers and peers, and get along with their peers (Blair & Razza, 2007; Raver & Knitze, 2002). It also supports research finding that social competence can work in tandem with learning-related disorders to affect academic outcomes among adopted children specifically (Hakkarainen et al., 2015, 2016).

Our results also show that the impact of social competence has an equally strong effect regardless of the adoption context: Specifically, children with greater social competence skills do better in school. This finding is consistent with Vygotsky's theory of cognitive development, wherein all children are reliant on their social competence skills in order to engage with and do well in school, and those who are the most socially fluid typically perform best (Gindis & Lidz, 2022; Vygotsky, 1978). In addition, interestingly, children adopted internationally had significantly higher GPAs and borderline significantly higher social competence scores than children adopted from foster care. Although not statistically significant, their scores in both domains were also higher than those of children adopted privately. Given their greater likelihood of adverse childhood experiences as compared to children adopted privately, we would have predicted the social competence scores and GPAs of children adopted internationally and from foster care to be more similar.

Why might the sample of children adopted internationally have higher GPAs than the sample adopted from foster care? First, the majority of our sample of children adopted internationally were identified as Southeast Asian (whereas none of the children adopted privately or from foster care identified that way), such that they are subject to the model minority stereotype applied to children of Asian descent and may feel extra pressure to do well academically (T. X. Tan, 2018). In contrast, considering the higher proportion of Black and Brown children among those adopted via foster care, it is possible that they faced race-based stereotype threat that hindered their academic performance (Steele, 1988), although it is noteworthy that race was not found to alter or account for the impact of learning-related disorders on GPA.

Second, the children adopted internationally were also significantly younger at the time of adoption than children adopted from foster care, such that their period of potential early-life adversity was shorter and thus less impactful than among children adopted from foster care. Indeed, many internationally adopted children, including those adopted from Southeast Asia, only experience one other caregiving environment aside from their adoptive home, which is associated with better outcomes as compared to

children who experience multiple placements (Nadeem et al., 2017; T. X. Tan et al., 2020). In addition, the quality of foster care (e.g., caregiver to child ratio) tends to be better in Asian countries as compared to elsewhere (T. X. Tan et al., 2020). Unfortunately, we did not have data on the specific early-life experiences of our sample of children to further explore this. Related to their younger age at adoption, the internationally adopted children in our sample would not have been hindered in school by the need for cultural adaptation, unlike if they had been adopted at older ages.

Implications of learning-related disorders on GPA

Our finding that learning-related disorders have an impact on academic performance beyond their effect on school engagement for at least some adopted children is supported by research by Hakkarainen et al., (2015, 2016) that used SEM to assess the longitudinal impact of learning disabilities and social competence on whether students graduated. They studied ninth graders in Finland, who were older and more homogenous than our sample but were similarly well-resourced, had lower social competence, and had a higher rate of learning disabilities than average. Parallel to our study, the presence of learning disabilities, specifically math-related issues, predicted lower graduation rates both directly and indirectly through school experience. It is likely that certain learning disabilities (e.g., dyscalculia) and/or their level of severity affect academic performance beyond how much they impact school engagement. Indeed, the researchers found that different learning disabilities led to different trajectories beyond high school and into college or the workforce. Thus, as our study shows, parents and teachers of adopted children should consider learning-related disorders early in a child's school career so that the child can get the resources they need to develop learning strategies to still engage in and be successful in school. This can include special education classes and Individualized Education Plans (IEPs) that customize a set of goals and strategies to help children learn (Ody-Weis, 2002). Per Vygotsky's theories on education and the resulting emphasis on the importance of tutoring and scaffolding based on shared knowledge, such early diagnosis and intervention may help teachers meet a student where they are developmentally and provide learning at a pace and in a manner the student can grasp (Howley-Rouse, 2021; Moll, 2013). Such support can help students stay engaged in and feel positive about school despite any initial or ongoing learning challenges.

Differences in the effects of learning-related disorders by adoption type

Our primary multi-group analysis yielded a very important finding, in that learning-related disorders were impactful on both school engagement and

academic performance among children adopted privately, while the impact was similar or lesser among children adopted internationally or from foster care, especially relative to social competence. This did not appear due to the types of learning-related disorders present in each group (e.g., ADHD and ADD were equally present in all three groups). We did not have data on either the timing of the learning-related disorder diagnosis or on its severity, but it seems likely that some combination of worse severity and/or later diagnosis among the children adopted privately, as compared to the children adopted from foster care or internationally, was driving the results. In other words, the analysis results suggest that learning-related disorders were more severe for privately adopted children than for children adopted internationally and were similarly severe but diagnosed later compared to children adopted from foster care, such that the children adopted privately had less time to receive and benefit from services. This finding should reiterate to parents, teachers, and adoption professionals that they should consider testing for learning differences early in a child's life regardless of the route through which the child was adopted. The following analysis by family type supports this result and recommendation.

Differences in the effects of learning-related disorders by family structure

Children of lesbian mother families were more impacted by learning-related disorders than children of heterosexual parent or gay father families were. Beyond that, privately adopted children of lesbian mothers were the most impacted by learning-related disorders and most often received school services, while privately adopted children of heterosexual parents were somewhat impacted by learning-related disorders but the *least* likely to receive school services. It is well established that sexual minority women are especially open to adopting children who have special needs—more so than sexual minority men (A. E. Goldberg, Tornello, et al., 2020), such that the lesbian mothers in our sample could have been parenting children with more severe learning-related disorders as compared to gay or heterosexual parents. Meanwhile, learning-related disorders could have negatively impacted privately adopted children of heterosexual couples because their parents may have been slow to identify their children's learning-related disorders and thus slow to secure the services their children needed. This interpretation is supported by previous research showing that heterosexual couples often prefer adopting infants via private adoption (Malm & Welti, 2010), often with the hope that they can have a large impact on their child's development (Brind, 2008). In tandem, it has been shown that adoptive parents, particularly fathers, struggle to adapt when their children's academic interests/abilities do not align with their own (A. E. Goldberg et al., 2021). Adoptive parents also struggle with feelings of

stress and disappointment when their children have unexpected special needs; in turn, they must acknowledge that they have less impact on their children's development than they had hoped (Moyer & Goldberg, 2017), creating a sense of disappointment that may be especially intense among heterosexual couples who adopted privately.

Importance of early diagnosis of learning-related disorders for all adopted children

Our study supports the finding that early timing of a diagnosis for a learning-related disorder is key, as learning-related social skills and disorders have been shown to affect school performance as early as kindergarten (Horbach et al., 2020; McClelland et al., 2000). This supports many adoption professionals who espouse the importance of and recommend early intervention for adopted children (Phillips, 2018), which provides rehabilitation services to children with developmental delays from birth through age 3. Beyond age 3, there are many available instructional programs that teach parents approaches that promote skills (e.g., developmental, language, social, play) of children with disabilities that can assist with learning (Gadsden et al., 2016). Parent involvement is crucial, given that studies have shown that parent-involved programs, as opposed to therapist-only run programs, are more effective (e.g., the Early Start Denver Model) (Gadsden et al., 2016).

Unlike parents who adopt children through private adoption, parents who adopt children internationally or from foster care have likely been taught by their agencies and case workers about the detrimental impact of early-childhood adversity and its effects on learning. For example, agencies counsel parents who adopt children internationally on their future child's potential health needs (A. E. Goldberg, Frost, et al., 2020). For children adopted from foster care, there are financial supports provided by the U.S. government for specialized services (Office of the Assistant Secretary for Planning and Evaluation, 2011). The result is that parents who adopt internationally and from foster care are more aware of and are likely faster to assess for and obtain diagnoses for learning-related disorders than parents who adopt children through private adoption. In contrast, parents who adopt privately may assume that because their child did not have the types of adverse experiences that are more common among children adopted internationally or from foster care (e.g., neglect, multiple caregiving transitions), they will not have learning challenges and thus are slower to identify them when they do manifest. Yet, adoptive parents would be remiss to neglect the reality that children adopted privately do have higher rates of early-life adversity, such as prenatal drug exposure, compared to non-adopted children (Jones et al., 2019).

Limitations and future research

This study used a cross-sectional mediation approach. Given that the relationships tested are assumed to unfold both simultaneously and longitudinally, there are some significant limitations to this approach. In addition, cross-sectional data do not allow us to draw conclusions about the direction of effects, although our model is consistent with the order laid out in existing literature. It seems reasonable to assume that GPA would not have an effect on whether someone had a learning-related disorder, but there could be feedback loops among GPA, social engagement, and social competence that we did not account for. Longitudinal analyses are needed to verify our findings and establish the temporal sequence of the predictors, although literature supports our proposed direction of effects. This includes work that demonstrated that among students of high school age or older, there is a positive feedback loop among academic self-efficacy, initiative/engagement, and academic performance (e.g., GPA), but this loop has not been established in younger children, such as those in our sample (Kristensen et al., 2023; Talsma et al., 2018). This could be because younger children do not yet have enough schooling history about which to feel efficacious or do not yet have enough sense of their own autonomy over their school outcomes.

Related to limitations about timing, we did not know the timing of the disorder diagnoses, which would have allowed us to make inferences about the length of time that children had to adapt to and receive services. We also did not have data on the severity of the diagnoses or on pre-adoption adversity (e.g., number of pre-adoption placements). Parents also did not provide information about their children's language skills at the time of adoption or on any genetic dispositions toward learning-related disorders. We did establish that including age at adoption did not change our results. Future research that includes data on the predisposition toward learning-related disorders, time and severity of diagnosis, and the pre-adoption context would help parse out which factors are driving the findings about the debilitating effects of learning-related disorders, particularly in children adopted privately (e.g., is length of time with a diagnoses and accompanying accommodations/services more impactful than the type of diagnosis in explaining the disorder's impact on GPA?)

A second limitation of our study is that our measures are based on parent self-report and have not been validated among adopted children. Having school and medical reports to compare against parent reports would enhance the robustness of our findings as well as give us greater understanding of the impact various kinds of disorders have on adopted children. Similarly, the high-level constructs of social competence and school engagement could be parsed apart to see whether certain elements

of these constructs are driving the results (e.g., interpersonal competence versus self-regulatory processes within the social competence construct).

A third limitation is that we did not have a measure of parent–child relationship quality in our model. In line with existing research, we speculate that children with good-quality relationships with their parents would likely do better in school via better social competence than children with poor-quality relationships with their parents (Soares et al., 2019). This is in part because children with good-quality relationships can likely replicate in school the warm and presumably reciprocal interaction style they have learned at home (Attili et al., 2010) as well as better handle negative emotions, like frustration, when they arise (Soares et al., 2023). Good parent–child relationships may also have a direct effect on GPA if such children feel more comfortable asking their parents for help on homework. Future models should include a measure of parent–child relationship quality. We would expect that high-quality relationships (e.g., high in warmth, closeness, and openness) would explain some of the positive indirect effects of social competence on GPA and mitigate the direct and indirect negative effects that learning-related disorders have on GPA.

Another limitation was sample size. Due to the relatively small number of children adopted internationally and from foster care, our detection of intergroup differences was likely underpowered, although clear trends were present. Our results should be interpreted cautiously until they can be replicated in larger samples. Final limitations included that GPA is just one component or index of success academically. Future research might include multiple dimensions of success or achievement, including academic awards, leadership roles in extracurriculars, and standardized test performance. Last, our participants were majority White and well-resourced. While this is reflective of many adoptive parents, our results may not be generalizable to all adoptive families.

Conclusion

Our research confirmed that among adopted children, increased social competence positively predicts academic performance through greater school engagement regardless of adoption type, while learning-related disorders negatively affect academic performance. Yet the extent to which learning-related disorders affect academic performance may vary among children adopted internationally, from foster care, and from private domestic adoptions, in that they may be more debilitating among children adopted privately versus from other contexts. This may be because learning-related disorders are diagnosed later in this population, such that they have fewer resources and adaptations available to them at the same point in their schooling as children adopted internationally or from foster care.

Findings have implications for parents, teachers, and adoption practitioners in that they should consider adopted children's learning needs early in their school careers regardless of how the child was adopted, so that the child can succeed in school to the best of their abilities. This could be especially relevant for heterosexual couples who have hopes or expectations that children adopted privately as infants will be "like them" and not struggle with learning challenges. For parents and adoption practitioners, this could start with having their children assessed for early intervention and instructional programs meant to help them with any developmental or social delays that could affect future learning. For parents and teachers, this means assessing whether their children/students could benefit from special education classes or IEPs.

Note

1. The term "special healthcare needs" was used to denote children with a medical, behavioral, or other health condition that results in limitations in activities and the long-term, increased use of medical treatment and services.

Disclosure statement

The authors report there are no competing interests to declare.

Data availability

The participants of this study did not give written consent for their data to be shared publicly, and because of the sensitive nature of the research supporting data are not available. Questions about the data can be directed to the corresponding author.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

Spencer Foundation.

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