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Is there a (transracial) adoption achievement gap? A national longitudinal analysis of adopted children's educational performance

Elizabeth Raleigh [a,*], Grace Kao [b]

[a] Department of Sociology and Anthropology, Carleton College, One N. College Street, Northfield, MN 55057, United States
[b] Department of Sociology, University of Pennsylvania, 3718 Locust Walk, Philadelphia, PA 19104, United States

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ABSTRACT

In one of the first longitudinal population-based studies examining adopted children's educational achievement, we analyze whether there is a test-score gap between children in adoptive families and children in biological families. Using data from the Early Childhood Longitudinal Study, we find in aggregate adopted children have lower reading and math scores than their counterparts living in biological families. Yet there is significant variation among adoptive families by their race and health status. On one hand adoptive parents tend to be White and have more economic capital than their non-adoptive counterparts potentially contributing to educational advantages. However adopted children are also more likely to have special educational needs, contributing to greater educational disadvantages. Untangling these variables through a multivariate regression analysis, we find that transracially adopted children have similar test scores to White children living with biological parents. We point to the interaction between race, family resources and children's health status and how these characteristics differentially shape achievement outcomes for adopted children.

1. Introduction

Over the past decade demographers of the family have noted the growing prevalence of adoptive families as greater numbers of parents use adoption as a pathway to parenthood (Smock & Greenland, 2010). In fact, the U.S. Census estimates that there are over two million adopted persons in the United States, and about 4% of families have an adopted person in the household (Kreider, 2003). Although the actual number of adoptions per year is estimated to be relatively stable at about 130,000 a year (Child Welfare Information Gateway, 2011), national data suggest that the types of adoptions have dramatically shifted. While a generation ago the majority of adoptions were kinship adoptions—such as the adoption of a child by a stepparent—currently the majority of adoptions involve the adoption of an 'unrelated' child, either through private domestic adoption, international adoption, or foster care (Vandivere, Malm, & Radel, 2009). Notably, adoption is also becoming more visible as White adoptive parents increasingly adopt across race (Ishizawa, Kenney, Kubo & Stevens, 2006; Jennings, 2006; Lee, 2003).

Despite the increased visibility of adoption, and in particular transracial adoption, there has been relatively little research on these families, especially at the national level. Most of the extant adoption studies tend to focus on psychological outcomes among adopted children and the development of identity (Brodzinsky, 1990; see Mohanty & Newhill, 2006 for review). Although these studies are important in terms of understanding how adopted children and adoptive families adapt, they do not take into account an important dimension of children's development—namely their educational trajectories. Because education is seen as the 'building block' of future success and socioeconomic attainment (Coleman, 1988), understanding adopted children's academic performance is an important piece of the puzzle in understanding adopted children's overall development and well-being.

Overall, most research on adopted children's educational outcomes find adopted children have lower educational outcomes than their biological peers. However, these studies are limited because they tend to be based on clinical samples that are not nationally representative. For example, in a review of sixty-two studies on adoption and cognitive development, van IJzendoorn, Juffer and Poelhuis (2005) find that adopted children academically lag behind their environmental peers and consistently score lower relative to non-adopted children living in similar circumstances. However, many of the studies included in the review only target one subset of the adopted child population such as children adopted from foster care or international Korean adoptees (see Wickes & Slate, 1997 for example).

The finding that adopted children tend to have lower test scores is puzzling considering that demographic research indicates adoptive families have higher levels of socioeconomic status (Kreider, 2003). Thus the adoption test score gap runs counter to status attainment theory which would posit that adopted children would do better in school compared to their less advantaged non-adopted counterparts. Hamilton and colleagues (Hamilton, Cheng, & Powell, 2007) find that adoptive parents' high levels of economic capital make it possible for them to devote greater resources to creating educational opportunities such as

* Corresponding author.
E-mail address: lraleigh@carleton.edu (E. Raleigh).

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private school enrollment, access to books and computers, as well as trips to the library and museums. This greater level of parental investment is important as their research suggests that this increased investment mediates adopted children's academic performance (Hamilton et al., 2007, footnote 15). Given the relatively advantaged status and high levels of parental investment among adoptive parents, an empirical puzzle emerges. How do we reconcile adopted children's lower test scores with their relatively advantaged social class backgrounds?

This study addresses this paradox by exploring the intersection of status attainment theory with adoptive family structure for a population about which social scientists know relatively little. We contribute to the growing body of literature on adoption in three ways. First, we provide a national benchmark for educational performance between adopted children and children in biological families. Second, through our multivariate analysis, we are able to untangle the effects of adoption from family resources and child characteristics. Third, taking advantage of the longitudinal nature of the data, we further investigate whether the gap between adopted and biological children widens over time or if their educational outcomes converge.

A longitudinal analysis of adoption and educational achievement may be a particularly useful approach to analyzing the parameters of an adoption test score gap. Research suggests that adoption acts as a powerful intervention, especially for children in institutional care or foster care (Blatt, Meguid, Stephany, & Armstrong, 2002; van Ijzendoorn & Juffer, 2005). As adopted children become more acclimated in their new surroundings they are also likely to 'catch up' in their health and development (Wilson, Weaver, Cradock, & Kuebli, 2008). This suggests that even though some adopted children may initially demonstrate disadvantaged educational outcomes related to their pre-adoption experiences, it may be that over time adopted children show improvement, especially those adopted into households with greater levels of socio-economic resources. However, the majority of studies that examine adopted children's academic performance are cross-sectional (for exceptions see Groze, 1996; Maughan, Collishaw, & Pickles, 1998) and we do not know whether the identified gaps between adopted and non-adopted children persist or shrink as children spend more time in adoptive households and progress in school.

In addition to exploring whether the adoption test score gap shrinks or widens over time, our study is able to go a step further by exploring the variation among adoptive families. From the literature, we know that there is a great deal of variation as to how children come to be placed with their adoptive families and a range of pre-adoption experiences (Vandivere et al., 2009). We examine this heterogeneity by disaggregating subsets of the adopted child population by whether children were adopted within race or adopted transracially. Whereas previous research has analyzed adoptive families as a whole, our approach underscores the importance of taking into account these differences.

2. Forms of capital and educational achievement

Prior research indicates that adopted children tend to grow up in relatively advantaged households with adoptive parents that have relatively high incomes and high levels of education. A report from the 2000 Census finds the median household income for adoptive families is about $58,000—or about $10,000 more than the median income for parents with biological children (Kreider, 2003). According to status attainment theory that posits a strong relationship between parents' socioeconomic status and children's educational achievement (Coleman, 1988; see Lareau, 2011 for more recent work), we might hypothesize that adoptive parents advantaged status would make them better positioned to transfer these advantages to their adopted children. This hypothesis would make sense given that prior research identifies how parents with greater levels of social and economic capital are able to leverage these resources to enhance children's educational prospects (Coleman, 1988; Teachman, Paasch, & Carver, 1997). Moreover, the relationship between parental resources and educational advantage may be especially pronounced during elementary school where parents are able to draw on their resources to create learning opportunities for their young children (Alexander, Entwisle, & Horsey, 1997; Lareau, 2000).

One limitation to status attainment theory for adoptive families is the framework does not consider children's pre-adoption experiences and how these experiences may contribute to academic performance. A recent study based on data from the US Census finds that internationally adopted children are significantly more likely to have a disability (Kreider & Cohen, 2009), which could be negatively associated with children's educational achievement. In addition, there is a wide body of literature that states how prior institutionalization can have long-term effects for children's cognitive development (Bakermans-Kranenburg, van Ijzendoorn, & Juffer, 2008). But despite the fact that many adopted children may begin with potential learning challenges, studies also show that adoptive parents tend to have greater access to health insurance and resources (Bramlett, Radel, & Blumberg, 2007) to address these challenges and that children in institutional care tend to 'catch up' once at home with their adoptive families (Loman et al., 2009; Wilson et al., 2008). However, because of the lack of nationally representative data that examines adoption and school outcomes, there has been little opportunity to untangle these variables at the national level.

The few national studies based on the adopted child population tend to examine adopted children as an aggregate group, rather than take into account the heterogeneity of the population. In one national study, Feigelman (1997) uses data from the National Longitudinal Survey of Youth, comparing behavior patterns between adoptees and those raised by both biological parents. He finds that adult adoptees exhibit a higher incidence of problem behaviors including delinquency, youth crime, and drug and alcohol abuse. In another population-based study drawing on data from the school-based sample of Add Health, researchers find that adopted adolescents have higher likelihoods of experiencing emotional distress, health problems, and academic disengagement (Miller et al., 2000). Another study based on the National Survey of Households and Families report similar results, with researchers concluding that adopted children have a higher incidence of behavior problems at school (Amato & Cheadle, 2008). In other words, adoptive parents tend to be relatively advantaged but the literature also suggests that adopted children face greater health disadvantages that negatively correlate with educational outcomes. The goal of this paper is to untangle this paradox by exploring whether and how these advantages and disadvantages shape the educational outcomes of all adopted children.

3. Adoption, race and children with special needs

From the literature on biological families, we know that there are clear racial and ethnic differences in educational outcomes (see Kao & Thompson, 2003 for a review) and that these differences are partially explained by varying levels of parental resources (Kaushal & Nepomnyaschy, 2009). But in adoptive families (especially those that are transracial), there may also be key levels of variation by not only the race of the child but also the race of the parents. Given these differential resources, one would hypothesize that White children adopted by White parents may have greater access to educational advantages that may translate into better educational outcomes. However, we do not know if these educational advantages translate for non-White children transracially adopted by White parents. Whereas previous research suggests that transracially adopted children have higher test scores than minority children adopted by minority parents (Moore, 1986; Scarr & Weinberg, 1983), we do not know how transracially adopted children's academic performance compares to that of White children adopted by White parents.

It is important to note that transracial adoptions are not evenly distributed across all adoptive households. Rather, at the population level, White parents are the most likely to adopt across race (Kreider, 2003; Raleigh, 2012). In an analysis of 2000 Census data, Ishizawa et al. (2006) conclude that adoptive parents may make certain tradeoffs when selecting the type of adoption they wish to pursue. They find that in navigating the adoption decision-making process, many prospective parents prioritize the age and health of the child over the child's race, leading them to choose transracial international adoption, especially from Asia and Latin America (Jennings, 2006). In contrast, because White foreign-born children (usually from Russia and Eastern Europe) have a higher likelihood of having a special health need (Ishizawa et al., 2006; Kreider & Cohen, 2009), some White parents may be less likely to adopt a White child from these regions because "many parents may prioritize having a healthy child over a child the same race as themselves" (Ishizawa et al., 2006:1219). Whereas some parents had previously pursued the adoption of White Eastern European children, Ishizawa and colleagues contend that recent news stories describing the health and adjustment challenges these children face may lead parents to consider transracial adoption in hope of identifying a younger and healthier child. Their findings that White parents deliberately adopt across race to adopt a healthier child suggests whether an adoptive family is a transracial adoptive family could be a significant axis of variation for educational outcomes. Building on these findings, in this paper we investigate at the national level whether there are significant differences between transracially and same-race adopted children's health status and explore how these differences translate into educational performance.

Because of the unique racial composition of adoptive families, we argue that in order to untangle the role of parental resources and child characteristics in adoption, it is imperative to examine these families according to their status as transracial adoptive families, not just by the race of the parents or the child. In most studies analyzing racial and ethnic differences in educational outcomes, race is examined by either the race of the child or race of the mother (Mare, 1991; see Kao & Thompson, 2003 for a review) because for the majority of biological families these two measures are highly correlated (Brunsma, 2005). Yet in adoption, the race of the child is often not correlated with the race of the mother. In fact a national survey of adoptive parents finds that almost 40% of adoptive parents hail from a different racial or ethnic background from that of their child (Vandivere et al., 2009).

Under the traditional methods of measuring race, for a transracial adoptive family, controlling for the race of the mother would mark the family as White but controlling for the race of the child would designate the child and the family as non-White. Yet neither of these approaches recognizes the unique position of transracial adoptive families nor allows researchers to explore points of variation among this subgroup of adopted children. Specifically, we analyze differences in test scores among White same-race adopted children, racial minority children transracially adopted by White parents, and racial minority children adopted by non-White parents.

Whereas nationally White children have some of the best health outcomes (Chen, Martin, & Matthews, 2006), a review of the literature suggests the inverse for White adoptees. A recent study based on 2000 Census data found that disability rates among internationally adopted children from Russia and Romania were significantly higher than internationally adopted children from East Asia or Latin America (Kreider & Cohen, 2009). In addition, an analysis of the population of children with special health care needs found that White adopted children—adopted domestically and trasnsnationally—were overrepresented within this population (U.S. Department of Health & Human Services, 2008).

It may seem counter-intuitive that some U.S.-born adopted children have greater health problems than foreign-born adopted children. But in a meta-review of studies on mental health and behavioral outcomes, researchers found that domestic adoptees had higher incidence of behavior problems and poorer mental health outcomes than international adoptees (Juffer & van Ijzendoorn, 2005). Whereas poverty and the cultural stigma against single-motherhood are the main factors driving the relinquishment of foreign-born children, the authors argue that the relinquishment for domestic adoptions might be more related to substance abuse, and mental health issues. Results from these studies suggest that there may be a higher incidence of special needs among domestically adopted White children which may contribute to a gap in achievement.

Although we know that non-White minority parents are less likely to adopt across race versus White parents (Ishizawa et al., 2006), we know very little about the experiences of minority adopted children with minority parents. Rather than examine the incidence of special health needs and their correlates with educational outcomes, most of the research on minority adoptive families tends to focus on the debate over transracial adoption (see Hollingsworth, 1998). We did identify a few studies focusing solely on minority adoptive families. Shireman and Johnson (1986) find that Black children adopted by Black parents on average have positive adjustments. In a more recent study, Smith-McKeever (2006) finds that the vast majority of African American parents who adopt are extremely satisfied with the adoption. Although these studies are useful, we do not know whether or how positive adjustment and adoption satisfaction translate into educational performance. Because our study is based on nationally representative data, we are able to significantly extend the literature by establishing a national benchmark of the educational outcomes of same-race adopted minority youth.

4. Methods

4.1. Data

We use data from the Early Childhood Longitudinal Study Kindergarten Cohort (ECLS-K). ECLS-K is a panel study conducted by the National Center for Education Statistics and is based on a nationally representative sample of over 20,000 kindergarteners in 1998–99 enrolled in public, private, and parochial schools (Tourangeau, Lê, & Nord, 2006). From this large national sample we were able to identify a subset of adoptive families. Because ECLS-K includes detailed measures of parents' socioeconomic status, family structure, and children's academic performance over several years, it is one of the most comprehensive studies of young children to date and one of the most promising for research that examines the educational trajectories of adopted children (see Hamilton et al., 2007). The study is well-suited to explore the racial variation among adopted children's educational outcomes because it oversamples minority children, allowing us to capture the variation among adoptive families and include greater numbers of minority children adopted transracially by White parents or adopted within race by minority parents.

Whereas other studies have examined educational outcomes among the adolescent adoptee population (Miller et al., 2000), we extend the literature by documenting the effects of adoption on educational outcomes for elementary school children. Moreover, the longitudinal design of the study allows us to examine both the achievement differences between adoptee and non-adoptee youth living with both biological parents, as well as how these differences may narrow or grow several years later.

4.2. Dependent variables

To measure academic performance, we use math and reading test scores administered to children in kindergarten and the third grade. The tests were designed using a standardized item response theory instrument developed by the National Center for Educational Statistics (for more information on these measures please see: Tourangeau et al.,

2006). We focus on kindergarten and third grade math and reading test scores because previous studies have shown that early childhood experiences are strongly associated with educational outcomes later in childhood and that there is a great deal of consistency in children's educational achievement from third grade onward (Alexander, Entwisle, & Horsey, 1997).

4.3. Key explanatory variables

4.3.1. Adoption status

In order to identify adoptive families we use a measure of family structure that distinguishes whether the household has two biological parents, two adoptive parents, a single biological parent, a single adoptive parent, or a biological parent and a stepparent. For the purpose of this study, we compare differences in outcomes between children living with two adoptive parents, and two biological parents. We omit the small number of children who living with single adoptive parents since based on the body of research documenting differences in educational outcomes between single and two-parent families (Lansford, Ceballo, Abbey, & Stewart, 2001), it is possible that children growing up with single adoptive parents may not have the same household resources which would also contribute to variation academic outcomes. Thus, in order to control for family background among adoptive families, we narrow our analysis to children living with two adoptive parents and compare them to children living with two biological parents.

4.3.2. Race and adoption

In order to explore the potential heterogeneity among adopted children, we divide the adoptee sample into three separate groups—White adoptees with two White parents (n = 88), transracial adoptees—i.e. non-White adoptees with two White parents (n = 44—with 5 Black, 14 Hispanic, 22 Asian, and 3 multiracial), and non-White adoptees with two non-White parents (n = 24—with 17 Black, 6 Hispanic, and 1 Asian). We focus on transracially adopted children as a whole because research suggests that some White parents may opt to adopt across race in order to adopt a younger child with fewer health concerns (Ishizawa et al., 2006; Jennings, 2006). Another reason we focus on transracially adopted children in aggregate is that studies suggest that educators and onlookers may be more likely to distinctly characterize these children as transracial adoptees rather than lump them in with 'other' minority children (Quiroz, 2007). Although it would be interesting to further disaggregate transracially adopted children by racial and ethnic background, sample sizes limited further analysis. Of note, it is extremely rare for White adoptees to be raised by non-White parents, and in our sample not a single White adoptee was transracially adopted by non-White parents.

4.4. Additional control variables

In order to untangle the effects of race, adoption, and educational outcomes we include additional family background measures that are also likely to be associated with children's academic performance. These covariates include a measure of the mother's years of education, household income (measured in thousands of dollars), and the number of siblings in the household. We also include individual level data on the child's gender, race and ethnic background, and whether the child has an identified special need. A child is classified as having a special need if he or she receives special educational services. Although these can include services for learning disabilities, severe cognitive delays, speech and language challenges, and behavioral and emotional problems, the majority of children receive services for either speech and language delays or learning differences (see Hibel, Farkas, & Morgan, 2010).

While we acknowledge that the sample sizes are small, to the best of our knowledge ECLS is the only extant nationally representative dataset including adoptive families that provides valuable longitudinal data on the intersection between adoption, race, and educational outcomes, making it the sole appropriate source of data to explore these questions. In addition, our study is limited because we do not know the history of the child prior to adoption. Research shows that children who are older or children who have spent more time in institutional care face greater cognitive delays (van Ijzendoorn et al., 2005). This is a potentially confounding variable as we untangle the variation in adoptive families and educational outcomes. One way that we try to account for this omission is to include a variable that includes whether or not the child has been diagnosed with a special need and receives special educational services (such as an Individualized Educational Plan). Research suggests that adopted children who are adopted as older children (i.e. not infants) and have been in institutional care are more likely to be diagnosed with a special need or disability and these special needs are likely to negatively impact academic performance (Bakermans-Kranenburg et al., 2008; Loman et al., 2009).

Although it would be beneficial to know the age of the child at the time of adoption, we do know that the child was at least younger than kindergarten (the age they entered the study) at the time of adoption. In this regard, the data from ECLS is probably the most suited to a population-based analysis of adoption and educational outcomes compared to other nationally representative sources of data that sample adopted children in middle or high school (such as Add Health). While we cannot differentiate between children adopted before age five, the longitudinal data makes it possible to investigate whether and how toddler and preschool-age children (i.e. those adopted before reaching kindergarten) 'catch up' once placed in adoptive families.

There was a relatively small number of missing data for covariates and we impute these missing values. In addition, to account for the complex sampling design of the study, in line with other studies based on these data (Cooper, Crosnoe, Suizzo, & Pituch, 2010; Turney & Kao, 2009) we weight our analysis to reflect the kindergarten population of 1998 and use the SVY procedures in STATA to estimate our coefficients.

5. Results

5.1. Descriptive statistics

Table 1 presents differences for our dependent and independent variables between children living with two biological parents versus those living with two adoptive parents. Perhaps what is most interesting about these findings is at the time of the kindergarten assessment there are no discernable differences in math or reading test scores between these two groups. This finding is puzzling since previous research suggests that as an aggregate group, adopted children are at risk for greater levels of disability that may negatively impact educational achievement. However, Table 1 also shows that adoptive families have greater family resources that have been repeatedly shown in the literature to be associated with academic performance. For example, adoptive parent households have significantly greater levels of human capital, with higher levels of education and income. In addition, because adoptive families tend to be smaller, these resources may not be as diluted among family members.

Although in kindergarten there are no discernable differences in educational outcomes between adopted children and children living with both biological parents, by the third grade the gap becomes apparent. There is more than a ten-point gap for adopted children in both math and reading scores. One reason for this gap may be that adopted children are more likely than the population of children living with both biological parents to have been diagnosed with a disability or special need (11% vs. 18%).

Table 1
Weighed descriptive statistics for study variables (n = 10,633).
Source: The Early Childhood Longitudinal Study—Kindergarten Cohort.

Variable	Two biological parents (n = 10,477)		Two adoptive parents (n = 156)	
	M	SE	M	SE
Educational performance in kindergarten				
Math	34.44	0.19	32.24	1.31
Reading	40.20	0.25	41.78	1.32
Educational performance in third grade				
Math	95.10	0.34	85.44	2.86
Reading	121.51	0.44	112.75	3.32
Family CHaracteristics				
Mother's years of education	13.53	0.04	15.44	0.44
Income ($1000s)	62.02	0.85	82.93	1.14
Number of siblings	1.54	0.02	1.48	*0.44
Child characteristics				
Female (%)	49%		55%	
Special needs(%)	11%		18%***	
Child's race (%)				
White	69%		55%***	
Black	8%		15%	
Hispanic	9%		14%	
Asian	3%		16%	

Note: Statistically significant across row at *p<.05, **p<.01, and ***p<.001.

While an aggregate analysis of children living in adoptive families does not uncover any significant variation in kindergarten test scores compared to children living with both biological parents, we find significant differences once we account for the variation within adoptive families. As shown in Table 2, even in kindergarten there is a significant level of variation in math performance between these groups. We find almost an eight point gap between White adoptees adopted by White parents and non-White children adopted by White parents (30.65 vs. 38.62). Non-White children adopted by non-White parents also have lower levels of academic achievement.

In the third grade, the gap in academic performance remains for White adoptees and for non-White adoptees adopted by non-White parents but transracially adopted children's test scores are very similar to children living with both biological parents. The test-score gap between White adoptees and White children living with both biological parents is puzzling, especially considering that White adopted children grow up in families with greater socioeconomic resources. For example, the average household income for White parents who adopt White children approaches $100,000 and these parents have high levels of education as well.

Our analysis suggests that there may be additional factors differentiating White adoptees from their White non-adoptee counterparts. The disproportionate number of White adoptees in the sample who receive special needs services may contribute to the populations' lower test scores. White adoptees have the highest proportion of special needs; with almost one in four (24%) of these adoptive parents reporting that their child had received services for either speech therapy or special education. This number is significantly higher than the number of transracial adoptees or non-White same race adoptees receiving special needs services.

5.2. Multivariate analysis

Because adoptive families are likely to differ from each other and from non-adoptive families in terms of family resources and child characteristics, we need multivariate analyses to unravel the advantages and disadvantages facing adoptive households and adoptee youth. In Table 3 we present regression coefficients that examine the role of adoptive family structure on children's academic outcomes. In our initial analysis we examine adoptive families in the aggregate, comparing them to biological families. Next, we disaggregate adoptive families type of adoptive family to show how race, family resources, and child characteristics shape the achievement outcomes of adopted children.

In line with our results from our bivariate descriptive analysis, results from Model 1 of Table 3 show that when analyzed as an aggregate group, there are no significant differences between children living with two biological parents and two adoptive parents for kindergarten math and reading academic performance. Results from Model 2 for math scores show that once disaggregating adoptive families, White adoptees perform significantly lower than children living with both biological parents. Yet in contrast, transracial adoptees have significantly *higher* math scores than children living with both biological parents.

Owing to the relatively advantaged family resources of many White adoptive parents, once taking into account these covariates in Model 3, the gap between White adopted children and White children in biological families is even more pronounced. For reading scores, results show that with additional controls, White adoptees have

Table 2
Weighted descriptive statistics by adoptive family (n = 156).
Source: The Early Childhood Longitudinal Study—Kindergarten Cohort.

Variable	Two biological parents (n = 10,477)		White same race (n = 88)		Transracial (n = 44)		Non-White same race (n = 24)	
	M	SE	M	SE	M	SE	M	SE
Educational performance in kindergarten								
Math	34.44*	0.19	30.65	1.69	38.62	2.15	29.16	3.53
Reading	40.20	0.25	41.53	1.83				
Educational performance in third grade								
Math	95.10 *	0.34	85.00	4.63	95.77	2.89	74.95	2.84
Reading	121.51 **	0.44	111.58	5.12	124.51	4.04	98.43	6.19
Family characteristics								
Mother's years of education	13.53 ***	0.04	14.26	0.46	16.33	0.89	12.95	0.54
Income ($1000s)	62.02 ***	0.85	98.86	19.54	79.80	4.03	38.86	4.71
Number of siblings	1.54 **	0.02	1.12	0.12	1.18	0.17	2.90	0.71
Child characteristics								
Female (%)	49%		44%		66%		71%	
Special needs(%)	11% *		24%		6%		7%	
Child's race (%)								
White	69% ***		100%					
Black	8%				19%		65%	
Hispanic	19%				42%		34%	
Asian	3%				39%		1%	

Note: Statistically significant across row at *p<.05, **p<.01, and ***p<.001.

Table 3
Results of multiple regression models predicting kindergarten educational performance.

	Math achievement						Reading achievement					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
Variable	*B*	SE	*B*	SE	*B*	SE	*B*	SE	*B*	SE	*B*	SE
Family structure												
Two adoptive parents	−2.20	1.32										
White same race			−3.80*	1.69	−6.54***	1.29	−1.58	1.34	1.33	1.84	−3.00*	1.52
Transracial			4.18*	2.13	3.01	2.83			3.75	2.36	0.50	2.65
Non-White same race			−5.29	3.46	0.12	3.16			−1.71	3.25	3.21	3.01
Family characteristics												
Mother's years of education					1.23***	0.08					1.75***	0.11
Income ($1000s)					0.02***	0.00					0.03***	0.00
Number of siblings					-0.41***	0.14					−1.20***	0.19
Child characteristics												
Female					−1.30***	0.33					1.25**	0.43
Special Needs					−5.37***	0.54					−4.83***	0.64
Black					−5.22***	0.59					-1.37	0.77
Hispanic					−4.73***	0.43					−10.63***	0.68
Asian					3.32***	0.92					−1.09***	1.12
Constant	34.44***	0.19	34.44***	0.19	19.72***	1.11	40.20***	0.25	40.20***	0.25	18.95***	1.51

Note: All models have been weighted to account for sampling design effects. Child lives with both biological parents is the reference category for family structure, White is the reference category for race.
* p<.05.
** p<.01.
*** p<.001.

significantly lower reading scores than their White counterparts living with their biological parents. Yet at the kindergarten benchmark there are no significant differences between transracial adoptees and non-White same race adoptees compared with similar children living with both biological parents.

As shown in Model 3, the addition of control variables to the models act in the expected directions, with the mother's years of education and household income positively contributing to children's academic performance. For math girls tend to score lower than boys but for reading the opposite trend is observed. Unsurprisingly, children with special needs face obstacles in academic achievement in both math and reading. Last, as has been well documented (Jencks & Phillips, 1998), as early as kindergarten there is a test score gap between Black and White children, even those living with both biological parents.[1]

Given the lack of significant differences for transracial adoptees and non-White same race adoptees, we wondered if this could be attributed to the small sample size of transracial and non-White adoptees. In supplemental analysis, we ran models that tested for interaction effects between these groups. We found that transracial adoptive families and non-White same race adoptive families were significantly different from White adoptive families, indicating that it is not a lack of power driving the results for transracial adoptive families but the fact that when all else is held constant, transracial adoptees have similar academic outcomes to children living with both biological parents (results available upon request).

As the children progressed through school, we wanted to investigate whether the initial gap in academic test scores for White adoptees remained and whether transracial and same-race non-White adoptees were able to maintain their parity in academic achievement with similar children living in two-parent biological families. In Table 4 we examine whether the gap widens or shrinks in children's test score results three years later, taking into account their previous performance in their kindergarten math and reading scores. In line with our previous analysis plan, we first examine adoptive families in the aggregate and then compare those results to more nuanced design that takes into account the potential variation within adoptive families.

Table 4 Model 1 shows that when predicting math and reading scores for adoptees as a whole, there is a clear gap in math and reading scores that widens between kindergarten and the third grade. Yet as shown in Model 2, once taking into account the heterogeneity among the adoptive families the data suggest a different pattern. For both reading and math there is a growing achievement gap for White and non-White same-race adoptees. However there are no significant differences between transracial adoptees and children living with both biological parents. Owing to the relative advantaged status of White and transracially adopted children's households, once adding these covariates to the model our results show that the differences become more pronounced. However for reading scores, even when taking into account child and family characteristics there are no significant differences in academic performance between transracially adopted children and White children living with both biological parents.

The gap in academic achievement between non-White same-race adoptees and White children living with both biological parents is troubling but also makes sense in light of the extensive literature documenting the persistent Black-White test score gap. But our findings for White adoptees and transracial adoptees point to an empirical puzzle. Given the relative advantage in family resources for both White adoptees and transracial adoptees, why is there so much variation in test scores between the two groups? Recall from Table 2 in Section 5.1 that White adoptive parents and transracial adoptive parents have some of the highest levels of education and income. Because these families have similar levels of household resources and both subsets of children are adopted, according to status attainment theory, we would expect that these children have relatively similar levels academic achievement. Yet, our multivariate analyses show that there is a clear and consistent gap for White adopted children that appears to widen over time while transracially adopted children perform at about the same level as children with two biological parents in both kindergarten and the third grade.

In order to address this question, we conducted a more in-depth examination of the link between being adopted and being diagnosed a special health care need, as our previous models found that having a special need was a strong negative predictor of academic challenges. The results are presented in Table 5. Using logistic regression, we

[1] It is important for the reader to remember for our adoption focus, the analytic population is for children with two parents and children living with single or step-parent families are excluded from this analysis. Thus, our coefficients estimating differences in academic performance by race should not be extrapolated to the general population as a whole.

Table 4
Results of multiple regression models predicting third grade educational performance.

	Math achievement						Reading achievement					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
Variable	*B*	SE	*B*	SE	*B*	SE	*B*	SE	*B*	SE	*B*	SE
Kindergarten achievement scores	1.26***	0.02	1.26***	0.02	1.12***	0.02	0.02**	0.19	0.89***		0.72***	0.02
Family structure												
Two adoptive parents	−6.85***	1.99					−10.19***	2.81				
White same race			−5.24*	2.96	−7.51*	3.00			−11.29**	4.25	−13.85***	3.69
Transracial			−4.51	2.77	−6.82***	2.07			−0.17	2.65	−3.89	4.30
Non-White same race			−13.41**	4.75	−9.29*	4.34			−21.37***	6.22	−14.25*	5.85
Family characteristics												
Mother's years of education					1.04***	0.10					1.66***	0.13
Income ($1000s)					0.02***	0.00					0.03***	0.00
Number of siblings					−0.27**	0.19					−0.94***	0.25
Child characteristics												
Female					−3.94***	0.44				1.56**	0.59	
Special Needs					−4.53***	0.88					−11.20***	1.24
Black					−5.36***	0.93					−9.41***	1.12
Hispanic					−1.43*	0.64					−2.09*	0.93
Asian					2.73**	0.96					−1.16	1.09
Constant	51.59***	0.86	51.59***	0.86	44.86***	1.52	85.70***	0.90	85.70***	0.90	71.28***	1.96

Note: All models have been weighted to account for sampling design effects. Child lives with both biological parents is the reference category for family structure, White is the reference category for race.
* p<.05.
** p<.01.
*** p<.001.

calculate the odds of the adopted child being diagnosed with a special health care need compared with a child living with both biological parents.

As shown in Model 1 of Table 5, adopted children have significantly higher odds of being diagnosed with a disability compared to their non-adopted peers. Yet, once taking into account the heterogeneity among adoptive families and disaggregating adopted children, we find that it is actually the White adopted children that are at the greatest risk of having being diagnosed with a special need. As shown in Model 2, this subset of adopted children has over two and a half times the odds (2.74) of receiving services for a special need compared with children living with both biological parents. Yet in Model 3, once controlling for other covariates, compared with their White non-adopted counterparts, White adopted children have even higher odds (2.83) of having a special need. In contrast, for non-White same-race adoptees and transracial adoptees, compared to children living with their biological parents there are no significant differences in the likelihood of having a special needs diagnosis. These findings suggest that White adopted children are at increased risk of facing academic challenges compared to the other groups and that the higher incidence of special needs is related to their gap in academic achievement.

Table 5
Results of logistic regression models predicting special needs diagnosis.

	Model 1		Model 2		Model 3	
Variable	e^b	SE	e^b	SE	e^b	SE
Family structure						
Two adoptive parents	1.84*	1.06				
White same race adoption			2.74**	1.06	2.83	1.21
Transracial adoption			0.56	0.35	1.23	0.77
Non-White same race adoption			0.61	0.49	0.65	0.53
Family characteristics						
Mother's years of education					0.96	0.25
Income ($1000s)					0.99***	0.00
Number of siblings					1.12*	0.16
Child characteristics						
Female					0.54***	0.06
Black					0.78	0.16
Hispanic					0.61**	0.11
Asian					0.48***	0.09
Constant	0.12***	0.05	0.12***	0.05	0.34***	0.35

Note: All models have been weighted to account for sampling design effects. Child lives with both biological parents is the reference category for family structure, White is the reference category for race.
* p<.05.
** p<.01.
*** p<.001.

In sum our findings indicate considerable variation within adoptive families in both academic performance and in terms of receiving special needs services. When examined as an aggregate group results suggest that there is a consistent gap in academic outcomes between children with two adoptive parents and children with two biological parents. However as shown in further analysis adopted children's academic performance varies by the type of adoption. Non-White children adopted by non-White parents score lower in reading and math compared to children living with both biological parents but much of these differences are explained by the non-White adoptive parents' race and socioeconomic status. In contrast, because White adoptive parents have high levels of SES the differences between biological families and adoptive families are further exacerbated once taking into account family background.

6. Discussion and conclusion

Perhaps what is most notable about our results is that we find a consistent gap in educational performance between White adopted children and White children living with both biological parents. Moreover our longitudinal analysis suggests that this gap grows over time. Put another way, transracially adopted children have better academic outcomes than White adopted children adopted by White parents. Notably this gap is not completely explained by differences in SES, since in general both groups of adoptive parents are advantaged. Since taking into account family background does little to ameliorate these differences our results suggest that these results may be shaped by White children's pre-adoption experiences.

It is important to remember that children available for adoption are not placed at random with the first available adoptive parents (Rothman, 2005). Rather prospective adoptive parents initiate the process of adoption and set the parameters of the characteristics of

children they are willing to adopt (Moosnick, 2004; Quiroz, 2007; Zelizer, 1985). While White prospective adoptive parents may want to adopt a U.S.-born White healthy newborn, the uncertainty and multiple-year waiting times associated with this type of adoption may lead these hopeful parents to consider other options (Brooks & James, 2003; Jennings, 2006; Raleigh, 2012). As Ishizawa et al. (2006) suggest, some prospective adoptive parents may prioritize the health and age of the child over the child's race. For other parents, having a mono-racial family may be more of a priority and they may be more likely to consider adopting a White child who is older or with some developmental delays.

Balancing a potential child's health, age at adoption, gender, and race is likely to contribute a unique demographic profile of the adoptee population that significantly differs from the general child population. Counter to the general population, in our descriptive analysis we find that White adopted children are actually more likely than non-White adopted children to have special educational needs. In fact, in our sample, almost one out of four (24%) of White adopted children received services for special educational needs, more than triple any other group. One reason for this finding may be that White adopted children are likely to be either adopted internationally from Russia or Eastern Europe or adopted domestically (born in the United States). Research has shown that children adopted from Russia and Eastern Europe have higher incidence of developmental delays and multiple special needs (Judge, 2003; Kreider & Cohen, 2009). Another study comparing the health of Russian adoptees to their medical records found that half of adopted children from Russia had medical conditions that were undiagnosed at the time of adoptive placement (Albers et al., 1997). Furthermore research suggests that some White native-born adopted children may also have a greater risk of special health needs (Juffer & van Ijzendoorn, 2005; U.S. Department of Health & Human Services, 2008) which may in turn shape this populations' educational outcomes.

Our results that White adopted children have some of the lowest levels of academic achievement compared to what we would predict based on their relatively advantaged family resources complicates the interpretation of status attainment theory. Because children in these families grow up in families with high levels of socioeconomic status and because of their advantaged racial background, it is possible that this subset of adopted children may be a hidden vulnerable population that could be overlooked in terms of receiving intervention and services.

Moreover, our results suggest that these differences in education performances actually increase over time. These findings are puzzling considering that the literature on child development suggests that adopted children who experienced foster or institutionalized care may begin with developmental and cognitive delays but after time in their adoptive families these children 'catch up' to their non-adopted peers. Our results run counter to this trend and indicate a need for future longitudinal research in this area.

Although our study finds that transracial adoptees academically perform as well as children living with both biological parents, it is important to keep in mind that there are also unique challenges associated with growing up in transracial families. Samuels (2009) research on the experience of adult transracial adoptees finds that while these individuals would be considered 'success stories' according to their educational attainment, they face complex challenges negotiating their identities. Findings from other qualitative studies on the experiences of transracial adoptees indicate similar complexities (Patton, 2000; Shiao & Tuan, 2008).

Although we are able to uncover significant levels of variation among adoptive families, there are limitations to our analysis. Because we disaggregate adoptive families by type of adoption, our small sample sizes make it more difficult to identify significant differences between groups. But the fact that we detect significant differences point to the considerable diversity among adoptive families that deserves further explication. Second, while we are able to identify the powerful intersection of race and special needs in adoption, the data limits our ability to explore other potential factors such as age at adoption. While we know that the children were placed in their adoptive families at least before the start of kindergarten, research on early childhood indicates that adoptive placement past infancy is associated with more adverse outcomes (Bakermans-Kranenburg et al., 2008; Sharma, McGue, & Benson, 1996). This suggests that our study underestimates the overall disadvantage of adoptee youth.

Despite these limitations, our findings underscore the importance of recognizing the variation within adoptive families. We have documented how considering the type of adoptive family is critical when examining potential differences in adopted children's outcomes. When taken as a whole, there is a consistent gap in achievement between adopted children and children living with two biological parents. However, this approach obscures how the gap in achievement varies by the type of adoptive family. While the gap in achievement is the most pronounced for White adoptees, in some cases the gap disappears altogether for transracial adoptees. These results point to potential areas for future research. Since over the past decade there has been a huge shift in adoption as fewer healthy babies and toddlers (of any race) are available for adoption (Selman, 2009), it is possible that the newest cohorts of adopted children will significantly differ than the population of adopted children analyzed in this study. In order to continue to untangle the role of family structure in educational outcomes among adoptive families, we will need more up to data national data. We hope that future data collection efforts will sample a larger number of adoptive families and explore why adoptee children have different school experiences.

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