Academic Achievement of Children in Same- and Different-Sex-Parented Families: A Population-Level Analysis of Linked Administrative Data From the Netherlands

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ABSTRACT Although numerous studies have examined how children raised in same-sex-parented families fare relative to children in different-sex-parented families, this body of work suffers from major methodological shortcomings. By leveraging linked administrative data from several population registers from the Netherlands covering the 2006–2018 period ($n=1,454,577$), we overcome most methodological limitations affecting earlier research. The unique features of the data include complete population coverage, reliable identification of same-sex-parented families, a large number of children in same-sex-parented families ($n=3,006$), multiple objective and verifiable educational outcomes, and detailed measures of family dynamics over children's entire life courses. The results indicate that children in same-sex-parented families outperform children in different-sex-parented families on multiple indicators of academic performance, including standardized tests scores, high school graduation rates, and college enrollment. Such advantages extend to both male and female children, and are more pronounced among children in female than male same-sex-parented families. These findings challenge deficit models of same-sex parenting.

KEYWORDS Child development • Same-sex couples • Family influences • Educational outcomes • Administrative data

Introduction

Up to the second half of the twentieth century, most developed countries featured legislation that criminalized same-sex sexual behavior and prevented two individuals of the same sex from entering legal partnerships. Since the 1970s, many countries have expanded the rights of same-sex couples in areas such as relationship recognition, taxation, insurance, marriage, and child adoption (Roseneil et al. 2013). Concurrently, public opinion toward same-sex relations became substantially more accepting (Pew Research Center 2019; Valfort 2017). Improvements in the social and legal standing of same-sex couples were followed by a surge in their numbers, as well as in the

number of children living in households with same-sex parents (Gates 2015; Powell et al. 2016). Within this context, an important question is how children raised in same-sex-parented families fare relative to children in other families—most notably children raised in traditional families with two biological different-sex parents.

Over the past two decades, many studies across the social sciences have attempted to answer this question. Recent reviews have documented 50–80 empirical efforts, depending on the inclusion criteria (Allen 2015; Center for the Study of Inequality 2017; Manning et al. 2014). Most of these studies reported no or few differences in the outcomes of children in same-sex-parented and different-sex-parented families, and these findings have been pivotal in informing subsequent legislative change. For example, the U.S. Supreme Court used such data to challenge federal definitions limiting marriage to different-sex couples in *Obergefell v. Hodges 2015* (Gates 2015; Manning et al. 2014; Powell et al. 2016). Thus, these studies are timely, and their results carry significant political weight. However, some commentators have criticized the rigor of this research, pointing to shortcomings such as small and nonrepresentative subsamples of same-sex-parented families, unreliable identification of these families in the data, reliance on subjective measures of child outcomes, and a lack of longitudinal information on family structure (Allen 2015; Marks 2012; Regnerus, 2012a; Schumm 2008).

In this study, we examine the academic performance of children in same-sex-parented and versus children in different-sex-parented families using population-level linked administrative data from the Netherlands. Leveraging this rich data source allows us to avoid the bulk of the methodological shortcomings present in earlier studies, generating rigorous and defensible findings.

Literature Review

Family Structure and Child Well-being

Research on the outcomes of children in same-sex-parented families sits within a broader literature that seeks to understand whether and how being raised in a nontraditional family imposes any fundamental disadvantage on children (Powell et al. 2016). This literature recognizes that parents can exert a significant influence on the developmental pathways of their offspring not only through their ability to access and mobilize material resources that foster child well-being but also through their capacity to parent and cater to children's psychosocial and emotional needs (Fomby and Cherlin 2007; Lamb 2012; McLanahan et al. 2013; Powell et al. 2016). Within this field, a long-standing body of work has investigated the ways in which family structure affects children's cognitive development and educational outcomes (Amato 2005; McLanahan and Percheski 2008; Powell et al. 2016; Waldfogel et al. 2010).

This literature demonstrates that certain family types enjoy greater access to resources that promote children's educational success. Such resources include financial assets (e.g., funds to purchase educational goods and services), locational advantage (e.g., residence within the catchment area of a high-quality school), or human capital (e.g., highly educated parents). Other factors inherently related to family structure have also been shown to influence children's educational performance. For exam-

ple, family instability can disrupt children's routines, expectations and attachments, impairing their ability to concentrate on their studies. This framework has been successfully used to explain why children in nonnormative family types—such as adoptive, single-parent, or stepparent families—tend to exhibit worse educational outcomes than children in normative family types—usually, two-parent married families (Amato 2005; McLanahan and Percheski 2008; Powell et al. 2016).

The same approach can be applied to explain differences in children's educational outcomes between same-sex-parented and different-sex-parented families, given that the two family types are likely to differ in these and other relevant factors. For instance, U.S. evidence indicates that different-sex parents tend to enjoy greater socioeconomic resources, whereas same-sex parents are usually more highly educated (Gates 2015). Further, pathways to parenthood differ markedly among the two family types. Same-sex couples are unable to reproduce without assistance, which means that children enter same-sex-parented families through other channels, including adoption, assisted reproductive technology, and previous relationships. This has important repercussions on children's timing of entry into these families and the life experiences that they have accumulated prior to it (Potter 2012; Rosenfeld 2015).

Research focusing on same-sex-parented families is particularly concerned with whether parental sex composition, in and of itself, contributes to the ability to serve as good parents (Biblarz and Stacey 2010). When the onus is on ascertaining whether parental gender composition exerts an independent effect on children's educational outcomes, the prevailing view is that differences in parental resources and pathways to parenthood must be treated as confounds because they represent extrinsic factors that often predate family formation, rather than constituting intrinsic features of same-sex or different-sex parenting (Boertien and Bernardi 2019; Rosenfeld 2010).

Parental Sex Composition and Child Well-being

Several perspectives explicitly address potential mechanisms (i.e., channels, mediators) linking parental sex composition to child well-being—net of the aforementioned confounds. Some scholars and public commentators endorse a deficit approach, arguing that being raised in a same-sex-parented family can diminish child well-being because of the nontraditional parental sex composition (see, e.g., Allen 2013; Marks 2012; Regnerus 2012a; Schumm 2008). These arguments stress that the absence of male or female parental role models and parents' tendency to make lower investments in children that are not biologically related to them may impair parenting by same-sex couples (for a review, see Powell et al. 2016). A separate strand of work points out that differences in child well-being between same-sex-parented and different-sex-parented families may also stem from factors outside of the control of parents, such as stigma and discrimination against same-sex couples and their children, or lack of access to the legislative and fiscal advantages of marriage (see, e.g., Boertien and Bernardi 2019; Reczek et al. 2016; Rosenfeld 2010).

Other perspectives emphasize plausible advantages associated with living in a same-sex-parented family. For example, same-sex parents face substantive barriers to parenthood (e.g., social scrutiny, greater costs of conceiving a child, and legislative hurdles), and overcoming these barriers may strengthen their commitment to parental roles.

These barriers, combined with minimal odds of unplanned pregnancies for same-sex couples, can foster positive parenting practices in same-sex-parented families (see discussions in Biblarz and Stacey 2010; Manning et al. 2014; Powell et al. 2016).[1] Similarly, the "double dose of motherhood" argument posits that children raised by female same-sex couples—who represent the majority of same-sex couples with children—may benefit from having two mothers because women exhibit more developed parenting skills than men (for a discussion, see Biblarz and Stacey 2010; Powell et al. 2016; Prickett et al. 2015).[2]

Methodological Implications

To ground the following discussion, we summarize in Table 1 the theoretical factors that may contribute to differences in the outcomes of children in same-sex-parented and different-sex-parented families discussed so far. As mentioned previously, the core focus of studies comparing these family types is not simply to document the presence or absence of unconditional differences, but to ascertain whether any such differences are attributable to the gender of the parents (Biblarz and Stacey 2010). Altogether, accomplishing this requires establishing (1) whether the sex of parents is indeed a factor that contributes *independently* to children's developmental outcomes, and (2) whether the mechanisms through which such a contribution operates are within the control of same-sex parents. Only when the answers to both questions are yes can any poor outcomes found among children in same-sex-parented families be attributed to the sex of their parents. Statistically, discerning the answers to these two questions involves ruling out the potential confounding role of factors such as differences in families' socioeconomic resources, pathways to parenthood, and stressors stemming from stigma and discrimination against nonheterosexual individuals and their children (see Table 1). As explained later, our study goes beyond previous research in accomplishing this.

The Role of Family Instability: Competing Views

One debate that looms large in this field is whether differences in life-course family stability between children in same-sex-parented and different-sex-parented families

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[1] Parallels can be drawn with parents of children conceived through assisted reproductive technology, who have been shown to enjoy better relationships with their children than parents who conceived naturally (Golombok 2015).

[2] How parental sex composition may translate into better or worse child outcomes specifically in the education domain (the focus of our study) has received little attention. Possible pathways include gender differences in parental time investments (e.g., helping children with homework or allocating time to educational activities) and the adoption of parenting practices that foster child adjustment and educational progress (e.g., warm and consistent parenting) (Biblarz and Stacey 2010). School bullying toward children with same-sex parents is another potential channel (van Gelderen et al. 2012). The literature has also been silent about differences in the effects of parental sex composition over children's educational careers and about differences between markers of educational achievement (e.g., test scores) and attainment (e.g., timely school progress).

Table 1 Key theoretical factors involved in generating differences in outcomes between children in same-sex-parented families (SSPFs) and different-sex-parented families (DSPFs)

Theoretical Factor	Theoretical Influence	Appropriate Action to Retrieve the Parental Gender Composition Effects
1. Confounds: Extrinsic factors unevenly distributed between SSPF and DSPF but not stemming explicitly from parental sex composition		
• Socioeconomic status	Advantages DSPFs	Include as a control
• Life course family (in)stability	Advantages DSPFs	Include as a control[a]
2. Mediators (or "channels" or "mechanisms"): Factors emerging explicitly from the gender composition of parents that may or may not be within the control of parents		
2.1 Out of the control of parents: Factors that may impair parenting ability but that stem from external constraints		
• Lack of access to the privileges of marriage	Advantages DSPFs	Include as a control
• Stigma/discrimination against same-sex couples and their children	Advantages DSPFs	Include as a control
2.2 In the control of parents: Factors related to parents' inherent ability to raise well-functioning children		
• Poor parenting due to a lack of male and female role models for children	Advantages DSPFs	Do not include as a control
• Poor parenting due to lower investments in nonbiological children	Advantages DSPFs	Do not include as a control
• Greater commitment to parenthood	Advantages SSPFs	Do not include as a control
• Double dose of motherhood (female same-sex couples only)	Advantages SSPFs	Do not include as a control

[a] Some scholars consider this to be a mediator rather than a confound, in which case there would be no need to control for it in the statistical models.

should be treated as confounds or mediators of the associations between parental sex composition and child outcomes. The dominant view is that such differences are better conceptualized as confounds (Boertien and Bernardi 2019; Potter 2012; Rosenfeld 2010, 2013, 2015), which is consistent with how they are treated in the broader field examining the outcomes of children in other nontraditional family forms (Fomby and Cherlin 2007; McLanahan et al. 2013; Powell et al. 2016). Proponents of this perspective stress that children living in same-sex-parented families are more likely to have experienced the dissolution of a previous—usually different-sex-parented—family (Gates 2015; Potter 2012; Rosenfeld 2013, 2015), and that family instability is often traumatic to children and a major contributing factor to suboptimal child outcomes (Fomby and Cherlin 2007; McLanahan et al. 2013). Thus, failure to adjust statistical models for family history and stability means that any negative repercussions stemming from the breakdown of a previous family are erroneously attributed to children's experiences in their subsequent same-sex-parented families (Rosenfeld 2013, 2015).

An alternative perspective is to conceptualize family stability as a mediator in the relationship between parental sex composition and children's outcomes (Allen et al. 2013; Regnerus 2012b). The few scholars advocating this view implicitly or explicitly claim that family instability is either an intrinsic feature of same-sex parenthood (because many children enter same-sex-parented families from a dissolved different-sex-parented family) or that it is inherent to same-sex relations (e.g., on the grounds of lifestyle or relationship preferences). If one assumes this to be true, then adjusting the models for differences in life-course family stability would be statistically inappropriate because it would suppress channels through which parental sex composition may affect child well-being.

Here, we adhere to the dominant view that such differences are better conceptualized as confounds for three reasons. First, the logic portrayed by this perspective is appealing at face value. If children in same-sex-parented families have experienced instability prior to entering these families, any negative consequences of such instability should not be attributed to their current family. Second, as we discuss later, we observe that the share of children entering same-sex-parented families after the breakdown of a different-sex-parented family is falling steadily. This finding suggests that this pathway to family formation is not an immutable feature of same-sex parenthood but is rather the by-product of contextual and legislative barriers faced by same-sex parents. Third, as explained later, our data yield no empirical evidence in support of the claim that same-sex-parented families are less stable than different-sex-parented families. Nevertheless, whether life-course family stability is treated as a mediator or a confound does not change the main conclusions drawn from our empirical analyses.

Outcomes of Children in Same-Sex-Parented Families: Empirical Evidence

Many studies have attempted to identify the empirical associations between parental sex composition and child well-being. With a few exceptions (Allen 2013; Allen et al. 2013; Regnerus 2012a), studies find no statistically significant differences in the outcomes of children raised by same-sex and different-sex parents (see reviews by Adams and Light 2015; Allen 2015; Manning et al. 2014; Patterson 2006). Multiple

commentators, however, have pointed to significant data-driven limitations that cast doubts over the robustness of these findings (Allen 2015; Marks 2012; Regnerus 2012a; Schumm 2008). Key criticisms include the use of nonprobability samples (resulting in estimates that cannot be extrapolated to the broader population), modelling of parent-reported measures of child well-being (which may suffer from subjective biases), and reliance on small samples of children in same-sex-parented families (which limits statistical power to detect group differences).

Regnerus' (2012a) controversial study serves as a cautionary tale about the catastrophic consequences that poor data and methodological practices can exert on the findings of empirical studies in this field. Regnerus' (2012a) findings seemed to indicate that adults raised by same-sex parents experienced significantly worse outcomes than those raised by different-sex parents, as indicated by a host of measures of health and socioeconomic attainment. However, subsequent reanalyses of the data used to reach these conclusions demonstrated that such associations were almost entirely due to an array of misclassification, measurement, and analytic problems (see Cheng and Powell 2015; Rosenfeld 2015).

State-of-the-Art Empirical Studies and Unresolved Issues

Only a handful of peer-reviewed studies have analyzed representative data sets containing large subsamples of children with same-sex parents, and all have evaluated the timeliness of children's school progress. The results of these state-of-the-art studies have been mixed. On the one hand, three analyses of U.S. Census-based data—either the 2000 U.S. Census or the American Community Survey—revealed no statistically significant differences in grade retention between children in same-sex-parented and different-sex-parented families (Boertien and Bernardi 2019; Rosenfeld 2010; Watkins 2018). On the other hand, a reanalysis of the 2000 U.S. Census by Allen et al. (2013) yielded higher grade retention among children in same-sex-parented families, and an analysis of the 2006 Canadian Census by Allen (2013) revealed comparatively lower high school graduation rates among these children.

However, even these state-of-the-art studies suffer from significant methodological shortcomings that potentially compromise their findings. First, they all used census-based data, which are subject to selective nonresponse and misreporting of information that could be used to identify vulnerable subpopulations (Massey and Tourangeau 2013; Van Hook and Bachmeier 2013). These issues can distort the representativeness of the families with same-sex parents identified in the data.

Second, because of data limitations, the studies used unreliable methods to identify same-sex-parented families, requiring multiple assumptions to determine which households contain same-sex couples and which individuals in those households are their children. Name-matching techniques suggest that up to 40% of same-sex couples identified in census data could be miscoded different-sex couples (Black et al. 2007; Kreider and Lofquist 2014). Further, only children whose parent self-identified as head of the household in the census could be reliably identified as living in a same-sex-parented family (Boertien and Bernardi 2019).

Third, these studies measured timely school progress indirectly by comparing child's age and school grade (or graduation). This method ignores that many parents

deliberately delay their children's school entry—a process known as academic red-shirting, which leads to misclassification of approximately 20% of children (Frederick and Hauser 2008). In addition, the focus on timely school progress may mask substantial variation in children's overall academic abilities, reducing the comparison to a crude indicator of severe underperformance.

Fourth, these studies relied on cross-sectional data containing little to no information on the amount of time children have spent in their current family or on the number of family transitions they have experienced. As explained before, the inability to adjust statistical models for family stability means that these studies may have conflated the initial disadvantage experienced by many children entering families with same-sex parents after birth with their educational progress while they live with such families (Rosenfeld 2013, 2015).

Analytic Advantages of the Dutch Linked Administrative Data

In this study, we analyze the academic performance of children in same-sex-parented and different-sex-parented families using population-level, linked administrative data from the Netherlands.[3] These data offer a host of unique advantages over the data sets used in previous studies. First, they cover the entire population of the Netherlands, thus enabling our analyses to avoid issues with sampling and selective nonresponse. Further, because the Netherlands is a relatively populous country (17.2 million inhabitants in 2018), we can analyze a substantially larger number of children in same-sex-parented families ($n = 3,006$) than most of the earlier studies.

Second, the data enable us to identify same-sex-parented families with a high degree of accuracy. We use information from several linked population registers to identify both married and cohabiting same-sex couples with children, while ensuring that the cohabiting group does not include false positives (e.g., households comprising two single adults with children, or a single parent living with the child's grandparent). An important distinction between this study and census-based studies (e.g., Allen 2013; Allen et al. 2013; Boertien and Bernardi 2019; Rosenfeld 2010; Watkins

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[3] Other studies exploiting the properties of Dutch administrative data have been in development in parallel to the present study. A study by Mazrekaj et al. (2019) utilized similar data to compare children's test scores. Despite ineluctable similarities between our study and theirs, the two pieces of work complement rather than duplicate each other. Mazrekaj and colleagues focused on devising and implementing a methodology for causal analysis (e.g., through the use of cousin fixed-effect models and coarsened exact matching). The present study focuses on demonstrating how methodological shortcomings have affected the conclusions of previous state-of-the-art studies, providing a more in-depth examination of the role of family instability and investigating the influence of parental gender composition on a greater number of educational outcomes. Given the different study aims and associated empirical strategies, the two studies also fundamentally differ in how they approach entry into parenthood and the selection of the focal sample. We consider children who entered families with same-sex and different-sex parents through all possible pathways and measure child and parental characteristics concurrent to the educational outcomes. Mazrekaj and colleagues focused primarily on a more selective sample of children born into two-parent families and living continuously in two-parent families until age 12. Further, unlike most previous studies, they measured child and parental circumstances at birth. These choices resulted in substantially different statistics, interpretations, and implications for current understandings of the mechanisms linking same-sex parenting to child outcomes.

2018) is that we retrieve parental sex and parent-child relationships from the municipal register, which minimizes the chances of miscoding (Black et al. 2007; Kreider and Lofquist 2014).

Third, the data contain multiple objective measures of academic achievement. The primary outcome of interest is the overall score from a standardized test (*Cito toets*) taken by Dutch children at the end of primary school (Grade 8, ages 11–12). The test grading is automated, eliminating the scope for favoritism, discrimination, and other implicit biases often found in teacher and parent assessments. A major advantage of the test scores over measures of grade retention is that the test scores capture differences between children across the entire ability distribution. The data also allow us to consider other measures of educational success: high school grade retention, choice of high school academic track, high school graduation, and college enrollment. All of these are objective measures retrieved from official registers and are therefore unaffected by parental misreporting. Further details regarding the test and the Dutch education system are presented in the online appendix (Section 1).

Fourth, we are able to derive remarkably comprehensive sets of child and family characteristics to be used as control variables in multivariable modelling. Critically, and unlike most previous studies, the data also allow us to derive longitudinal measures of the child's family dynamics from birth up to the time of outcome measurement. As a result, we are able to generate results that are not affected by confounding bias due to differences in family stability between children in same-sex-parented and different-sex-parented families.

The Netherlands as a Case Study

Our focus on the Netherlands also provides an important counterfactual to existing large-scale studies, all of which are based in the United States or Canada. Historically, Dutch legislation on same-sex relationships has been among the most inclusive in the world (see Table S1, online appendix). Same-sex sexual behavior was decriminalized as early as 1811—compared with 1962–2003 across the United States and 1967 in the United Kingdom. Throughout the 1980s, Dutch same-sex couples were afforded legal recognition and protection by anti-discrimination laws, and in 2001, the Netherlands became the first country to legalize same-sex marriage (Waaldijk 2001). Since then, same-sex couples have been entitled to the same marital and parenting rights as different-sex couples—including child adoption and legal parenthood status (Government of the Netherlands 2019). The Netherlands also exhibits highly progressive public opinion on same-sex relationships. In 2012, 92% of the Dutch population agreed with the statement, "Homosexual individuals (sic) should be free to live their lives as they wish" (Smith et al. 2014), with cross-national comparisons often placing the Netherlands as the country with the most accepting social attitudes toward same-sex relationships (Andersen and Fetner 2008; Smith et al. 2014).

The high levels of legislative and public support of same-sex relationships in the Netherlands suggest low levels of prejudice, stigma, and discrimination toward same-sex couples and their offspring. As a result, the outcomes of children in Dutch same-sex-parented families may be better than the outcomes of those of children in same-sex-

parented families in other countries, including the United States, the site of most previous research.[4]

Altogether, it can be argued that the Netherlands represents the best case scenario for studying the independent influence of parental sex composition on children's outcomes, given that the confounding effect of contextual factors outside of parental control—namely, stigma and discrimination—is minimized by design (as outlined in Table 1). As such, the outcomes of Dutch children living in same-sex-parented families represent a valuable counterfactual for countries with more stigmatizing social structures (e.g., the United States).

Data and Methods

All data used in this study were provided by the Dutch national statistics agency, *Statistics Netherlands*. The cornerstone of the linked administrative data set is the municipal register, which contains information on the complete population of the Netherlands for the 1994–2018 period. This register includes each person's unique identifier (based on their national identification number), date of birth, sex, and migrant background, as well as longitudinal records on their living arrangements, marital histories, places of residence, and family relations. Data from other administrative data sets (e.g., the test score, education, and tax registers) were linked deterministically to the municipal register through individuals' unique personal identifiers. The data access and release protocols are detailed in the online appendix (Section 2).

Analytic Sample

Given that the main outcome of interest is the child's *Cito* test score, we began constructing the data set by retrieving the records of the population of children who participated in the *Cito* test over the period of observation, 2006–2018 ($n = 1,786,697$). Approximately 85% of Dutch primary schools participate in the *Cito* test, and the test is compulsory for all children attending these institutions (Kortlever and Lemmens 2012). Next, we recovered the characteristics of the households in which the children resided at the time of taking the test. The focus on household characteristics at the time of the test—rather than at birth—parallels the approach of earlier studies (Allen 2013; Allen et al. 2013; Boertien and Bernardi 2019; Rosenfeld 2010; Watkins 2018).

We then isolated children living in households with two parental figures at the time of the test ($n = 1,494,382$). These are children living with both of their legal parents or with one legal parent and that parent's recognized partner. For the latter case to apply, the couple has to be in a civil union (a marriage or registered partnership), share legal parenthood of a common child, or be recognized as a cohabiting couple

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[4] Studies based on small and nonrepresentative samples of families with same-sex parents ($n = \sim 30-130$) indicate that Dutch children raised by same-sex couples fare just as well as those raised by different-sex couples (Bos et al. 2008; Bos et al. 2016; Bos et al. 2018; van Rijn-van Gelderen et al. 2015).

by the Dutch tax and welfare system. We used these conditions to prevent erroneous classification of children living in other family types (such as children living with one parent and a grandparent) as being in a family with same-sex parents. Children living in other household types at the time of the test—mostly single-parent families—were excluded from the main analyses. This exclusion was partly because it is not possible to ascertain the sexual orientation of the parental figure in single-parent families and partly because it is unclear how to compare the characteristics of parental figures in two-parent families with the characteristics of single parents or other legal guardians.

In addition, we excluded children born outside of the Netherlands ($n = 39,459$) because we could not observe their complete family histories, and a small number of children with missing sociodemographic characteristics for one or both parents ($n = 346$). The final analytical sample comprises 1,454,577 children. Analogous sample-selection protocols were followed to derive the analytical samples for models of children's later-life educational outcomes (see the online appendix, Section 4).

Identification and Incidence of Same-Sex-Parented Families

The municipal records include the sex of the parental figures, allowing us to determine whether the children were living in same-sex-parented or different-sex-parented families at the time of taking the test. Information about parental sex comes from official birth certificates or from municipal data banks. We identify 3,006 children living in same-sex-parented families: 125 were living with two male parents, and 2,881 were living with two female parents. Children in same-sex-parented families thus represent 0.2% of the sample, a share that is comparable to those reported in U.S. and Canadian studies (Allen 2013; Allen et al. 2013; Boertien and Bernardi 2019; Rosenfeld 2010; Watkins 2018).

The ratio of male to female same-sex-parented families is lower than the ratios reported in the United States and Canada (Allen 2013; Rosenfeld 2010; Watkins 2018) but virtually identical to the ratios reported in Nordic countries (Kolk and Andersson 2018; Nix and Andresen 2019). A likely reason for this discrepancy is that the Nordic countries and the Netherlands cover the costs of IVF treatment for female same-sex couples, whereas the United States and Canada do not.

Outcome Variables: *Cito* Test Scores and Later-Life Educational Outcomes

The outcome variables in the analyses include the aforementioned *Cito* test scores, as well as measures of high school grade retention, high school graduation, academic high school track enrollment, and college enrollment. *Cito* test scores are retrieved from the official register of test scores. As explained before, this is a nationwide standardized test of 11- to 12-year-old children at the end of primary school (Grade 8). The test assesses children's capabilities in Dutch language, mathematics, and learning ability (e.g., text comprehension and information processing). To ease interpretation, in the regression models, we normalize the test scores so that they are expressed as standard deviations (SD). Specifically, we use year-specific moments

of the grade distribution to account for year-on-year differences in test difficulty and student achievement.

Of note, two changes to the tests were implemented in 2015. First, the stand-alone learning ability module was discontinued, and the questions contained within it were incorporated into the Dutch language and mathematics modules. Second, the Dutch government allowed schools to select test providers other than *Cito*. This led some participating schools to change the test provider, reducing the pool of children taking the *Cito* test by approximately 10%. As detailed later, sensitivity analyses excluding data for years 2015–2018 yielded consistent results (online appendix, Section 3).

Information on later-life educational outcomes comes from the education register. We use this information to derive a set of binary variables taking a value of 1 if the education outcome is realized and a value of 0 otherwise. *High school grade retention* is measured directly, meaning that a child must be enrolled in the same grade for two consecutive years to be coded as having repeated a grade. This measure is therefore not distorted by parental misreporting, academic red-shirting, or other factors influencing the timeliness of children's school entry (Frederick and Hauser 2008). Over the observation period, approximately 19% of children repeated a high school grade.[5] *High school graduation* is evaluated at age 19, when the vast majority of youth have already finished high school. Over the observation period, 91% of 19-year-old Dutch youth had graduated from high school.[6] Both the grade retention and high school graduation variables capture ability differences among relatively low-performing students. In contrast, the *academic high school track enrollment* (measured in Grade 12) and *college enrollment* (measured at age 19) variables capture ability differences among relatively high-performing students. The academic high school track encompasses approximately 22% of high school students and prepares them for college education. College education in the Netherlands is highly selective, with only 14% of 19-year-olds being enrolled in college. Of the remaining 19-year-olds, 23% are enrolled in a professional bachelor program, and 63% are not pursuing a tertiary degree.[7] In the presented analyses, we restrict the outcome measure to enrollment into college bachelor programs because these are the most selective and prestigious degrees.

Control Variables

The models control for a comprehensive set of factors known or suspected to be correlated with both same-sex parenting and children's educational outcomes (Boertien and Bernardi 2019; Potter 2012; Rosenfeld 2010, 2013; Watkins 2018). The control

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[5] Although this is a relatively high retention rate for international standards, it is consistent with PISA data (OECD 2011). In such data, the combined primary and secondary school grade retention in 2009 was approximately 14% in the United States and 24% in the Netherlands.

[6] This is comparable to the U.S. high school graduation rate over the same period (NCES 2017).

[7] The U.S. college enrollment rate over the same period was 40% (NCES 2018), which is comparable to the combined college and professional bachelor enrollment in the Netherlands (37%).

variables are divided into three thematic sets. First, *family sociodemographic charac-teristics* include measures of the child's sex and adoptee status;[8] number of children in the household; province of residence; urbanization level; year of the *Cito* test, parents' civil union status; and each parent's ethnicity, migrant background, and birth cohort. Time-varying variables—such as civil union status or residential characteristics—are measured when children take the *Cito* test.

Second, *family socioeconomic status* includes measures of parental educational attainment, labor market participation, disability, and income. Information on income is linked from the tax registers and enters the model as a set of dummy variables cor-responding to deciles of the joint parental income distribution.[9]

The third set of controls captures *children's life course family dynamics* and includes measures that are not available in census-based data (see also Potter 2012; Rosenfeld 2015). We use two main longitudinal measures: the number of residential moves and the number of changes in family structure experienced by the child prior to taking the test. Each of these measures enters the model as a set of nine dummy variables, dis-tinguishing up to eight moves/changes. With respect to residential mobility, we count only those cases in which a family moves to another municipality.[10] With respect to household structure, we focus on fundamental changes that are indicative of family dissolution and/or parental repartnering.[11] We also control for the initial household composition at birth, distinguishing children born to the parental figures with whom they reside at the time of taking the test, children born to a different couple, children born to a single parent, children born into other family arrangements, and children who were institutionalized at birth.

Modelling Approach

We begin the multivariable analysis by fitting an unconditional, ordinary least squares, linear regression model in which the outcome variable is the normalized *Cito* test score and the sole explanatory variable is a dummy variable equal to 1 if the child lives in a same-sex-parented family and 0 if the child lives in a different-sex-parented family. However, the unconditional differences in test scores estimated by this model may be confounded by differences in the characteristics of different-sex-parented and same-sex-parented families. Thus, we estimate a series of additional models in which we gradually add controls for family demographics, family socioeconomic status, and children's life course family dynamics. The model with the full set of control variables constitutes the principal model specification. We use the same model specification to

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[8] A child is considered to be adopted if neither parent is a biological parent. Adoptions of stepchildren by their stepparents are not recorded in the register data.

[9] We also include a dummy variable identifying parents whose observed income level is negative because these are distinct from the parents with low—but positive—income levels.

[10] There are 355 municipalities in the Netherlands, averaging a population of 52,000 and an area of 95 square kilometers.

[11] A change is counted if the child's household structure changes from two-parent to single-parent house-hold (or vice versa), one of the parental figures is replaced by a new partner, or the child moves into or out of a nonstandard household type (e.g., living with grandparents).

Table 2 Selected summary statistics of children and their families in the main analytical (*Cito* test) sample

Variable	Different-Sex-Parented Children		Same-Sex-Parented Children	
	Mean	SD	Mean	SD
Child's *Cito* Test Scores (percentiles)				
Overall	51.54	29.02	55.23	28.96
Language	51.93	29.10	56.96	28.88
Mathematics	52.08	29.15	53.22	29.13
Learning ability	53.60	29.38	58.00	29.09
Demographic Characteristics				
Parents married (%)	88.07		44.88	
Parents registered partners (%)	1.03		17.03	
Both parents are first-generation immigrants	9.49		5.06	
Number of children in the household	2.50	0.96	2.06	0.85
Socioeconomic Background				
Both parents are college-educated (%)	12.07		22.12	12.07
Both parents are employed (%)	75.39		76.51	
Annual gross income, deflated (in €1,000)	93.75	54.65	89.89	50.70
Family Dynamics				
At least one residential move (%)	29.23		36.06	
Total number of residential moves	0.38	0.70	0.58	0.99
At least one change of family structure (%)	10.44		57.35	
Total number of changes of family structure	0.24	0.79	1.31	1.54
Initial household composition (%)				
Couple household, same parents	91.57		44.15	
Couple household, different parents	5.79		44.68	
Single-parent household	2.18		8.98	
Other household types/institutionalized	0.46		2.19	
Share of life in a same-sex household	0.00	0.34	63.61	37.38
Number of Observations	1,451,571		3,006	

Notes: Test scores and family characteristics of children in two-parent families who participated in the *Cito* test between 2006 and 2018. Table S2 in the online appendix shows the full set of summary statistics.

evaluate the subject-specific *Cito* test scores. To explore heterogeneity in the association between same-sex parenting and child outcomes, we fit additional models interacting the same-sex parenting dummy variable with parental sex and child's sex. Because later-life educational outcomes are specified as discrete binary variables, we model them using logistic regression models. For ease of interpretation, estimates from logistic regression models are expressed as average marginal effects (AMEs). All regression models feature heteroskedasticity-robust standard errors.[12]

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[12] The need for measures of statistical uncertainty in population-level analyses and their interpretation have been the subject of debate. Detractors argue that these measures are intended for analyses of *samples* from an underlying population and that uncertainty becomes irrelevant when sampling-frame coverage reaches 100% (Desbiens 2007). Advocates argue that population-level *p* values express the chances of the observed differences manifesting in a super-population, which may consist of the same population observed under different states of the world or the population of countries with comparable characteristics (see Gelman 2005; Graubardand and Korn 2002).

Empirical Evidence

Descriptive Statistics

In Table 2, we present key descriptive statistics on the analytic variables for children living in different-sex-parented and same-sex-parented families (Table S2 in the online appendix shows descriptive statistics on the full set of variables). On average, children in same-sex-parented families attain overall *Cito* test scores that are 5 percentile points higher than those of children in different-sex-parented families. This advantage is sustained across all test subjects, with a magnitude ranging from 1.1 percentile points (mathematics) to 5 percentile points (language).

Table 2 further reveals important differences in the characteristics of same-sex-parented and different-sex-parented families. Parents in same-sex-parented families are more likely to be university-educated, less likely to be in a civil union and to be first-generation immigrants, and have fewer children on average. They are also slightly more likely to be dual earners, and despite their higher educational attainment, average parental income is 6% lower in same-sex-parented families.

The most striking differences, however, pertain to family dynamics. Most children in different-sex-parented families (92%) live with their birth parents, having experienced little to no fundamental change in their family structure over the first 11 years of their lives. The same applies to only 44% of children in same-sex-parented families. That is, more than half of 11-year-olds living in same-sex-parented families experienced a major change in their family structure. For most, this included the dissolution of their different-sex-parented birth family and subsequent repartnering of one or both parents.

Nevertheless, fewer and fewer children in same-sex-parented families experience family instability. The share of children in same-sex-parented families who were born into those families grew from 30% in 2006 to 58% in 2018. This piece of evidence is important because it supports our previous argument that family instability is not an intrinsic feature of same-sex parenthood.[13] Accordingly, the statistical models should treat family dynamics as confounds. Failure to account for them may produce artificially worse outcomes for children in same-sex-parented families.

Regression Models

In Table 3, we present regression results corresponding to the unconditional model of overall *Cito* test scores and to the three models with gradually expanded sets of control variables. The unconditional model results in the first column indicate that the average test scores of children in same-sex-parented families are 11.8% of an SD higher than those of children in different-sex-parented families ($\beta = 0.118$, $p < .01$). Adding controls for child and family sociodemographics does not change the mag-

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[13] This view is also supported by the results of auxiliary analyses of union dissolution, which indicate that—net of differences in observables characteristics—there are no significant differences in the risk of dissolution between same-sex-parented and different-sex-parented families (results available upon request).

Table 3 Coefficients (standard errors) from ordinary least squares regression models of children's *Cito* test scores, principal model estimates

	Model 1	Model 2	Model 3	Model 4
Parental Sex Composition (ref. = different-sex-parented family)				
Same-sex-parented family	0.118***	0.118***	0.053***	0.120***
	(0.018)	(0.018)	(0.017)	(0.017)
Family Sociodemographic Controls[a]		Yes	Yes	Yes
Socioeconomic Status Controls[b]			Yes	Yes
Family Dynamics Controls[c]				Yes
n	1,454,577	1,454,577	1,454,577	1,454,577
R^2	<.001	.051	.138	.141

Notes: The analyses use linked administrative register data from the Netherlands (2006–2018) for children living in two-parent families at the time of the test. Table S3 in the online appendix shows the full set of regression coefficients.

[a] Parental immigration, ethnic background, marital status, and birth cohort; household residential characteristics; and child's sex and adoptee status.

[b] Parental education, employment, disability, and income.

[c] Number of residential moves since birth, number of changes in family structure since birth, and household structure at birth.

***$p < .001$

nitude of this association ($\beta = 0.118$, $p < .01$). Expanding the model further by adding controls for family socioeconomic status, however, reduces the association to 5.3% of an SD ($\beta = 0.053$, $p < .01$).[14] Finally, adding longitudinal controls for family dynamics substantially increases the advantage associated with living in a same-sex-parented family to 12% of an SD, with the regression coefficient ($\beta = 0.120$, $p < .01$) being significantly different from the coefficient in the previous model ($p < .01$).[15]

The results of the additional models presented in Table 4 indicate that the advantage associated with living in a same-sex-parented family applies to all *Cito* test domains, even after we account for confounds. Results from Wald tests ($p < .01$) reveal that the advantage is larger for language ($\beta = 0.131$, $p < .01$) and learning ability ($\beta = 0.130$, $p < .01$) than for mathematics ($\beta = 0.079$, $p < .01$). Full sets of regression coefficients for these models can be found in Table S4 in the online appendix.

The last two columns of Table 4 examine heterogeneity in the principal results with respect to children's and parents' sex. The models reveal a statistically significant advantage among children in female same-sex-parented families ($\beta = 0.121$,

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[14] Supplementary analyses introducing variables within the family socioeconomic status vector one at a time (available upon request) suggest that this reduction is largely due to the higher educational attainment of same-sex parents.

[15] This advantage also emerged in models conditioning the estimated same-sex-parenting association on children's initial family composition (i.e., same family, different-couple family, single-parent household, or other arrangements). Further, differentiating the initial breakdown of different-sex-parented family from the other family transitions experienced by children in same-sex-parented families did not alter the results (see the online appendix, Section 3).

Table 4 Coefficients (standard errors) from ordinary least squares regression models of children's *Cito* test scores, estimates for specific test domains

Variables	*Cito* Test Score: Language	*Cito* Test Score: Mathematics	*Cito* Test Score: Learning Ability	*Cito* Test Score: Overall	*Cito* Test Score: Overall
Parental Sex Composition (ref.=different-sex-parented family)					
Same-sex-parented family	0.131***	0.079***	0.130***		
	(0.016)	(0.017)	(0.020)		
Parental Sex Composition (ref.=different-sex-parented family)					
Female same-sex-parented family				0.121***	
				(0.017)	
Male same-sex-parented family				0.082	
				(0.092)	
Parental Sex Composition and Child Sex (ref.=children of the respective sex in a different-sex-parented family)					
Boy in a same-sex-parented family					0.130***
					(0.024)
Girl in a same-sex-parented family					0.109***
					(0.023)
Family Sociodemographic Controls[a]	Yes	Yes	Yes	Yes	Yes
Socioeconomic Status Controls[b]	Yes	Yes	Yes	Yes	Yes
Family Dynamics Controls[c]	Yes	Yes	Yes	Yes	Yes
n	1,454,577	1,454,577	1,049,087	1,454,577	1,454,577
R^2	.151	.119	.128	.141	.141

Notes: The analyses use linked administrative register data from the Netherlands (2006–2018) for children living in two-parent families at the time of the test. The number of observations for the model of learning ability scores is lower because the module was discontinued in 2015, and its questions were incorporated into the other two modules. Tables S4 and S5 in the online appendix show the full set of regression coefficients.

[a] Parental immigration, ethnic background, marital status, and birth cohort; household residential characteristics; and child's sex and adoptee status.

[b] Parental education, employment, disability, and income.

[c] Number of residential moves since birth, number of changes in family structure since birth, and household structure at birth.

***$p < .001$

$p < .01$). The coefficient for children in male same-sex-parented families is also positive ($\beta = 0.082$) but is not statistically different from 0 ($p > .1$) or from the female coefficient ($p > .1$ in a Wald test). This is most likely due to the low number of children in male same-sex-parented families ($n = 125$). Finally, we find no statistically significant differences in the advantage associated with living in a same-sex-parented family for male ($\beta = 0.130$; $p < .01$) or female ($\beta = 0.109$; $p < .01$) children ($p > .1$ in a Wald test).

Table 5 Average marginal effects (in percentages) and standard errors from logistic regression models of children's later-life educational outcomes

Variables	High School Grade Retention	Academic High School Track Choice	High School Graduation (by age 19)	College Enrollment (by age 19)
Parental Sex Composition (ref. = different-sex-parented family)				
Same-sex-parented family	−3.45	21.61***	1.47*	11.20*
	(3.47)	(3.11)	(0.59)	(4.75)
Family Sociodemographic Controls[a]	Yes	Yes	Yes	Yes
Socioeconomic Status Controls[b]	Yes	Yes	Yes	Yes
Family Dynamics Controls[c]	Yes	Yes	Yes	Yes
n	1,812,466	1,812,466	2,102,945	2,102,945
Pseudo-R^2	.034	.125	.266	.179

Notes: The analyses use linked administrative register data from the Netherlands (2005–2017) for children living in two-parent families when attending secondary school (by age 15 for the first two models, and by age 17 for the latter two models). Table S10 in the online appendix shows the full set of regression coefficients.

[a] Parental immigration, ethnic background, marital status, and birth cohort; household residential characteristics; and child's sex and adoptee status.

[b] Parental education, employment, disability, and income.

[c] Number of residential moves since birth, number of changes in family structure since birth, and household structure at birth.

*$p < .05$; ***$p < .001$

The results from regression models of later-life educational outcomes are presented in Table 5. Full sets of descriptive statistics for these subsamples and model results are presented in Tables S9 and S10 in the online appendix. Consistent with previous studies (Boertien and Bernardi 2019; Rosenfeld 2010; Watkins 2018), we find that children in same-sex-parented families do not differ from children in different-sex-parented families in terms of grade-retention rate (AME=−3.45%, p=.32). Children with same-sex parents, however, outperform those with different-sex parents across all other outcomes; they are more likely to enter an academic (i.e., advanced) high school track (AME=21.61%, p<.01), graduate from high school (AME=1.47%, p=.01), and enroll in college (AME=11.20%, p=.02).

Importantly, our results were robust to a range of alternative methodological choices and model specifications.

Sensitivity Analyses

To ensure that our principal results were not distorted by our analytic choices, we performed an encompassing set of robustness checks. A detailed discussion of each alternative specification and the corresponding results can be found in the online appendix (sections 3 and 4). Here, we provide an overall summary.

First, we estimated a series of models with different sample selection criteria: excluding children with parents who have missing education records, excluding
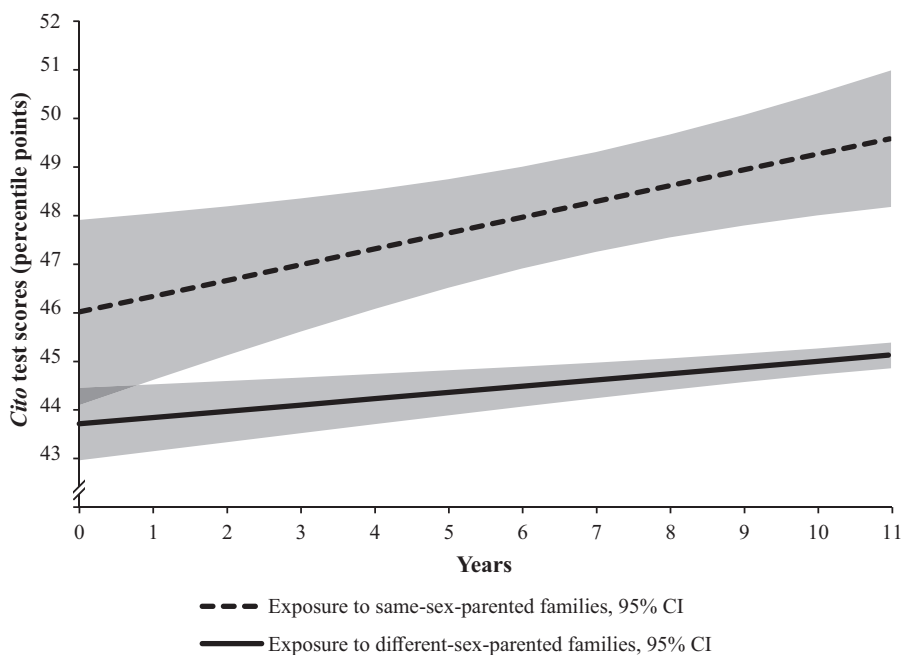
Fig. 1 Dependence of *Cito* test scores on the number of years spent in families with same-sex and different-sex parents. The predictions correspond to a hypothetical child with median characteristics who is 11 years old and resides in a two-parent family at the point of taking the test. Shaded areas surrounding the prediction lines correspond to 95% confidence intervals.

children with parents who are first-generation immigrants, including children in single-parent families and other family types, and excluding test scores for the years 2015–2018 given the aforementioned changes in test administration. Each of these models yielded results that were consistent with the principal model specification (see Tables S5 and S6, online appendix).

Second, we estimated a series of models expanding on the role of family transitions in same-sex-parented families. Full estimates for these models are presented in Tables S6 and S7 (online appendix). One such model used an additional dummy variable accounting for any exposure to same-sex parenting over the child's life. The coefficient corresponding to this variable relates to children who were exposed to same-sex parenting but who were not part of a same-sex-parented family at the time of taking the test. Children in this category outperformed children who had not experienced same-sex parenting ($\beta = 0.093$; $p = .09$), although their estimated advantage was somewhat smaller than that of children who were still living in a same-sex-parented family at the time of the test.

Expanding on this finding, we assessed whether children with longer exposure to same-sex parenting attained higher test scores. Using a model explicitly controlling for the length of time living in a same-sex parented family, we identified that longer exposure to same-sex-parenting was associated with larger gains in *Cito* test scores than longer exposure to different-sex parenting. The key results are presented in Figure 1, which plots the dependence of the *Cito* test score advantage on the time spent

in same-sex-parented and different-sex-parented families for a child with median characteristics.

We also estimated a model conditioning the same-sex parenting coefficient on the child's household composition at birth. This adjustment allowed us to quantify the influence of same-sex parenthood on children who entered their families through similar pathways. The results showed that the test score advantage of children in same-sex-parented families emerges irrespective of the initial household composition. In addition, we estimated a model separating the effects of the initial breakdown of a different-sex-parented family and those of other family transitions experienced by children in same-sex-parented families. To this end, we added an extra dummy variable equal to 1 if children in same-sex-parented families experienced the initial breakdown of a different-sex-parented family, and 0 otherwise. The results showed that the test score disadvantage stemming from the initial breakdown of a different-sex-parented family is comparable to the disadvantage stemming from other types of family transitions.

Third, we examined the sensitivity of the results to the protocols used to compare same-sex and different-sex parents and to parametrize their characteristics. In the main specification, we compared fathers in different-sex couples with the older of the two same-sex parents, and mothers in different-sex couples with the younger of the two same-sex parents. The first alternative protocol sorted parents based on their education, irrespective of their sex. In each couple, Parent 1 (Parent 2) was defined as the more (less) educated one, or as the older (younger) parent when both parents had the same education level. The second alternative protocol followed the same steps but sorted parents based on their income rather than their education level. The third alternative protocol was based on a dominance approach, using only one set of parental characteristics (i.e., the dominant characteristics). To derive these, we compared the characteristics within each pair of parents and selected the characteristics that were empirically associated with higher *Cito* test scores among Dutch children. Results from all of these models were consistent with those of the main specification (Tables S7 and S8).

Fourth, we confirmed that the results of the models of high school graduation and college enrollment are not sensitive to the age at which the outcome is measured. In this regard, supplementary analyses evaluating the two outcomes at age 21 yielded similar findings (see Table S10, online appendix). In addition, the advantage of children in same-sex-parented families remained when we examined the combined college and professional bachelor enrollment rate (see Table S10).

Finally, we tested for selective enrollment at primary schools that participate in the *Cito* tests (approximately 85% of all primary schools). We found that children in same-sex-parented families were as likely to attend these schools as children in different-sex-parented families (see Table S10), indicating that selective enrollment by parental sex composition at participating schools does not affect the results of the principal analyses.

Discussion

Through innovative use of linked administrative registers from the Netherlands, we were able to generate robust answers to long-running—yet timely—questions about

the relative well-being of children raised in same-sex-parented and different-sex-parented families. The Dutch administrative data have many features that help overcome the methodological limitations that characterize previous literature on child wellbeing in same-sex-parented families. These features include complete population coverage, reliable identification of same-sex-parented families, a large number of children in same-sex-parented families, multiple objective and verifiable outcomes, and detailed measures of family dynamics over children's entire life courses. By exploiting these advantages, our analyses have moved closer to isolating the independent contribution of parental sex composition on children's educational outcomes.

Consistent with earlier findings based on less fit-for-purpose data sets (see reviews in Allen 2015; Center for the Study of Inequality 2017; Manning et al. 2014), Dutch children living in same-sex-parented families experienced no educational disadvantage relative to Dutch children living in different-sex-parented families. In fact, these children performed significantly—and sometimes substantially—better than children living in different-sex-parented families. Adjusting for an encompassing set of observable characteristics and circumstances of children and their families, we found that children in same-sex-parented families scored, on average, 12% of an SD higher on the *Cito* tests. This corresponds to a 4 percentile point difference in the test score distribution. The association is equivalent in magnitude to moving up one quintile in the income distribution or living in a dual-earner household relative to a household in which neither parent works. Compared with children in different-sex-parented families, children in same-sex-parented families were also found to be—on average—21.6% more likely to enter an academic high school track, 1.5% more likely to graduate from high school, and 11.2% more likely to be enrolled in college by age 19. The only association between parental sex composition and children's educational outcomes that was statistically insignificant is the one for the model of high school grade retention.

Although differences were not statistically significant, we also found some evidence of greater benefits to children associated with being raised in female than male same-sex parents. These findings align with theoretical perspectives emphasizing the positive effects on children of receiving a "double dose of motherhood." That is, the comparative advantage observed for children in female same-sex-parented families may emerge because women's parenting style tends to be more conducive to positive child development than men's. This finding is consistent with Biblarz and Stacey's (2010) review of the literature, in which they document that women score higher than men on parenting skills and develop warmer, closer, and more communicative relationships with their children. Similarly, compared with married heterosexual couples, female same-sex parents played more with their children and disciplined them less, and they were also less likely to use corporal punishment, set strict limits, or impose social and gender conformity on their children (Biblarz and Stacey 2010).

Methodologically, our study showed that analyses of grade retention may fail to capture important differences in the academic achievement of children in same-sex-parented and different-sex-parented families. State-of the-art studies in the peer-reviewed literature have largely relied on analyses of census-based data in which the only available measure of child well-being was school grade retention (Allen et al. 2013; Boertien and Bernardi 2019; Rosenfeld 2010, 2013; Watkins 2018). This coarse indicator of educational success proved to be the only outcome variable for

which we did not identify any advantage among children in same-sex-parented compared to children in different-sex-parented families. Accordingly, previous studies relying solely on measures of grade retention may have overlooked important margins of educational success and generated a distorted picture of the well-being of children in same-sex-parented families—one that presented them in a less positive light.

Critically, the findings presented here also demonstrate that estimates from models that fail to control for children's life-course family dynamics are likely to be biased against children in same-sex-parented families (Rosenfeld 2010, 2013, 2015). The test score model including the full set of controls yielded a same-sex parent coefficient that was substantially larger than the coefficient corresponding to the model with conventional demographic and socioeconomic controls. A disproportionate number of children in same-sex-parented families had experienced a change in their initial family structure, a process that is known to contribute negatively to academic achievement (Fomby and Cherlin 2007; McLanahan et al. 2013). In the absence of appropriate controls, that negative effect was absorbed by the same-sex parent coefficient. As noted earlier, some scholars have argued that differences in life course family dynamics between children in same-sex-parented and different-sex-parented families should be treated as mediators—rather than confounds—of the relationship between parental gender composition and child outcomes (Allen et al. 2013; Regnerus 2012b). Even if one adheres to this view, our results still portray an advantage for children in same-sex-parented families (one that amounts to ~5% of an SD).

Despite the unique contributions of this study, several limitations must be acknowledged. First, because of data availability, the scope of the analyses is restricted to children's educational outcomes. Studies that share the advantages offered by the Dutch administrative data and that consider other domains of child well-being (e.g., physical and mental health) are thus required to complement the findings presented here. In addition, our education measures are not encompassing. In particular, we did not have access to outcomes before age 11, and we evaluated only one direct measure of achievement (the *Cito* test scores). As a result, we were unable to determine whether the role of parental gender composition on children's educational outcomes is contingent on children's age and developmental stage, particularly in the early years. Second, because only a small number of same-sex parents in the Netherlands are male, the results for children in such families were estimated with relatively low precision. Hence, we could not provide conclusive evidence that the outcomes of children in male same-sex-parented families are distinct from those of children in female same-sex parented families or children in different-sex-parented families. Third, the linked administrative data did not allow us to identify the specific processes that generate the educational advantages observed among children in same-sex-parented families. Quantitative analyses of survey data and qualitative analyses of same-sex parenting remain better positioned to uncover these mechanisms.

Given the high levels of public approval of same-sex relationships and legislative protection afforded to sexual minorities, we argue that the Dutch institutional context represents the best case study for exploring the achievement of children in same-sex-parented families. This raises the question of whether and how the findings reported here are relevant to other countries with differing institutional environments. Theoretical models of how nontraditional family structures can lead to suboptimal child outcomes often refer to the role of contextual mechanisms that remain outside

parental control (Powell et al. 2016). In relation to same-sex parenting, we have high-lighted the likely importance of two contextual factors: legislative access to marriage for same-sex couples, and the intensity of stigma and discrimination toward same-sex couples and their children. By conducting our analyses in the Netherlands, we were largely able to rule out these factors as major influences on the outcomes of children in same-sex-parented families. As a result, the associations between parental sex composition and child outcomes reported here are more likely to reflect any effects on children emerging from same-sex parenting itself than to reflect external influences outside parental control. Therefore, our findings portray a viable counterfactual of what may happen in countries with more restrictive institutional environments, should they direct comparable efforts toward the inclusion of sexual minorities.

To conclude, our findings directly contradict deficit models of same-sex parenting, as well as claims that being raised in a same-sex-parented family has an independent, detrimental effect on children. Instead, they support the idea that in sociopolitical environments characterized by high levels of legislative or public support, children in same-sex-parented families fare at least as well as children in different-sex-parented families. More broadly, this study demonstrates how linked administrative data can be deployed to address important and timely social science research questions, including questions that are difficult to answer using traditional data sources. ∎

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