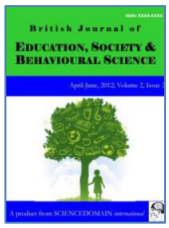

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Emotional Problems among Children with Same-Sex Parents: Difference by Definition

D. Paul Sullins[1*]

[1]*Department of Sociology, The Catholic University of America, USA.*

Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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ABSTRACT

Aims: To test whether small non-random sample findings that children with same-sex parents suffer no disadvantage in emotional well-being can be replicated in a large population sample; and examine the correlates of any differences discovered.
Methodology: Using a representative sample of 207,007 children, including 512 with same-sex parents, from the U.S. National Health Interview Survey, prevalence in the two groups was compared for twelve measures of emotional problems, developmental problems, and affiliated service and treatment usage, with controls for age, sex, and race of child and parent education and income. Instruments included the Strengths and Difficulties Questionnaire (SDQ) and the Kessler Scale of Psychological Distress (SPD). Bivariate logistic regression models tested the effect of parent psychological distress, family instability, child peer stigmatization and biological parentage, both overall and by opposite-sex family structure.
Results: Emotional problems were over twice as prevalent (minimum risk ratio (RR) 2.4, 95% confidence interval (CI) 1.7-3.0) for children with same-sex parents than for children with opposite-sex parents. Risk was elevated in the presence of parent psychological distress (RR 2.7, CI 1.8-4.3, p (t) < .001), moderated by family instability (RR 1.3, CI 1.2-1.4) and unaffected by stigmatization (RR 2.4, CI 1.4-4.2), though these all had significant direct effects on emotional problems. Biological parentage nullified risk both alone and in combination with any iteration of

**Corresponding author: E-mail: psullins@gmail.com;*

factors. Joint biological parents were associated with the lowest rate of child emotional problems by a factor of 4 relative to same-sex parents, accounting for the bulk of the overall same-sex/opposite-sex difference.

Conclusion: Joint biological parentage, the modal condition for opposite-sex parents but not possible for same-sex parents, sharply differentiates between the two parent groups on child emotional problem outcomes. For child well-being the two groups differ by definition. Intact opposite-sex marriage ensures children of the persistent presence of their joint biological parents; same-sex marriage ensures the opposite. Further work is needed to determine the mechanisms involved.

Keywords: National health interview survey; same-sex parents; child emotional problems; stigmatization; biological parentage.

1. INTRODUCTION

In the past two decades dozens of studies have concluded that children with same-sex parents fare as well or better than those in opposite-sex families on a wide range of outcomes related to child well-being and emotional health. So consistent and well-publicized has been this finding of "no differences" that it has been presented as a settled conclusion in judicial proceedings and public policy and professional settings [1-4]. Recently, however, two developments have called this finding into question: Detailed critical reviews that have exposed substantial weaknesses in many of the studies of the same-sex parenting, and the emergence of studies designed to overcome those weaknesses which claim, not without controversy, to have discovered poorer outcomes on some measures for children in same-sex families [5,6].

In a flurry of excellent detailed contrasting reviews of the same-sex parenting literature [7-9,4 defend equal outcomes; for critical reviews see 10–15,6], critics and defenders agree that a critical issue constraining clarity on the question of equal outcomes has been the lack of sufficiently large random samples of the small population of same-sex parents, leading to the persistent use of small, non-representative samples. Allen, a critic, reviewing 49 same-sex parenting studies prior to 2010, 47 of which supported some variant of "no differences", found that no study involved a representative sample large enough to distinguish differences if they existed. Rosenfeld, a defender, observes that the mean sample size of children with same-sex parents in the literature was only 39 cases [16], virtually guaranteeing Type II error (failing to detect a real effect) regarding population differences. Only four studies used a probability (random) sample; the largest of these included only 44 same-sex families. The remaining 45 studies based their findings on conveniently available or selected groups of participants, usually recruited from homophile sources such as "LGBT events, bookstore and newspaper advertisements, word of mouth, networking and youth groups" (Allen 2013:640; see this article or Manning et al. 2014 or Marks 2012 for comprehensive lists of study sample sizes and sources.). Public health studies have repeatedly recognized the severe methodological limitations, including bias and non-representativeness, of such recruited samples [17–21].

To be sure, drawing a probability sample of sufficient size to discern population differences with any statistical power presents substantial difficulties for what Rosenfeld [22] has colorfully termed the "needle-in-a-haystack" population of same-sex parents. According to the U.S. Census, same-sex couple households comprise less than 0.005 (five one-thousandths, or one-half of one percent) of U.S. households with children [23].

[1]To attain a sample of 800 same-sex couples, which has been estimated to be the minimum sample size needed to make inferences for this population [24], would require drawing at least 160,000 cases, assuming a perfect response rate. Same-sex couples, moreover, tend to have somewhat lower than normal response rates, perhaps due to stigma and female couples are more likely to be raising children than males, resulting in an extremely low yield for same-sex parents and particularly gay male parents, in randomized population samples.

[1]*The U.S. Census estimates, based on 2010 American Community Survey data, that 115,064 of the 24,443,599 U.S. households with children are comprised of same sex parents (.47 percent). [23]*

Several recent studies have attempted to improve the state of knowledge by bringing larger and truly random samples to bear on questions of same-sex parenting, with mixed results. Wainwright and Patterson [25] attempted secondary analyses using the National Longitudinal Survey of Adolescent Health, but found that the 12,105 adolescent cases in the core sample yielded only 50 identifiable children with same-sex parents; only 6 of these were male couples. Regnerus [5], in an ambitious retrospective survey collecting 2,988 cases, discovered only 39 young adults who had lived as children with same-sex parent couples for more than three years; only 2 of the same-sex parent couples were male. Both of these studies employed well-validated standard measures of key outcomes that could have distinguished differences if the number of sampled children with same-sex parents had been sufficient. Both compensated for the sparse results—Wainright and Patterson by employing matched samples, Regnerus by expanding the definition of "child with same-sex parents" to include anyone whose parent had ever had a same-sex relationship—to enable (largely contradictory) findings that, on the central question of differences between children in same-sex and opposite-sex parent families, are interesting and informative, but hardly dispositive. Regnerus' study was very controversial and has been the subject of extensive criticism [26–29].

In 2010 Rosenfeld published an analysis of school completion rates for children in same-sex families based on over 700,000 cases from the 2000 Census Public Use Micro sample [16]. The study credibly found no significant difference in school completion rates for children with same-sex parents. However, because the decennial Census obtains only demographic information, Rosenfeld was limited to a single outcome measure that was inferred from questions about child age and grade in school. Allen and colleagues challenged this finding on technical grounds [30], and Allen later published an analysis finding that, in a sample of almost 1.2 million cases from the Canadian census, high school graduation rates were 35% lower for children with same-sex parents [6]. Although coming to contrasting conclusions, both of these studies represented substantial improvements in the quality and rigor of analysis focused on children with same-sex parents. The current study endeavors to advance the state of knowledge a step further, by comparing child emotional health in opposite-sex and same-sex families using a nationally representative probability sample which both uses standard, well-validated psychometric measures of emotional problem prevalence and is sufficiently powerful to distinguish differences if they exist.

Despite the null finding of "no differences", there has been a lively interchange in the literature regarding what mechanisms might affect child outcomes with parents of different sexual orientations. The current study tests four hypotheses deriving from this debate. These are not mutually exclusive; all may pertain to some extent. The most common claim is that social stigma faced by same-sex families may affect child well-being. Children who have two mommies or two daddies may suffer higher teasing, isolation, or bullying from their peers, leading to greater emotional distress. Same-sex persons and their children report suffering stigma in many social settings [31]. Recently Crouch and colleagues, reporting on the Australian Study of Child Health in Same-Sex Families, observed: "Numerous studies have found that when there is perceived stigma, experienced rejection or homophobic bullying, children with same-sex attracted parents are more likely to display problems in their psychosocial development" [32]. Their study confirmed that stigma can be a "key factor" affecting the health and well-being of children in same-sex families. Accordingly, the present study tests the hypothesis that bully victimization accounts for at least part of any differential distress for children with same-sex parents compared to those with opposite-sex parents.

It is also often suggested that child outcomes may be negatively affected by greater transience or impermanence in same-sex parental relationships. Demographic studies show that during the period under study. Same-sex relationships dissolved at somewhat higher rates than did opposite-sex ones [33–36]. Research on divorce has suggested that family dissolution and recoupling may affect child emotional health due to increased parental conflict prior to dissolution, as an indicator of genetic traits toward lower mental health common to parent and child, or by introducing increased relational transitions that children encounter as they mature [37]. Regardless of the mechanism, such effects are powerful and persist throughout the life course [38]. Recent studies have argued that navigating any type of change in parental and/or sibling relationships, whether out of or into marriage or between other family forms for parents, tends to

reduce overall child well-being [39,40]. Homeownership has repeatedly been found to be highly correlated with residential stability, which is in turn associated with relationship duration. A recent Census analysis of 2009 data, for example, found that renters were five times more likely to move than were homeowners [41]. Family homeownership has also been found to be associated, both independently and by means of increased stability, with a variety of positive outcomes for child educational achievement and health such as persistence in school [42], greater cognitive ability and fewer behavior problems [43], higher self-esteem and happiness [44] and more engaged parenting [45]. The present study tests the hypothesis that reduced stability relative to opposite-sex families may explain part or all of any increased emotional distress experienced by children in same-sex families.

Evidence is robust that the possession of mentally or affectively ill parents is a potent risk factor for child mental or emotional distress [46–50] and that same-sex attraction is associated with elevated risk for mental disorders or psychological distress [51,19,21,52]. Parent emotional dysfunction may indicate direct genetic influence [53] or may compromise family relationships and parenting quality to induce child emotional distress [54] in both opposite-sex and same-sex families [55]. The social effects on children, moreover, have been found to be strongly gendered [56] and suggest that "opposite-sex parenting [meaning a parent that is the opposite sex of the child] is important to children's adjustment during the years of early adolescence" [57]. Taken together, this evidence suggests that parent psychological distress may be greater or transmitted to children in different ways in same-sex families, compared to opposite-sex families. The present study tests the hypothesis that this difference may account for some or all of any difference in child emotional distress.

Manning and colleagues, defending the "no differences" thesis, lament that the small sample sizes that characterize the same-sex parenting literature "can be problematic because they may prevent distinguishing between key sources of variation that differentiate same-sex parent families, such as … biological relationship of children to parents …"[4]. Although the strength of biological relatedness relative to other influences on child well-being is not clear, largely due to the difficulty of isolating genetic from family factors [58], the presence of this effect is recognized [37,59]. Adopted children, compared to those not adopted, have long been found to have higher rates of emotional and behavioral problems [60,61]. More recently Juffer and van IJzendoorn [62], in a meta-analysis of 98 studies involving over 25,000 adoptees and 80,000 non-adoptees, reported significantly more behavioral problems among the adopted children. Keyes et al., examining emotional problems among children adopted in infancy, found that "being adopted approximately doubled the odds of having contact with a mental health professional and of having a disruptive behavior disorder" [63]. Although with increased re-partnering [39] many opposite-sex families include children who are not biologically related to one of their parents, same-sex families are much more likely to include such children. Currently, same-sex couples are about ten times more likely to adopt a child than are opposite-sex couples [64,65], (Table 1). The importance of biological ties has also been proposed as one theory to account for the increased emotional and adjustment problems evidenced by children in single-parent, divorced and blended families [66,67]. Almost all studies that have examined the question, by contrast, have found that child well-being is highest, all other things equal, among children who live with both of their biological parents [68]. The present study tests the hypothesis that differences in biological parentage account for at least part of any higher child emotional distress observed in same-sex families.

Biological parentage is also related to differences between opposite-sex and same-sex parents in family structure patterns, which may help to account for differences in child outcomes. Almost all opposite-sex parents who are raising joint biological offspring are in intact marriages, but very few, if any, same-sex parents were married during the period under observation. (Same-sex partners were not permitted to marry anywhere in the United States prior to 2004 and in only a small minority of states in the U.S. after that. All same-sex partners on NHIS are coded as "cohabiting", although some, both before and after 2004, report their partner as "spouse" rather than "cohabiting partner".) In addition to two-biological-parent married families, children with opposite-sex parents in the United States also may experience a step-parent family, in which only one partner is the biological parent of the child; a cohabiting family, in which the partners are not legally married; or may be raised by a single parent. Same-sex partners are more similar to cohabiting families or to step-parent

families than they are to intact married families in that they are not legally married or that at most one partner is the biological parent of the child. Research persistently has found that children in these alternate family forms suffer lower outcomes on most measures of well-being. Differences in child emotional problem risk due to same-sex parentage may be due to constrictions of family form, such that children with same-sex parents do no worse than children with opposite-sex cohabiting or step-parent families. The present study also tests this family structure hypothesis.

2. DATA AND MEASURES

The National Health Interview Survey (NHIS) is the principal source of public health information about the United States population. Since 1957 the United States Centers for Disease Control and Prevention's National Center for Health Statistics has annually interviewed between 35,000 and 40,000 households, collecting data on 75,000 to 100,000 individuals comprising a nationally representative sample of the civilian noninstitutionalized population of the United States. Extensive health and demographic information is collected for all household members. In addition, for each family that includes children under age 18, detailed supplemental health information is collected for one child chosen at random (the "sample child"). The information is provided by one of the child's parents or other knowledgeable adult informant. Detailed year-specific information on sample design and questionnaires is available at http://www.cdc.gov/nchs/nhis/nhis_questionnaires.htm

The present study examines combined 1997-2013 NHIS data, consisting of information on 1,598,006 persons, including 207,007 sample children. Response rates for the NHIS household survey ranged from 75.7% to 91.8% over these seventeen years. The NHIS interview constructs a family roster which collects extensive background information on each family member and their relationships. As well as sex, household members who are spouses or cohabiting partners are also identified and paired. For this study, same-sex couples were identified as those persons whose reported spouse or cohabiting partner was of the same sex as themselves. This is similar to the procedure used in the U.S. Census, with the advantage that on NHIS the reported partner is clearly a sexual partner and not possibly just a roommate or unrelated adult living in the household. Recent studies have used this procedure with NHIS data to examine cigarette smoking, general health and breast cancer risk among same-sex cohabiting and spousal couples [69–72]; the present study extends such analysis to their children. The NHIS sample included 2,751 same sex couples—2,304 cohabiting and 447 spousal—consisting of 1,387 male couples and 1,384 female couples; 582 couples—406 female and 176 male—had children under age 18 in the home. A more extensive battery of health questions, including the measures of emotional health used in this study, was completed for 512 children sampled, one per family, from the same-sex parenting families.

NHIS employs a complex multistage probability sample that includes clustering, stratification and oversampling of some populations. After weighting for probability of selection, cases are stratified by race, ethnicity, region and residence within sampling units. Poststratification weights are subsequently applied to adjust the sample to the known joint distribution of age, race, ethnicity, and sex. By these means, sample representativeness is substantially improved over that of simple random sampling. In addition to adjusting variance for survey design in order to prevent inflated confidence intervals, the analytical models in this paper incorporated population and stratification weights as well as primary sampling unit and strata identifications to adjust for combining multiple years of data, based on design information provided by the CDC [73-76]. Table 1 compares selected resulting population estimates for age and family structure, including same sex spousal and cohabiting parents families, derived from the NHIS data used in this study to corresponding amounts reported by the U.S. Census. The population estimates agree very closely, providing confidence that the data and methods used in this study are accurate.

For the statistical analysis, logistic regression models were calculated using Stata 13, incorporating survey design weights with linearized variance estimates. To avoid overstating differences, relative risks were calculated rather than odds ratios, and bias-corrected confidence intervals were calculated when either proportion is less than 10. Contrasts were marginally standardized and adjusted for all other variables in the model. The adjusted risk ratios were computed using the algorithm and software developed by Norton and colleagues

[77]; selected estimates were also checked using Localio et al. bootstrap method [78], which produced nearly identical results. Goodness of fit was assessed by the F-adjusted mean residual test developed and recommended for testing the fit of logistic regression models in complex survey data, and validated using NHIS data, by Archer, Lemeshow and Hosmer [79–81].

2.1 Variables in the Analysis

2.1.1 Dependent variable

Emotional or Behavioral Problems. Beginning in 2001NHIS has in most years administered a short form of the Strength and Difficulties Questionnaire (SDQ), a widely-used screening instrument for child emotional and mental health difficulties. For the NHIS interview, parents of children aged 4-17 years were asked whether each of the following five statements were "not true" (coded zero), "somewhat true" (coded 1), or "certainly true" (coded 2) with respect to the sample child: "1) Is generally well behaved, usually does what adults request, 2) has many worries, or often seems worried, 3) is often unhappy, depressed, or tearful, 4) gets along better with adults than with other children/youth, and 5) has good attention span, sees chores or homework through to the end."[i] [2]The resulting 0-10 scale used on NHIS was calibrated against a sample with known clinical diagnoses by a team from the Harvard University School of Public Health, who discovered that a high score (6 or more) screened for 12-month clinical diagnoses, as determined by a more extensive clinical assessment, with a positive predictive value of 74%, negative predictive value of 98%, and overall concordance (AUC) of 80. [82] Other validation studies of the SDQ have demonstrated it to be a robust predictor of child mental health distress in diverse populations [83,84], as well as predicting "a significantly increased probability of meeting criteria for a DMS-IV disorder" [85]. In the present study "high SDQ" is coded "1" if the short form SDQ is 6 or greater and 0 otherwise.

On the NHIS interview parents were also asked directly: ''Overall, do you think that [sample child] has any difficulties in one or more of the following areas: emotions, concentration, behavior, or being able to get along with other people?'' The response options were 1) ''no''; 2) ''yes, minor difficulties''; 3) ''yes, definite difficulties''; and 4) ''yes, severe difficulties.'' A parental response of "yes, definite difficulties" or "yes, severe difficulties" has been found to be significantly associated with higher use of mental health and special education services. [86] Following NCHS usage [87], the present study contrasts children with "serious" difficulties, defined as those whose parents reported "definite" or "severe" difficulties, with the remainder whose parents reported no or only minor difficulties. Responses for children whose parents reported both high SDQ and serious difficulties, or who reported either one or the other, are combined to form two other summary measures of emotional or psychic distress.

2.2 Independent Variables

Models in the analysis include dichotomous controls for sex, age, and race of child, and for parental education and family income. Female is coded 1 for females and 0 for males (the reference). White contrasts nonwhite persons (the reference) with all white persons, designating nonhispanic white persons following U.S. Census categories. Age of child is coded in years and, unless otherwise noted, conceived as a continuous linear predictor. Family income as a percent of poverty is calculated as a linear predictor over three groups: Below the poverty threshold (reference); 1-3.99 times the poverty income; and 4 or more times the poverty income. Pastor and colleagues, examining emotional problems on the NHIS, found that there was no significant difference between income categories, as a ratio of the poverty threshold, until families attained at least four times the poverty income [87]. Parent education is coded 0 for less than a college degree (reference) and 1 for a college degree or more education, and reports on the higher-educated parent.

Hypothesis variables draw on secondary measures that measure the proposed causal element directly or are highly correlated with the dimension of interest. Bully victimization uses an item that asked the family informant to characterize the statement, "During the past six months [the sample child] is picked on or bullied by other children" as not true, somewhat true, or certainly true.

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[2]The full 25-question version of the SDQ was administered on the NHIS in 2001, 2002 and 2004. The 2001 NHIS values are reported by Goodman as U.S. norms for the instrument; see http://www.sdqinfo.com/USNorm.html These quantities were computed from the data used in this study, and match Goodman's published norms exactly (i.e., to one decimal point, which is all he published).

Both “certainly true” and “somewhat true” are combined into a single category and contrasted with “not true” (reference). Relational stability is measured by housing status, indicating whether the family owned (or were buying) their home or were renting. For parent psychological distress, NHIS administers the Kessler Scale of Psychological Distress (K6) “to identify persons with a high likelihood of having a diagnosable mental illness and associated functional limitations” [88]. This 24-point scale, developed by a Harvard Medical School team led by Dr. Ronald Kessler [89], has been validated by dozens of studies, and is used to estimate the prevalence of mental illness in WHO surveys worldwide, as well as the Australian and Canadian counterparts to the NHIS. Following Kessler’s scoring scheme and CDC usage, persons scoring 13 or higher were classified as experiencing non-specific serious psychological distress (SPD). Biological parentage reports three stages of biological relation between the child and both parents: 1) The child is the joint biological offspring of both parents; 2) The child is the biological offspring of only one parent. This includes all single parents. 3) The child is the biological offspring of neither parent, typically an adopted child.

Five types of parenting families are distinguished for analysis. The opposite-sex family structures replicate definitions used in a series of CDC reports of NHIS findings on family structure and health [90–92]: 1) Nuclear families, defined as “one or more children living with two parents who are married to one another and are each biological or adoptive parents to all children in the family” [90]. This is the reference category. 2) Any other married parent families, including step-parenting, adoptive and extended families. This category would include same-sex parents reporting as spouses if they were not broken out for comparison purposes. 3) Unmarried cohabiting partners with child (ren). The child may be the biological child of both partners, one of the parents may be a step-parent, or an adoptive child of one or both partners. This category would include same-sex parents reporting as unmarried partners if these were not broken out for comparison purposes. 4) Single parent families consisting of “one or more children living with a single adult” [90]. The adult may be of either sex, with a biological or adoptive child. Since NHIS did not ask about sexual orientation, this category probably includes an unknown number of same-sex oriented persons. 5) Same-sex parent couples.

3. RESULTS

Table 3 compares the unadjusted and adjusted prevalence of child emotional problems with same-sex parents and opposite-sex parents in the United States. Adjusted prevalence reports logit estimates controlling for the sex, age and race of the child and for the education and income of the parents. The three categories of measures replicate those selected by the CDC to characterize the range and depth of child emotional problems in a 2012 report on the emotional and behavioral health of America’s children [87]. An additional category in included, “Either A or B”, which is useful in the models examined later in this paper.

Four direct measures of emotional problems are included in the top four lines of Table 3; the third and fourth measures are constructed from the first two. On all four measures, children in same-sex families are at least twice as likely to experience serious emotional problems compared to their counterparts in opposite-sex families.

The top four lines of the table report on direct measures of emotional problems. On the Strengths and Difficulties Questionnaire (SDQ), children in same-sex families were over twice (2.1 times) as likely, at 9.3%, to be rated above the cutoff for emotional or behavioral difficulties than were children in opposite-sex families, at 4.4%. Likewise, same-sex parents or informants reported that their children experienced “definite” or “severe” emotional problems over twice (2.3 times) as often as did opposite-sex parents or informants. For the most restrictive test, which is both high SDQ and directly reported serious emotional problems, the proportion of children with emotional difficulties in same-sex families drops to only 6.3%, but the comparative proportion in opposite-sex families drops even more, to 2.1%, with the result that the risk ratio for same-sex families is even higher (2.9). “Either A or B”, includes children indicated for emotional problems by either of the first two measures, reporting somewhat larger proportions but a smaller risk ratio (2.3) for same-sex families compared to opposite-sex families. This item, with a more inclusive categorization and lower discrimination between opposite-sex and same-sex families, is thus a more conservative measure both substantively and statistically, as being least likely to overstate opposite-sex/same-sex differences, and is the preferred measure for analysis in this paper.

Table 1. Same-sex households in 2005: NHIS 1997-2013 Compared to U.S. Census Estimates (CPS and ACS)

	NHIS	U.S. Census
U.S. Population	289,564,000 (100)	291,166,000 (100)
White Population – N (%)	236,252,000 (81.6)	238,920,000 (82.1)
Pop age 15 and over – N (%)	228,733,000 (79.0)	230,435,000 (79.1)
Married – N (%)	123,124,000 (53.8)	122,350,000 (53.1)
Widowed – N (%)	13,331,000(5.8)	13,860,000 (6.0)
Divorced – N (%)	17,565,000 (7.7)	22,302,000 (9.7)
Separated – N (%)	4,117,000 (1.8)	4,829,000 (2.1)
Never Married – N (%)	68,827,000 (30.1)	67,096,000 (29.1)
Same-sex partner households – N (%)	599,600 (100)	565,000 (100)
Male – N (%)	297,800 (49.7)	271,000(48.0)
Percent With Children	*11.9*	*13.9*
Percent Reporting as Spouse	*17.3*	*24.3*
Female – N (%)	301,800 (50.3)	294,000(52.0)
Percent With Children	*26.8*	*26.5*
Percent Reporting as Spouse	*14.8*	*28.6*

Includes only the civilian noninsitutionalized population of the United States. U.S. Census population numbers are from Current Population Survey, Annual Social and Economic Supplement 2005, Age and Sex Composition in the United States 2005, Table 1, at https://www.census.gov/population/age/data/2005comp.html NHIS estimates are derived from CDC/NCHS, National Health Interview Survey, 1997-2013 data estimating at the midpoint of 2005, and are rounded to the nearest thousand. NHIS marital status assignment includes two nonresponse categories, totaling about 0.8 percent, which are not shown. Census same-sex household estimates are from the 2008 American Community Survey

Pastor and colleagues reported on three developmental conditions that were highly correlated with emotional problems. Of children whose parent or informant reported both a high SDQ score and serious emotional problems, 58% had been diagnosed with ADHD, 49% had a learning disability and 7% had an intellectual disability; 72% had one or more of these three [87]. The four middle lines of Table 3 compare children in opposite-sex and same-sex families with regard to any or all of these developmental conditions. Consistent with the direct measures of emotional problems, children in same-sex families were 1.8 to 2.1 times more likely to have been diagnosed with one of these developmental conditions. The adjusted difference is not significant, however, for intellectual disability.

The CDC also reported that children identified with emotional problems were more likely to receive special education services (41%), see a general doctor for mental health (47%) or see a mental health professional such as a psychiatrist or licensed counselor (58%). Eight in ten children (80%) with emotional problems had received at least one of these services [87]. The four lines in Table 3 under the heading "Treatment/Service Use" compare children with opposite-sex and same-sex parents on these four variables. Although the proportion of children in same-sex families using these services is higher than that of children in opposite-sex families, the adjusted difference is trivial for seeing a mental health professional and is not statistically significant for the use of special education services. However, children in same-sex families were more than twice as likely to have seen a general physician for mental health issues and about 1.7 times as likely to have used at least one of the three services reported in the table-differences that are significant at 1%.

In sum, Table 3 reports that children with same-sex parents are assessed at higher levels of distress, compared to children with opposite-sex parents, for every measure of child emotional difficulty, developmental difficulty or treatment service. For eight of the twelve psychometric measures presented in the table, both adjusted and unadjusted differences between same-sex and opposite-sex families are clear, statistically significant, of substantial magnitude and to the advantage of opposite-sex families. For all but one item (Learning Disability), prevalence and same-sex parent risk are slightly higher in the presence of controls for age, sex, race, education and income.

3.1 Analysis of Confounders

To understand the differences further, risk contrasts adjusted for the four confounders presented in the Introduction were estimated from binomial logistic regression models predicting either a high SDQ score or reported

serious emotional problems, i.e. the variable reported as "Either A or B" in Table 3.

3.1.1 Same-sex versus opposite-sex contrasts

Table 4 presents six models exploring the first four causal hypotheses presented in the Introduction. The dependent variable is either high SDQ score or reported serious emotional problems. The coefficient reported in these models is the adjusted risk ratio, which describes the likelihood of children experiencing emotional problems who have same-sex parents compared to those with opposite-sex parents. Model 4.1 presents the baseline comparison. This model is identical to the unadjusted prevalence shown in Table 3; its relative risk of 2.1 is precisely the ratio of the two proportions shown for "Either A or B" in Table 3, that is, 14.9% for children with opposite-sex parents and 7.1% for children with same-sex parents. Model 4.1 reports that, when no other factors are considered, children with same-sex parents are more than twice as likely to manifest emotional problems than are children with opposite-sex parents.

Model 4.2 includes the same control variables already reported in Table 3. For ease of interpretation the age control in the models in Table 4 is fit as linear, not categorical. The relative risk of 2.38 predicted by Model 4.2 thus differs slightly from the risk corresponding to the proportions reported in Table 3, which is 2.28. Model 4.2 predicts that when sex, age, and race of child and the education and income of the parents are held constant, children in same-sex families are at 2.38 times the risk of emotional problems compared to children in opposite-sex families.

The next four models in Table 4 (Models 4.3-4.6) introduce variables to test each of the four explanatory hypotheses discussed above. Model 4.3 presents housing status as a measure of residential and thus relational instability. The coefficient for instability is significant and including it improves model fit, suggesting that family stability has an important effect on the development of child emotional problems.

Model 4.4 tests the effect of stigmatization. The risk of emotional problems is over four times (4.33) greater among children who have been picked on or bullied by their peers than among those who have not, but including stigmatization in the model has no explanatory effect on the relative risk due to having same-sex parents, actually increasing it slightly (from 2.36 to 2.38).

Model 4.5 examines the effect of parental serious psychological distress (SPD). As predicted, parent SPD is strongly associated with child emotional problems; in Model 4.5, children of parents with SPD are at three (2.99) times the risk of developing emotional problems compared to those whose parents do not have SPD. Fitting this association, however, does not reduce, but increases by 15%, children's risk ratio for emotional problems due to having same-sex parents.

Model 4.6 fits all three confounders for instability, peer stigmatization or victimization and parent SPD. All three effects are moderated slightly when combined.

Model 4.7 tests the effect of biological parentage. Including this variable in the model reduced the relative risk of child emotional problems with same-sex parents by 39% and the resulting risk ratio was no longer statistically significant.

3.2 Family Structure Contrasts

Table 5 presents logistic regression models testing the family structure hypothesis. Since the relative risk with same-sex parents is the question of interest, each category of family structure shown in Table 5 serves as the reference group for the relative risk of child emotional problems with same-sex parents, expressed by the exponentiated coefficient (risk ratio) reported for each model. Model 5.1 presents the baseline unadjusted risks; it essentially elaborates Model 4.1 by family structure. The unadjusted risk for children with same-sex parents is not significant relative to opposite-sex cohabiting or single parent families, however in both cases it approaches significance. When the comparisons are equalized by demographic and SES controls (Model 5.2), risk with same-sex parents is systematically elevated, ranging from 1.8 to 3.6, and is significant at .01 or better relative to all opposite-sex family structures. The overall risk for same-sex parents (2.4, see Model 4.2) is greatly increased compared to two married biological parents (3.6) and reduced relative to all other opposite-sex family structures. Consideration of biological parentage, as Model 5.3 shows, renders null all same-sex parent risk ratios, fully accounting for differences between same-sex and opposite-sex parents in child emotional problems.

4. DISCUSSION

4.1 The Discovery of Difference

The findings of this paper present a clear counter-example to the dominant claim of "no differences" that disadvantage children with same-sex parents. Regarding this claim, Perrin and colleagues reasonably argue: "If there is sufficient evidence to support H2 ["Children from same-sex families display notable disadvantages when compared to children from other family forms"] with confidence, the no-differences hypothesis should be rejected; if there is not, the no-differences hypothesis stands as the current state of knowledge." [29] On this argument, based on the evidence in Table 3, the no-differences hypothesis should be rejected. Two other recent studies have also found disadvantages among older children and adults raised by same-sex parents [6,93]. At minimum, it is no longer accurate to claim that no study has found children in same-sex families to be disadvantaged relative to those in opposite-sex families [94,9,29,4].

In examining the possible causes of this difference, beginning with the models shown in Table 4, the control variables indicate that the development of child emotional problems is lower among girls than boys, higher for nonwhite children, increases with the age of the child and is suppressed by higher parent education and income. When these factors are included, the predicted relative risk of emotional problems due to having same-sex parents is elevated slightly, by about 13% over the baseline model.

The relative risk for instability indicates that children of families in rented quarters are 31% more likely to experience emotional problems than children of homeowner families. However, this distinction accounts for very little (3%) of the difference in risk for child emotional problems. In supplementary modeling (not shown), the term for the interaction between stability and same-sex/opposite-sex parents was not significant, indicating that the effect of (in) stability on the development of child emotional problems was the same for both opposite-sex and same-sex parents. Although same-sex parents are more likely to be renters and thus probably less settled in their residences and relationships, than are opposite-sex parents, the difference between the two groups, at only eight percentage points (see Table 2), is evidently not sufficient to account for much of the increased emotional distress of children with same-sex parents.

Table 2. Weighted proportions (standard deviations) of independent variables in the analyses, by same-sex or opposite-sex parents: NHIS 1997–2013

Variable	Opposite-Sex parents	Same-Sex parents
Family structure		
Intact married biological parents (CDC Definition)	48.5 (.002)	0 (0.0)
All other married (step-families)	28.8 (.002)	27.3 (.025)
Unmarried cohabiting	4.9 (.001)	72.7 (.024)
Single parent	17.9 (.02)	Unknown
Female	48.9 (.14)	50.2 (2.8)
Age of child (mean)	8.54 (.02)	8.57 (.29)
White	50.3 (.30)	48.1 (2.8)
B.A. or higher	33.6 (.27)	35.2 (2.6)
Poverty income		
Under poverty threshold	18.9 (.22)	20.1 (2.9)
1-3.99 times poverty threshold	55.6 (.22)	49.7 (3.2)
4 or more times poverty threshold	25.5 (.25)	30.3 (2.8)
Housing Status - Renting (vs. home owned/being bought)	37.8 (.28)	45.1 (2.8)
Child picked on or bullied by peers	19.2 (.31)	15.1 (4.4)
Serious psychological distress (SPD) - Parents	3.4 (.08)	6.1 (2.2)
Biological parentage – parents-child biological relationship		
Two biological parents	63.9 (.22)	0 (0)
One biological parent	34.2 (.22)	76.4 (2.7)
No biological parent	1.8 (.04)	23.6 (2.7)

Table values show survey-based population estimates with linearized standard errors reported in parentheses. Confidence intervals may be different than plus/minus the standard error.

Table 3. Unadjusted and adjusted population prevalence of child emotional problems, development problems and associated service use, among children aged 4–17 years, comparing opposite-sex and same-sex families: NHIS 2001–2013

	Unadjusted prevalence					Adjusted prevalence					
	OS parents	95% CI	SS parents	95% CI	P (t): OS=SS	OS parents	95% CI	SS parents	95% CI	Model fit	P (t): OS=SS
Emotional											
A: High SDQ score	4.2	4.1-4.37	8.2*	4.38-12.1	.04	4.4	4.2-4.6	9.3*	4.7-13.9	.66	.04
B: Serious emotional problems	5.2	5.1-5.4	12.1**	8.0-16.2	.001	5.5	5.3-5.7	14.9***	9.7-20.0	.65	<.001
Both A and B	2.0	1.9-2.1	4.9	1.8-8.0	.06	2.1	2.0-2.3	6.3*	2.2-10.5	.46	.045
Either A or B	7.1	6.9-7.3	14.9***	10.0-19.8	.001	7.4	7.2-7.6	17.4***	12.1-22.7	.08	<.001
Developmental											
C: ADHD	6.8	6.7-7.0	14.0**	9.7-18.2	.001	7.1	6.9-7.2	15.5***	10.8-20.2	.38	<.001
D: Learning disability	7.7	7.5-7.9	14.1**	9.5-18.8	.007	8.0	7.8-8.2	14.1*	9.1-19.0	.62	.02
E: Intellectual disability	0.7	0.69-0.8	1.5	0.3-2.8	.21	0.7	0.68-0.8	1.9	0.3-3.5	.98	.17
Any of C, D or E	9.9	9.7-10.0	18.3***	13.8-22.9	<.001	10.2	10.0-10.4	19.3***	14.6-24.0	.40	<.001
Treatment/Service Use											
F: Special education	6.5	6.3-6.6	9.5	6.0-13.0	.09	6.7	6.5-6.8	10.4	6.5-14.4	.78	.07
G: Saw general doctor for mental health	5.0	4.8-5.1	11.0**	6.4-15.5	.01	5.2	5.0-5.4	13.1**	8.1-18.0	.006	.002
H: Saw mental health professional	17.2	16.6-17.8	18.1	8.5-27.6	.86	18.6	17.8-19.3	24.6	11.3-37.8	.39	.38
Any of F, G or H	9.9	9.8-10.1	15.9**	11.6-20.2	.006	10.4	10.2-10.6	17.8**	13.0-22.5	.69	.003

*Table values show logit estimates for children ages 4-17. Adjusted prevalence adjusts for child sex, age (one-year categories) and race, and parents' education and income. Uncontrolled models fit marginal effects, i.e. a fit of 1.0. SDQ, Strengths and Difficulties Questionnaire, OS, opposite sex; SS, same sex; CI, confidence interval; ADHD, attention-deficit hyperactivity disorder. *P <0.05; **P <0.01; ***P <0.001. Significance tested by t-test.*

Like instability, stigmatization has a powerful effect on child emotional distress, but accounts for none of the difference between same-sex families and opposite-sex families. As Table 2 indicates, there is no difference between children with opposite-sex and same-sex parents in exposure to bullying; in fact, contrary to the assumption underlying this hypothesis, children with opposite-sex parents are picked on and bullied more than those with same-sex parents, though the overall difference is not above sampling variation. Moreover, the interaction term between bullying and same-sex/opposite-sex parents (not shown) is not significant. In sum, while the experience of peer rejection, abuse or stigmatization is strongly associated with child emotional problems, it appears that the rate of abuse and susceptibility to emotional distress due to stigmatization does not differentiate sharply between children in same-sex and opposite-sex families.

Exposure to parental severe psychological distress (SPD), far from explaining children's increased risk of emotional problems in same-sex families, appears to moderately elevate the relative risk of emotional problems compared to an equivalent exposure in an opposite-sex family.

Surprisingly, the risk due to same-sex parents is not moderated, but increases substantially, when all three of the above factors are combined. Further exploration of this interesting and contrary finding is beyond the scope of the present study. Here it is pertinent only to note that these factors did not appear to explain, but rather aggravate, the risk of child emotional problems due to same-sex parents.

By contrast, biological parentage had a powerful explanatory effect. In supplementary modeling (not shown), the relative risk for having same-sex parents was statistically significant in every model that excluded biological relationship, but was not significant in most models that included it. No combination of explanatory variables that included biological relationship, moreover, improved upon the reduction in predicted relative risk for same-sex parents obtained by biological relationship alone. Biological relationship, it appears, is both necessary and sufficient to explain the higher risk of emotional problems faced by children with same-sex parents.

Findings for adopted children were consistent with this result, although because of the very small number of adopted children it was not possible to include this category in the multivariate models. As with instability and stigmatization, adopted children were at higher risk of emotional problems overall (RR 1.65 CI 1.5-1.8), but including child adoption status had no effect on risk due to same-sex parents (RR 2.10 CI 1.5-2.9 with adoption included). Among children with no biological relationship to either parent, the prevalence of emotional problems was twice as high for ones with same-sex parents (22.0% CI 8.0-47.6) than for those with opposite-sex parents (11.2% CI 10.2-12.1). This estimate should be interpreted with caution due to the sparseness of the data.

Regarding the family structure hypothesis, examined in Table 5, residence with opposite-sex cohabiting partners or a step-parent or single parent does raise the level of child emotional problems, reducing the observed risk for residing with same-sex parents relative to these family forms. Child emotional problems in opposite-sex families are highest for single parent families and lowest with married joint biological parents. Compared to single parents, children with same-sex parents have less than twice the risk of emotional problems (1.8 times), but they are at almost four (3.6) times the risk of emotional problems when compared to children residing with married biological parents. However, risk with same-sex parents is lowest relative to opposite-sex single parent arrangements, not cohabiting or step-parent families and after adjusting for controls, is significantly higher relative to any opposite-sex family form. Risk of child emotional problems is 1.9-2.2 times greater, significant at .01 or better, with same-sex parents than with opposite-sex cohabiting parents or step-parent family. Therefore, the hypothesis that restrictions on parentage or married status explain the higher risk of emotional problems in same-sex families must be rejected.

Table 4. Logistic regression models predicting adjusted risk ratios (95% CI) for emotional and behavioral problems (clinically high SDQ score or reported serious difficulties) among children aged 4–17 years, comparing opposite-sex and same-sex families: NHIS 2001-2013

	Model 4.1	Model 4.2	Model 4.3	Model 4.4	Model 4.5	Model 4.6	Model 4.7*
All opposite-Sex	1.00	1.00	1.00	1.00	1.00	1.00	1.00
All same-Sex	2.10** (1.5 – 2.9)	2.38*** (1.7-3.3)	2.32*** (1.7-3.2)	2.38* (1.4 - 4.2)	2.74*** (1.8 - 4.3)	3.43* (2.0-5.9)	1.43(0.98-2.1)
Controls							
Female		0.64*** (0.60-0.68)	0.68*** (0.61-0.71)	0.85*** (0.77-0.95)	0.65*** (0.60-0.71)	0.82* (0.70-0.96)	0.67*** (0.63-0.70)
Older (in years)		1.05*** (1.045-1.06)	1.05*** (1.04-1.06)	1.06*** (1.05-1.08)	1.04*** (1.03-1.05)	1.06*** (1.03-1.08)	1.04*** (1.03-1.05)
Nonwhite		1.45*** (1.3-1.6)	1.48*** (1.39-1.59)	1.24*** (1.10-1.39)	1.35*** (1.23-1.49)	1.27* (1.1-1.5)	1.51*** (1.41-1.61)
B.A. Degree		0.72*** (0.66-0.78)	0.79*** (0.73-0.85)	0.78*** (0.67-0.90)	0.77*** (0.69-0.86)	0.90(0.75-1.1)	0.86*** (0.79-0.93)
Income (Poverty multiple)		0.60*** (0.57-0.64)	0.69*** (0.65-0.72)	0.76*** (0.70-0.83)	0.68*** (0.64-0.72)	0.85* (0.75-0.97)	0.71*** (0.67-0.74)
Confounders							
Instability			1.31*** (1.23-1.41)			1.17(0.99-1.4)	
Child picked on/bullied				4.33*** (3.9-4.8)		4.16*** (3.6-4.8)	
Parent SPD					2.99*** (2.6-3.4)	2.76*** (2.3-3.4)	
Biological Degree							2.14*** (2.0-2.3)
N (unweighted)	115,700	89,282	89,236	22,047	38,389	10,712	85,577
Model Fit F (p)	1.0	0.08	0.72	0.71	0.22	0.97	0.94

*Numbers in parentheses report the 95% confidence interval. SDQ, Strengths and Difficulties Questionnaire; SPD, Severe Psychological Distress on the Kessler scale. *P <0.05; **P <0.01; ***P <0.001.* - indicates preferred model. Data for confounders do not align by year sufficiently to include all of them in a single model.*

Table 5. Risk ratios for child emotional problems contrasting same-sex parents with four opposite-sex family structures: two married biological parents, married step-parent family, cohabiting partners, and single parent: NHIS 2001–2013

Relative Risk for Same-Sex parents compared to:	Model 5.1 (baseline)	Model 5.2 (controls)	Model 5.3 (controls and confounders)	Model 5.4 (controls and parentage)
Two married bio parents	3.50*** (2.5-4.9)	3.62*** (2.6-5.0)	4.52** (2.53-8.1)	1.48[1] (1.01-2.2)
Married step-parent	1.82** (1.3 – 2.5)	2.16*** (1.6-3.0)	2.97** (1.7-5.3)	1.39(0.95-2.0)
Cohabiting	1.49[1] (1.04 – 2.13)	1.87** (1.3-2.6)	2.46* (1.3-4.7)	1.31(0.9-2.0)
Single parent	1.38[1] (0.99 – 1.9)	1.78** (1.3-2.4)	3.08* (1.8-5.3)	1.50[1] (1.03-2.2)
Controls				
Female		0.65*** (0.62-0.70)	0.83* (0.71-0.98)	0.65*** (0.6-0.7)
Older (in years)		1.04*** (1.03 - 1.05)	1.05** (1.03-1.07)	1.04*** (1.03-1.05)
Nonwhite		1.50*** (1.4-1.6)	1.32** (1.1-1.6)	1.51*** (1.4-1.6)
B.A. Degree		0.82*** (0.77 - 0.88)	0.97(0.81-1.2)	0.83*** (0.77-0.90)
Income (Poverty multiple)		0.71*** (0.68 – 0.78)	0.88(0.77–1.0)	0.71*** (0.68–0.75)
Confounders				
Stability			1.08(0.92–1.3)	
Stigmatization			4.10*** (3.5–4.8)	
Parent SPD			2.62*** (2.1–3.2)	
Biological parentage				2.14*** (2.0–2.3)
N	111,437	86,160	10,423	84,924
Model Fit F (p)	1.0	0.59	.79	.59

*Numbers in parentheses report the 95% confidence interval. * P <0.05; ** P <0.01; *** P <0.001; [1] .05 < P <= .10*

Confirming this conclusion, and consistent with Model 4.6, the relative risk for same-sex parents increases in the presence of confounders for stability, peer stigmatization and parent psychological distress (Model 5.3). The risk ratio increases (from Model 5.2 to Model 5.3) much more for children with single parents (by 73%) compared to cohabiting (30%) or stepfamilies (38%), and the least (24%) for children with two married biological parents, suggesting that among children with opposite-sex parents, those with single parents are the most exposed to, and those with two married biological parents the most protected from, the effect of these confounders. Further study of these effects is beyond the scope of this paper.

As expected, family structure interacts with biological parentage, as Model 5.3 shows. The risk ratios for two married biological parents and for single parents are marginally significant, however, with P-values less than .10, but there is clearly no difference in risk between same-sex parents and opposite-sex step and cohabiting parent families once the degree of biological relationship is specified. It is possible, therefore, to assert that the family structure hypothesis is supported in a limited sense: The risk of child emotional problems is no different with same-sex and opposite-sex parents in the comparable family forms, i.e. cohabiting and step-parent families, once differences in biological parenting are equalized.

On the other hand, parentage and structure are highly correlated (r = .68) and in every model that fit both parentage and structure as independent effects, structure was highly attenuated while biology was scarcely affected. Family structure, in other words, appears to specify differences in biological parentage. Rather than due to any independent effect, this suggests, the apparent effect of structure may be attributed to the fact that it serves as an efficient proxy for biological parentage.

4.2 The Importance of Biology

In examining the causes of the differences observed, the results of this paper converge on a clear central finding: Biological parentage uniquely and powerfully distinguishes child outcomes between children with opposite-sex parents and those with same-sex parents. In every analytical model that excluded parentage, the relative risk due to same-sex parents was significant and substantial; in every model that included it, the relative risk was rendered null. Regarding the other three confounders, stigmatization and parent psychological distress aggravated relative risk while instability reduced it slightly; their combined effect increased, rather than accounted for, the relative risk due to same-sex parents.

Biological parentage, however, is not strictly speaking a proper explanatory variable for differences between opposite-sex and same-sex families, because it is implicated in the definition of those categories. The absence of common biological parents is not an external factor, but is part of the premise of same-sex partnerships. No children were reported living with both biological parents in a same-sex family, while in opposite-sex families almost two-thirds (64%) of children lived with both biological parents (See Table 2). Only 4.3% (95% CI 4.0-4.5) of such children suffer emotional problems (compared to 7.1% overall, for the measure “Either A or B”, see Table 3), whereas there is no corresponding group of children with such small emotional problems in same-sex families. The presence of this large group of children with opposite-sex parents with a very low rate of emotional problems accounts for most of the difference in overall emotional problems between the two groups of parents. This striking difference in distribution on biological parentage is not accidental, but definitional. No child can be the joint biological offspring of two intimate partners of the same sex, whereas this is the modal condition of children with opposite-sex parents.

In every analysis in this paper, the lowest risk of emotional problems was observed among children living with both biological parents who were married. Family research on two-biological-parent married and cohabiting parents has broadly demonstrated that “both marital status and biological parentage are integral to children’s well-being” [95,96]. The strength of marriage and biology relative to each other and relative to other influences on child well-being, as well as theories to account for their effects, are a matter of some debate, but the fact, that the parent-child biological relationship has a strong effect, has been well established. In this research, as in the present study, other factors—for example, economic resources, parental socialization, family stability, or even marriage—are also influential on child well-being and may qualify or interact with biological parentage, but they do not explain it away [97–99,95]. To a large extent, the present study merely extends to same-sex

families McLanahan and Sandefur's conclusion regarding single-parent families: "Children who grow up in a household with only one biological parent are worse off, on average, than children who grow up in a household with both of their biological parents" regardless of the parents' race, education and marital status, including remarriage [100]. This is also true, the present study would add, regardless of whether the parents are same-sex or opposite-sex partners.

Clinical studies of female same-sex partners conceiving via donor insemination or other assisted reproductive techniques (ART), moreover, have long recognized that the lack of conjoined biological ties creates unique difficulties and relational stresses [101–104]. The birth and non-birth mother (also known as the co-mother) are subject to competition, rivalry, and jealousy regarding conception and mothering roles that are never faced by conceiving opposite-sex couples, and which, for the children involved, can result in anxiety over their security and identity [105]. Biblarz and Stacey [9] acknowledge that "[l] esbian [donor insemination] comothers … confront asymmetrical legal, biological and cultural ties to children that can exascerbate [sic] maternal competition and jealousy" leading to higher rates of relationship dissolution compared to opposite-sex parents. The authors add that "access to equal legal parental status and rights … will not eliminate these asymmetries" [9].

4.3 Strengths and Limitations

The greatest strength of this study is its use of a representative sample of same-sex parents that, with 512 families, with many outcome measures, is several times larger than typical samples of this population and permits unbiased estimates with relatively large statistical power. The greatest limitation of this study is its use of a representative sample of only 512 same-sex parent families, which is several times smaller than optimum for most population studies. Post-stratification weighting improved representativeness somewhat over that of simple random sampling, however the data for same-sex parents were still too sparse to support examination of distinctions within this group, such as between same-sex male and same-sex female partner couples, or those identifying as spouses or cohabiting partners, which may have significant effects on child emotional problems. The representativeness of the weighted sample provides generalizability of the results to United States household population, however results may not be applicable to other countries, particularly where the social situation of same-sex parents differs markedly from the US. As with all observational studies, causal inference is not possible. Another limitation is the use of secondary measures, which may not relate to the topic of interest in the manner intended, and of parent-reported measures that are likely subject to social desirability bias. However, it is unlikely that such measurement imprecision or bias would operate differentially on the two groups of parents involved.

5. CONCLUSION

With respect to joint biological fertility, same-sex partners are different from opposite-sex partners by definition. The importance of common biological parentage for optimum child well-being found in this study raises the difficult prospect that higher child emotional problems may be a persistent feature of same-sex parent families, since they are distinguished from opposite-sex parents on just this capacity. Since same-sex partners cannot, at least at present, conceive a child that is the biological offspring of both partners, in the way that every child conceived by opposite-sex partners is such,[3] it is hard to conceive how same-sex parents could ever replicate the level of benefit for child well-being that is the case in opposite-sex relationships involving two biological parents. Future research on the relative effects of marriage and biological relationship among all family forms, including same-sex couples, would be of great value to help sort out these issues more clearly.

5.1 Implications for Marriage Policy

The reduced risk of child emotional problems with opposite-sex married parents compared to same-sex parents is explained almost entirely by the fact that married opposite-sex parents tend to raise their own joint biological offspring, while same-sex parents never do this. The primary benefit of marriage for children, therefore, may not be that it tends to present them with improved parents (more stable, financially affluent, etc., although it does do this), but that it presents them with their own parents.

[3]*While some forms of ART among female same-sex partners can formally achieve a genetic link to both partners, none can do so without introducing male sperm from a third party.*

This is the case for all children with married joint biological parents—which most successfully fulfill the formal civil premise of marriage, which is lifelong and exclusive partner commitment—compared to less than half of children in any other family category and no children in same-sex families. Whether or not same-sex families attain the legal right, as opposite-sex couples now have, to solemnize their relationship in civil marriage, the two family forms will continue to have fundamentally different, even contrasting, effects on the biological component of child well-being, to the relative detriment of children in same-sex families. Functionally, opposite-sex marriage is a social practice that, as much as possible, ensures to children the joint care of both biological parents, with the attendant benefits that brings; same-sex marriage ensures the opposite.

It is worth noting that, even in the worst case conditions examined in this study, the large majority of children did not experience emotional problems. Although children fare worse in some family settings than others, to an extent that well justifies social and policy concerns about differences between family structures, including between opposite-sex and same-sex families, most children in most families achieve a level of psychosocial function that is not characterized by serious emotional problems.

5.2 Future Research

Future research is needed to determine the mechanisms by which biological parentage affects child emotional wellbeing. Research should focus on distinctions among same-sex families and their children to determine the predictors of child emotional distress in this population more precisely, and on associations that may help to identify mechanisms. For example, a study that distinguished sex of parent and child, examining outcomes for male and female children with same-sex male parents and same-sex female parents, could distinguish influences on child outcomes, if any, due to the presence or absence of an opposite-sex parent (meaning a parent that is the opposite sex of the child). Research that differentiated adolescents (age 12-17) from younger children (age 4-11) would contribute to our knowledge of the effect of same-sex parenting on the distinct emotional profiles of these two groups, and may be able to suggest time-order effects. Research that distinguished adopted from non-adopted children may help to distinguish biological from familial effects. Further research would also be helpful to explore the surprising finding that parent psychological distress aggravated rather than helped to account for the risk of child emotional problems with same-sex parents. Most valuable, of course, would be population representative longitudinal data following children with same-sex parents into adulthood, which would support rigorous causal inference regarding long-term differences in outcome, if any, in this population.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. American Psychological Association. Lesbian and Gay Parenting: Theoretical and Conceptual Examinations [Internet]. American Psychological Association; 2005 Available:http://www.apa.org/pi/lgbt/resources/parenting.aspx [cited 2014 Sep 11].
2. Walker V. (Judicial Decision) Perry V. Schwarzenegger. 704 F. Supp. 2d 921 (N.D. California); 2010.
3. Perrin EC, Siegel BS. The American Academy of Pediatrics. Promoting the well-being of children whose parents are gay or lesbian. Pediatrics. 2013;131(4):e1374–83.
4. Manning WD, Fettro MN, Lamidi E. Child Well-Being in Same-Sex Parent Families: Review of research prepared for American Sociological Association Amicus Brief. Popul Res Policy Rev. 2014;33(4):485.
5. Regnerus M. How different are the adult children of parents who have same-sex relationships? Findings from the New Family Structures Study. Soc Sci Res. 2012;41(4):752–70.
6. Allen D. High school graduation rates among children of same-sex households. Rev Econ Househ. 2013;11(4):635–58.
7. Patterson CJ. Children of lesbian and gay parents. Curr Dir Psychol Sci. 2006;15(5):241–4.
8. Biblarz TJ, Savci E. Lesbian, Gay, Bisexual and Transgender Families. J Marriage Fam. 2010;72(3):480–97.
9. Biblarz TJ, Stacey J. How does the gender of parents matter? J Marriage Fam. 2010;72(1):3–22.

10. Fitzgerald B. Children of lesbian and gay parents: A review of the literature. Marriage Fam Rev. 1999;29(1):57–75.
11. Schumm WR. What was really learned from Tasker and Golombok's (1995) study of lesbian and single parent mothers? Psychol Rep. 2004;94(2):422–4.
12. Schumm WR. Re-evaluation of the "no differences" hypothesis concerning gay and lesbian parenting as assessed in eight early (1979-1986) and four later (1997-1998) dissertations. Psychol Rep. 2008;103(1):275–304.
13. Marks L. Same-sex parenting and children's outcomes: A closer examination of the American psychological association's brief on lesbian and gay parenting. Soc Sci Res. 2012;41(4):735–51.
14. Amato PR. The well-being of children with gay and lesbian parents. Soc Sci Res. 2012;41(4):771–4.
15. Eggebeen DJ. What can we learn from studies of children raised by gay or lesbian parents? Soc Sci Res. 2012;41(4):775–8.
16. Rosenfeld MJ. Nontraditional families and childhood progress through school. Demography. 2010;47(3):755–75.
17. Muehrer P. Suicide and sexual orientation: A critical summary of recent research and directions for future research. Suicide Life Threat Behav. 1995;25(s1):72–81.
18. Bailey JM, Dunne MP, Martin NG. Genetic and environmental influences on sexual orientation and its correlates in an Australian twin sample. J Pers Soc Psychol. 2000;78(3):524.
19. Bailey J. Homosexuality and mental illness. Arch Gen Psychiatry. 1999;56(10):883–4.
20. Solarz AL, others. Lesbian Health: Current Assessment and Directions for the Future [Internet]. National Academies Press; 1999 Available:http://books.google.com/books?hl=en&lr=&id=mtBTAgAAQBAJ&oi=fnd&pg=PR15&dq=solarz+lesbian+health&ots=I38SpJd2ww&sig=iSXGb4ibwPqxo_nXJuTqrh4uzlU [cited 2014 Dec 16].
21. Cochran S, Susan D Cochran, J Greer Sullivan, Vickie M Mays. Prevalence of mental disorders, psychological distress, and mental health services use among lesbian, gay, and bisexual adults in the United States. J Consult Clin Psychol. 2003;71(1):53.
22. Rosenfeld MJ. Nontraditional Families and Childhood Progress Through School: Reply to Allen et al. Demography. 2013;50(3):963–9.
23. Lofquist D. Same Sex Couple Households [Internet]. U.S. Census Bureau: American Community Survey Briefs. 2011 Sep. Available:http://www.census.gov/prod/2011pubs/acsbr10-03.pdf
24. Nock S. Affidavit of Steven Nock. Halpern et al. v. Canada and MCCT v. Canada. ON S.C.D.C. [Internet]; 2001. Available:<http://marriagelaw.cua.edu/Law/cases/Canada/ontario/halpern/affnock.pdf> [cited 2011 Feb 15].
25. Wainright JL, Patterson CJ. Peer relations among adolescents with female same-sex parents. Dev Psychol. 2008;44(1):117–26.
26. Sherkat DE. The editorial process and politicized scholarship: Monday morning editorial quarterbacking and a call for scientific vigilance. Soc Sci Res. 2012;41(6):1346–9.
27. Gates et al. GJ. Letter to the editors and advisory editors of social science research. Soc Sci Res. 2012;41(6):1350–1.
28. Bartlett T. Controversial gay-parenting study is severely flawed. Journal's Audit Finds [Internet]. The Chronicle of Higher Education Blogs: Percolator; 2012. Available:http://chronicle.com/blogs/percolator/controversial-gay-parenting-study-is-severely-flawed-journals-audit-finds/30255 [cited 2014 Sep 30].
29. Perrin AJ, Cohen PN, Caren N. Are children of parents who had same-sex relationships disadvantaged? A scientific evaluation of the no-differences hypothesis. J Gay Lesbian Ment Health. 2013;17(3):327–36.
30. Allen DW, Pakaluk C, Price J. Nontraditional families and childhood progress through school: A Comment on Rosenfeld. Demography. 2013;50(3):955–61.
31. Tasker F, Golombok S. Adults raised as children in lesbian families. Am J Orthopsychiatry. 1995;65(2):203–15.
32. Crouch S, Waters E, McNair R, Power J, Davis E. Parent-reported measures of child health and wellbeing in same-sex parent families: A cross-sectional survey. BMC Public Health. 2014;14(1):635.
33. Kurdek LA. Relationship outcomes and their predictors: Longitudinal evidence from heterosexual married, gay cohabiting, and

lesbian cohabiting couples. J Marriage Fam. 1998;60(3):553.

34. Kurdek LA. What do we know about gay and lesbian couples? Curr Dir Psychol Sci. 2005;14(5):251–4.
35. Andersson G, Noack T, Seierstad A, Weedon-Fekjær H. the demographics of same-sex marriages in Norway and Sweden. Demography. 2006;43(1):79–98.
36. Lau CQ. The stability of same-sex cohabitation, Different-Sex Cohabitation, and Marriage. J Marriage Fam. 2012;74(5):973–88.
37. Cherlin AJ, Chase-Landsdale PL, McRae C. Effects of parental divorce on mental health throughout the life course. Am Sociol Rev. 1998;63(2):239–49.
38. Uphold-Carrier H, Utz R. Parental divorce among young and adult children: A long-term quantitative analysis of mental health and family solidarity. J Divorce Remarriage. 2012;53(4):247–66.
39. Cherlin AJ. The marriage-go-round: The state of marriage and the family in america today. 1st Vintage Books ed. New York: Vintage Books. 2010;271.
40. Jeynes WH. The impact of parental remarriage on children: A meta-analysis. Marriage Fam Rev. 2006;40(4):75–102.
41. Ihrke DK, Faber CS, Koerber WK. Geographical mobility: 2008 to 2009 [Internet]. US Department of Commerce, Economics and Statistics Administration, US Census Bureau; 2011
42. Available:https://www.census.gov/prod/2011pubs/p20-565.pdf . [cited 2014 Aug 19].
43. Green RK, White MJ. Measuring the benefits of homeowning: Effects on children. J Urban Econ. 1997;41(3):441-61.
44. Haurin DR, Parcel TL, Haurin RJ. Does homeownership affect child outcomes? Real Estate Econ. 2002;30(4):635–66.
45. Rossi PH, Weber E. The social benefits of homeownership: Empirical evidence from National Surveys. Hous Policy Debate. 1996;7(1):1–35.
46. Grinstein-Weiss M, Williams Shanks TR, Manturuk KR, Key CC, Paik J-G, Greeson JKP. Homeownership and parenting practices: Evidence from the community advantage panel. Child Youth Serv Rev. 2010;32(5):774–82.
47. Beardslee W. Children of parents with major affective disorder: A review. Am J Psychiatry. 1983;140:825–32.
48. Downey G, Coyne JC. Children of depressed parents: an integrative review. Psychol Bull. 1990;108(1):50.
49. Last CG. Anxiety disorders in children and their families. Arch Gen Psychiatry. 1991;928–34.
50. Merikangas KR, Dierker LC, Szatmari P. Psychopathology among offspring of parents with substance abuse and/or anxiety disorders: A High-risk Study. J Child Psychol Psychiatry. 1998;39(05):711–20.
51. Beardslee WR, Versage EM, Gladstone TRG. Children of affectively Ill parents: A Review of the Past 10 Years. J Am Acad Child Adolesc Psychiatry. 1998; 37(11):1134–41.
52. Fergusson DM, Horwood L, Beautrais AL. Is sexual orientation related to mental health problems and suicidality in young people? Arch Gen Psychiatry. 1999; 56(10):876–80.
53. Gilman SE, Cochran SD, Mays VM, Hughes M, Ostrow D, Kessler RC. Risk of psychiatric disorders among individuals reporting same-sex sexual partners in the National Comorbidity Survey. Am J Public Health. 2001;91(6):933.
54. Turner SM. Psychopathology in the offspring of anxiety disorder patients. J Consult Clin Psychol. 1987;55:229–35.
55. Davies P, Windle M. Interparental discord and adolescent adjustment trajectories: The potentiating and protective role of intrapersonal attributes. Child Dev. 2001; 72(4):1163–78.
56. Chan RW, Raboy B, Patterson CJ. Psychosocial adjustment among children conceived via donor insemination by lesbian and heterosexual mothers. Child Dev. 1998;69(2):443–57.
57. Phares V, Compas BE. The role of fathers in child and adolescent psychopathology: Make room for daddy. Psychol Bull May. 1992;111(3):387–412.
58. Leinonen JA, Solantaus TS, Punamäki R-L. Parental mental health and children's adjustment: The quality of marital interaction and parenting as mediating factors. J Child Psychol Psychiatry. 2003;44(2):227–41.

59. Haugaard JJ, Hazan C. Adoption as a natural experiment. Dev Psychopathol. 2003;15(04):909–26.
60. Lansford JE, Ceballo R, Abbey A, Stewart AJ. Does family structure matter? A Comparison of Adoptive, Two-Parent Biological, Single-Mother, Stepfather, and Stepmother Households. J Marriage Fam. 2001;63(3):840–51.
61. Schechter MD. Observations on adopted children. Arch Gen Psychiatry. 1960; 3(1):21–32.
62. Peters BR, Atkins MS, McKernan McKay M. Adopted children's behavior problems: A review of five explanatory models. Clin Psychol Rev. 1999;19(3):297–328.
63. Juffer F, van IJzendoorn MH. Behavior problems and mental health referrals of international adoptees: A meta-analysis. JAMA. 2005;293(20):2501–15.
64. Keyes M, Sharma A, Elkins I, Iacono W. The mental health of US adolescents adopted in infancy. Arch Pediatr Adolesc Med. 2008;162(5):419–25.
65. Gates GJ, Badgett ML, Macomber JE, Chambers K. Adoption and foster care by gay and lesbian parents in the United States. [Internet]. UCLA: The Williams Institute; 2007.
Available:https://escholarship.org/uc/item/2v4528cx
66. Krivickas K, Lofquist D. Demographics of Same-Sex Couple Households with Children. [Internet]. U.S. Census Bureau, Fertility and Family Statistics Branch; 2011. SEHSD Working Paper No. 2011-11.
Available:http://www.census.gov/hhes/samesex/files/Krivickas-Lofquist%20PAA%202011.pdf
67. Amato PR, Kurdek LA, Demo DH, Allen KR. Children's adjustment to divorce: Theories, hypotheses and empirical support. J Marriage Fam. 1993;55(1);23–38.
68. Amato PR. The consequences of divorce for adults and children. J Marriage Fam. 2000;62(4):1269–87.
69. McLanahan S, Sandefur G. Growing up with a single parent: What Hurts, What Helps. Cambridge, MA: Harvard University Press; 1994.
70. Cochran SD, Mays VM. Risk of breast cancer mortality among women cohabiting with same sex partners: Findings from the National Health Interview Survey, 1997–2003. J Womens Health. 2012;21(5):528–33.
71. Liu H, Reczek C, Brown D. Same-Sex Cohabitors and Health: The role of race-ethnicity, gender and socioeconomic status. J Health Soc Behav. 2013; 54(1):25–45.
72. Reczek C, Liu H, Brown D. Cigarette Smoking in same-sex and different-sex unions: The role of socioeconomic and psychological factors. Popul Res Policy Rev. 2014;33(4):527–51.
73. Reczek C, Liu H, Spiker R. A population-based study of alcohol use in same-sex and different-sex unions. J Marriage Fam. 2014;76(3):557–72.
74. National Center for Health Statistics. Design and Estimation for the National Health Interview Survey, 1995-2004. [Internet]. Vital and Health Statistics 2000:2(130).
Available:http://www.cdc.gov/nchs/data/series/sr_02/sr02_130.pdf
75. National Center for Health Statistics. Variance Estimation and Other Analytic Issues in the 1997-2005 NHIS [Internet]; 2009.
Available:http://www.cdc.gov/nchs/data/nhis/9705var.pdf [cited 2014 Aug 17].
76. National Center for Health Statistics. Design and Estimation for the National Health Interview Survey. [Internet]. National Ctr for Health Statistics; 2006-2015.
Available:http://www.cdc.gov/nchs/data/series/sr_02/sr02_165.pdf 2014
[cited 2014 Aug 17].
77. National Center for Health Statistics. Variance Estimation and Other Analytic Issues, NHIS 2006-2013 [Internet]; 2014.
Available:http://www.cdc.gov/nchs/data/nhis/2006var.pdf [cited 2014 Aug 17].
78. Norton EC, Miller MM, Kleinman LC. Computing adjusted risk ratios and risk differences in Stata. Stata J. 2013; 13(3):492–509.
79. Localio AR, Margolis DJ, Berlin JA. Relative risks and confidence intervals were easily computed indirectly from multivariable logistic regression. J Clin Epidemiol. 2007;60(9):874–82.
80. Archer KJ, Lemeshow S, Hosmer DW. Goodness-of-fit tests for logistic regression models when data are collected using a

complex sampling design. Comput Stat Data Anal. 2007;51(9):4450–64.

81. Archer KJ, Lemeshow S. Goodness-of-fit test for a logistic regression model fitted using survey sample data. Stata J. 2006;6(1):97–105.
82. Archer KJ. Goodness-of-fit tests for logistic regression models developed using data collected from a complex sampling design. Unpubl Ph Diss Ohio State Univ Columb OH; 2001.
83. Kessler R, Gruber M, Sampson N. Validation Studies of Mental Health Indices in the National Health Interview Survey. [Internet]. Harvard Medical School, Boston, MA; 2006.
Available:http://www.hcp.med.harvard.edu/ncs/scales.php
84. Goodman R. Psychometric properties of the strengths and difficulties questionnaire. J Am Acad Child Adolesc Psychiatry. 2001;40(11):1337–45.
85. Goodman A, Goodman R. Strengths and difficulties questionnaire as a dimensional measure of child mental health. J Am Acad Child Adolesc Psychiatry. 2009;48(4):400–3.
86. He J-P, Burstein M, Schmitz A, Merikangas K. The Strengths and Difficulties Questionnaire (SDQ): The Factor Structure and Scale Validation in U.S. Adolescents. J Abnorm Child Psychol. 2013;41(4):583–95.
87. Bourdon KH, Goodman R, Rae DS, Simpson G, Koretz DS. The Strengths and Difficulties Questionnaire: U.S. Normative Data and Psychometric Properties. J Am Acad Child Adolesc Psychiatry. 2005; 44(6):557–64.
88. Pastor PN, Reuben CA, Duran CR. Identifying emotional and behavioral problems in children aged 4-17 years: United States, 2001-2007. Natl Health Stat Rep. 2012;(48):1–17.
89. Pratt LA, Dey AN, Cohen A, others. Characteristics of adults with serious psychological distress as measured by the K6 scale, United States, 2001-04 [Internet]. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics; 2007
Available:http://198.246.112.54/pub/Health_Statistics/NCHS/Publications/DVD/DVD_1/Advance_Data/ad382.pdf [cited 2014 Aug 21].
90. Kessler RC, Barker PR, Colpe LJ, Epstein JF. Screening for serious mental illness in the general population. Arch Gen Psychiatry. 2003;60(2):184.
91. Blackwell D. Family structure and children's health in the United States: Findings from the National Health Interview Survey, 2001–2007. Natl Cent Health Stat. 2010;(246).
92. Dawson D. Family structure and children's health and well-being: Data from the 1988 National Health Interview Survey on Child Health. J Marriage Fam. 1991;53(3):573–84.
93. Dawson D. Family structure and children's health in the United States, 1988: Data from the National Health Survey. Natl Cent Health Stat. 1991;(178).
94. Regnerus M. How different are the adult children of parents who have same-sex relationships? Findings from the New Family Structures Study. Soc Sci Res. 2012;41(4):752–70.
95. Stacey J, Biblarz TJ. (How) does the sexual orientation of parents matter? Am Sociol Rev. 2001;66(2):159–83.
96. Brown SL. Marriage and child well-being: Research and policy perspectives. J Marriage Fam. 2010;72(5):1059–77.
97. Amato PR. The impact of family formation change on the cognitive, social and emotional well-being of the next generation. Future Child. 2005;15(2):75–96.
98. Carlson MJ, Corcoran ME. Family structure and children's behavioral and cognitive outcomes. J Marriage Fam. 2001;63(3):779–92.
99. Brown SL. Family Structure and Child Well-Being: The Significance of Parental Cohabitation. J Marriage Fam. 2004; 66(2):351–67.
100. Bramlett MD, Blumberg SJ. Family Structure and Children's Physical And Mental Health. Health Aff (Millwood). 2007;26(2):549–58.
101. Mc Lanahan S, Sandefur GD. Growing up with a single parent: What hurts, what helps. Harvard University Press. 1994;212.
102. Reimann R. Does Biology Matter? Lesbian couples' transition to parenthood and their division of labor. Qual Sociol. 1997; 20(2):153–85.

103. Glazer DF, Drescher J. eds. Gay and lesbian parenting. Binghamton, New York, USA: Haworth Medical Press; 2001.
104. Crespi L. Baby makes three: A dynamic look at development and conflict in lesbian families. Glazer and Drescher, eds. Gay and lesbian parenting. Binghamton, New York, USA. Haworth Medical Press. 2001;1:7-30.
105. Chabot JM, Ames BD. It wasn't 'let's get pregnant and go do it': Decision making in lesbian couples planning motherhood via donor insemination. Fam Relat. 2004; 53(4):348–56.
106. Glazer DF. Lesbian mothers: A foot in two worlds. Psychoanal Psychother. 1999; 16:145–51.

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Appendix: On the effect of miscoded same-sex partners on NHIS

Correspondence with NCHS staff has indicated that, from 2004 to the second quarter of 2007 ("unchecked period"), a significant percentage of same-sex couples are likely miscoded opposite-sex partners. Here is what NCHS says, in pertinent part:

As you know, the Census Bureau collects the data for the NHIS through a cooperative agreement. From 1997–2003, Division of Health Interview Statistics (DHIS) staff identified same-sex married or cohabiting couples as part of one large-scale relationship edit and manually reviewed the spouses'/partners' names to try to confirm the sex of each spouse/partner. If sex was believed to be incorrectly recorded for one spouse/partner based on this information, the sex code of that spouse/partner was changed.

In 2004, Census and DHIS implemented a new NHIS instrument that utilizes Windows-based computer-assisted interviewing software. In addition, data production processes were streamlined and automated. Records with data inconsistencies in relationships were flagged, but such records were only sent back to the Census Bureau for verification when inconsistencies occurred in 3% or more of families in a given quarter. As a result, from 2004 through quarter 2 of 2007, the sex codes for married or cohabiting couples identified as being same-sex did not undergo further verification.

Starting in quarter 3 of 2007, DHIS staff began sending ALL flagged records back to the Census Bureau for verification. Census staff is asked to verify the sex of each spouse/partner in a same-sex married or cohabiting couple and correct the sex code if in error. Census Bureau staff reviews the case level notes for those identified cases to see if the interviewer included notes that used words such as "wife," "husband," "he," or "she" that verify the sex of each person. If the case level notes are not informative, the Census Bureau Regional Office contacts the field supervisor and the specific interviewer in question to ask the interviewer to recall the interview. If the interviewer is unavailable or does not recall the details of the case, a Census Bureau representative at the Regional Office will usually phone the respondent to try to verify the case. Lastly, if the Census Bureau is unable to reach the respondent for verification, the Census Bureau will manually review confidential data files containing the household members' names to try to confirm the sex of each same-sex spouse/partner. Also, starting in 2008, a verification screen for same-sex married or cohabiting couples was added to the instrument for display to the interviewer shortly after the household roster is generated.

The verification process implemented in late 2007 does find that a significant percentage of married or cohabiting couples identified during pre-processing as being same-sex has an incorrect sex code for one of the partners (which is therefore corrected).

To check the effect of this error on my findings in this paper, I compared odds ratios from logistic regression estimates for five of the outcome variables examined in the study under three conditions: A) all survey years; B) all survey years except the unchecked period; and C) cases during the unchecked period only. The results are below, in Appendix Table 1.

Appendix Table 1: Consistency check: Logistic regression models predicting unadjusted odds ratios for emotional and behavioral problems on various measures among children aged 4–17 years, comparing opposite-sex and same-sex families: Comparing A:NHIS 2001-2013, B:NHIS 2001-2003,2008-2013, C:NHIS 2004-2007

	High SDQ or serious emotional problem			High SDQ and serious emotional problem			High SDQ			Serious emotional problem			ADHD Diagnosed		
Sample	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Odds ratio: Same-sex parents over Opposite-sex parents	2.29*** (1.6-3.4)	2.78*** (1.6-4.7)	2.20 (.78-6.2)	2.54** (1.3-4.9)	2.88* (1.2-6.8)	1.74 (.97-3.1)	2.04** (1.2-3.4)	2.65** (1.4-5.0)	1.46** (.62-3.5)	2.50*** (1.7-3.7)	2.78*** (1.6-4.8)	2.20* (1.2-4.1)	2.21*** (1.5-3.2)	2.66*** (1.7-4.1)	1.69 (.88-3.2)
N (unwieghted)	111,324	67,123	33,330	115,700	82,370	33,330	99,724	66,629	33,095	115,542	82,262	33,280	172,029	132,853	39,176
Model Fit F (p)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

According to CDC, consistency checks for misidentified sex among reported same-sex partners were not made from 2004 to 2007, second quarter ("unchecked period"). The chart compares results for all cases over the study period (A), all cases with the unchecked period excluded (B), and all cses during the unchecked period (C). (Note: this working table includes all of 2007 in the unchecked period.) Model Fit F reports the Archer-Hosmer-Lemeshow logistic model goodness-of-fit statistic. Numbers in parentheses report the 95% confidence interval. Significance of coefficients (t-test) indicated b: *[no asterisk] P >=.05; *P < 0.05; **P < 0.01; ***P < 0.001*

The "A" estimates present essentially the same estimates that are reported in the paper. Recall that in the paper I presented relative risk estimates, which are somewhat smaller than the corresponding odds ratios.

The "C" odds ratios confirm the presence of contamination of the same-sex partners category during the unchecked period. For every outcome, estimates during this period are lower and less significant than they are during the rest of the survey years.

The "B" estimates show that, for every outcome, the estimates excluding the unchecked period are somewhat larger than those that include all survey years. The effect of the miscoding is to reduce the estimates presented in the paper below the correct population estimates. The paper, therefore, generally understates the same-sex/opposite-sex contrasts by about 20%. In that sense, the findings in the paper are conservative regarding the difference in outcomes between same-sex and opposite-sex parents.

Paul Sullins