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J Health Psychol published online 24 May 2011

DOI: 10.1177/1359105311403522

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Journal of Health Psychology
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DOI: 10.1177/1359105311403522

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Abstract

Although studies show that adolescents with same-sex parents experience homophobic discrimination, little is known about associations between stigmatization and substance use in this population. The 17-year-old offspring of lesbian parents from the largest, longest-running, longitudinal study of same-sex parented families were surveyed about substance use, experiences of homophobic stigmatization, and overall life satisfaction. Compared to matched adolescents from a national probability sample, adolescents with same-sex parents were more likely to report occasional substance use but not more likely to report heavy use. No associations were found between substance use and homophobic stigmatization or life satisfaction.

Keywords

substance use, stigmatization, adolescents, lesbian families, same-sex families:

Introduction

Increased visibility of parenting by lesbian and gay men has called attention to the physical and psychological health of adolescents reared in such households. It is well established that healthy physical and psychological development is a product of the home, school, community, and social environments in which adolescents are raised (e.g. Youngblade et al., 2007). Although studies find that adolescents with same-sex parents are subjected to homophobic discrimination (Bos and Gartrell, 2010; Gartrell and Bos, 2010), very little is known about the associations between stigmatization and substance use in this population.

While research has found few differences between the adolescent offspring of same-sex and heterosexual parents in terms of psychological

well-being (Gartrell and Bos, 2010; Golombok and Badger, 2010; Wainright and Patterson, 2006, 2008; Wainright et al., 2004), only one study has examined substance use by adolescents reared since birth in planned lesbian families. In this study by Golombok and her research team, planned lesbian families were compared with solo heterosexual mother families and two-parent heterosexual families (Golombok and Badger,

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2010; MacCallum and Golombok, 2004). All lesbian mothers identified as lesbian before the birth of the child enrolled in this study. The offspring were surveyed at several points, including as young adults whose average age ranged from 18 to 19.5 years. Researchers found a significant difference in problematic drinking between 18 young adults with lesbian mothers and 32 young adults from two-parent heterosexual families; none of the young adults with lesbian mothers reported problematic drinking compared to one-quarter of young adults from two-parent heterosexual families. While 25% of the adolescents reared in lesbian families reported using marijuana compared to 48% of adolescents from two-parent heterosexual families, these differences were not statistically significant.

In contrast to Golombok's study of planned lesbian families, Wainright and Patterson (2006) analyzed data on 44 15-year olds reared in female-couple households collected in the 1994 National Longitudinal Study of Adolescent Health. Neither the sexual orientation of the parents nor whether these children were part of a planned lesbian family was known. Wainright and Patterson compared the adolescents from same-sex-parent households to 44 age-matched adolescents raised in households with different-sex parents. Unlike the young adults from Golombok's planned lesbian families, who reported less problematic drinking than their peers, Wainright and Patterson found no significant differences in reported tobacco, alcohol, or marijuana use between the two groups.

While both Golombok and Badger (2010) and Wainright and Patterson (2006) compared substance use by adolescent offspring of lesbian couples and female same-sex couples to adolescents reared in heterosexual families, neither study explicitly explored the connection between substance use and the specific experience of being raised in a lesbian-headed family. This is a noteworthy gap in the literature given that a growing body of research has developed models for adolescent substance use, which focus on social environments and overall psychological well-being (Mason et al., 2009).

The minority stress model is a conceptual framework which examines the relationship between being part of a minority or marginalized group and substance use. This model hypothesizes that experiences often associated with being part of a minority group, such as discrimination, stigmatization, and prejudice, can create a social environment that is hostile and stressful and may result in mental health problems and substance use (Meyer, 2003). Much of the minority stress literature focuses on the experiences of sexual minorities (Cochran, 2001; Meyer, 2003). Bolstering this model are studies establishing a connection between experiences of discrimination or stigmatization and substance use (Borrell et al., 2007; Okamoto et al., 2009).

Fewer studies focus on stigmatization and adolescent substance use (Kuntsche and Gmel, 2004; Tharp-Taylor et al., 2009). Recent investigations found that sexual minority adolescents were more likely to report substance use, and that this increased use was related to having experienced homophobic discrimination (Coker et al., 2010; Padilla et al., 2010). Similarly, several studies of high school students found that students who have experienced bullying were more likely to use alcohol and to drink alone than in social settings (e.g. Kuntsche and Gmel, 2004). A 2009 study of middle school students found that youth who experienced mental bullying, such as being physically threatened or had mean rumors or lies spread about them, were more than twice as likely to use alcohol or cigarettes, and more than three times as likely to use marijuana, than were students who had not been bullied (Tharp-Taylor et al., 2009).

Researchers have also found a relationship between perceived life satisfaction and substance use (Topolski et al., 2001; Zullig et al., 2001). In a study of youth in South Carolina, Zullig et al. (2001) found that reduced life satisfaction was significantly associated with cigarette smoking, marijuana and cocaine usage, and binge drinking. Another study found that adolescents who abstained from tobacco, alcohol, and illicit drug use were likely to report

higher quality of life than were those who experimented or used regularly (Topolski et al., 2001). Moreover, this study found that adolescents who engaged in multiple categories of risk behavior reported lower quality of life than those engaging in one category of behavior.

The USA National Longitudinal Lesbian Family Study (NLLFS) provides an opportunity to fill gaps in the literature about substance use by offspring in planned lesbian families. The NLLFS was initiated in 1986 to provide prospective data on a cohort of lesbian families from the time the children were conceived until they reach adulthood (Gartrell et al., 1996). The current paper presents data from the 17-year-old NLLFS offspring, who were surveyed about their substance use, their experiences of homophobic stigmatization, and their overall life satisfaction. First, the substance use reported by the NLLFS adolescents was compared with the substance use reported by matched adolescents in a national probability sample. Second, within the NLLFS sample, substance use by adolescents who had experienced homophobic stigmatization was compared with the use by adolescents who indicated that they had not had such experiences. Finally, for the NLLFS adolescents, the relationship between life satisfaction and substance use was explored.

Method

Participants and procedure

The Institutional Review Board at California Pacific Medical Center approved this study. Data were collected from a total of 78 adolescents (39 girls and 39 boys) who were conceived through donor insemination and are participating in the NLLFS, an ongoing longitudinal study of planned lesbian families. The families were enrolled in the study between 1986 and 1992 while the prospective mothers were inseminating or pregnant with the index offspring. The families were recruited via announcements at lesbian events, in women's bookstores, and in lesbian-oriented publications. Lesbians who

were planning families through donor insemination were eligible for participation; those who wanted to learn more about the study were asked to contact the researchers by telephone. All interested callers became study participants, which resulted in a total cohort at T1 of 84 families (for additional information about the NLLFS sampling and data collection procedures, see e.g. Gartrell and Bos, 2010; Gartrell et al., 1996, 2010). The mothers were interviewed again when their children were two (T2), five (T3), and ten years old (T4). By the time the index offspring were 17 years old (T5), 78 families were still participating, constituting a 93% retention rate.

At T5, after consent had been obtained from the mothers for their offspring's participation, the adolescents were contacted, and provided assent under the assurance of confidentiality concerning their responses. The adolescents then completed a password-protected questionnaire on the study's secure website.

Since one family did not complete all portions of the T5 survey instruments, the total *N* used for the T5 analyses was 77 families with 78 adolescent offspring (including one set of twins). Eighty-seven percent of the NLLFS adolescents identified as White/Caucasian, 3.8% Latina/o, 2.6% African American, 2.6% Asian/Pacific Islander, 1.3% Armenian, 1.3% Lebanese, and 1.3% Native American. Their mean family social status based on the Hollingshead four-factor index was 49.8 (*SD* = 10.2), with a range of 18–66 (Gartrell et al., 2010). At T5, the families were residing in large urban communities, midsized towns, and rural areas of the northeastern (47%), southern (9%), midwestern (1%), and western (43%) regions of the United States (Gartrell and Bos, 2010).

Measures

Substance use. The NLLFS adolescents were asked to indicate their specific usage of (1) tobacco, (2) alcohol, (3) marijuana or hashish, (4) hallucinogens (LSD, MDA, mushrooms,

peyote, or others), (5) cocaine, (6) barbiturates, or (7) tranquilizers without a prescription (Valium, Prozac, or others). For each of the above substances, the adolescents were asked: 'for each drug, please indicate if you have ever tried it, and pick the most appropriate rating of your usage. Consider only drugs taken without prescription by your doctor'. Possible responses were: 'never used', 'tried but quit', 'several times a year', 'several times a month', 'weekends only', 'several times a week', 'daily', and 'several times a day'. The responses to questions about tobacco, alcohol, and marijuana/hashish usage were collapsed into four categories: 'never used or tried but quit', 'occasionally in the past year', 'monthly', and 'daily'. For hallucinogens, cocaine, barbiturates, and tranquilizers, the answer categories were collapsed into 'ever' versus 'never used'.

Homophobic stigmatization. Homophobic stigmatization was assessed through the following question: 'have you been treated unfairly because of having (a) lesbian mom(s)?' (0 = no, 1 = yes).

Life satisfaction. Life satisfaction for the NLLFS participants was measured by three items of the Youth Quality of Life Scale – Research Version (YQOL-R; Patrick et al., 2002). The items were 'I enjoy life', 'I am satisfied with the way my life is now', and 'I feel my life is worthwhile' (0 = not at all, 10 = completely). The mean score of the three items was calculated and used for further analyses. In this study, Cronbach's alpha for this scale was .82.

Data analysis. To compare substance use in the NLLFS 17-year-old sample with use in a nationwide probability sample representative of 12th-grade students across the United States, the NLLFS adolescents were matched to adolescents in the 2008 *Monitoring the Future: A Continuing Study of the Lifestyles and Values of Youth (MTF)* survey. The MTF is conducted annually by the Institute for Social Research at the University of Michigan with funding from the National Institutes of Health.

The 2008 MTF survey was administered at 120 high schools to 12th-grade students identified through a multi-stage random sampling procedure.

A total of 647 MTF adolescents matched the NLLFS adolescents based on four variables: gender, age, race/ethnicity, and parental educational attainment. From this initial sample of respondents with matching characteristics, one MTF adolescent was randomly selected to match one corresponding NLLFS adolescent. The resulting sample of 78 MTF adolescents has the same sex, age, race/ethnicity, and parental educational attainment as the 78 NLLFS adolescents (NLLFS: 50% female, $M_{\text{age}} = 17.05$, $SD_{\text{age}} = .36$, non-White ethnicity: 12.8%, 93.5% college-educated parents: 93.5%; MTF: 50% female, $M_{\text{age}} = 17.09$, $SD_{\text{age}} = .29$, non-White ethnicity: 12.8%, 93.6% college-educated parents: 93.5%).

The 78 MTF adolescents and their responses to the substance use questions were compared to the 647 MTF matched adolescents to ensure that the random selection was representative of the broader group. None of these comparisons were statistically significant ($p < 0.05$), leading to the conclusion that the selected group of 78 MTF adolescents had similar substance usage to the total matched sample from which it was drawn.

To compare the substance use responses given by the NLLFS and MTF participants, the MTF responses to questions about tobacco, alcohol, and marijuana/hashish were collapsed into four categories: 'never or tried but quit', 'occasionally in the past year', 'monthly', and 'daily' (see Table 1). For the remaining substances, a dichotomous variable was used based on a respondent's ever having used the substance.

Chi-square tests were conducted to compare substance use between the NLLFS and MTF adolescents. Within the NLLFS sample, chi-square tests compared the use of tobacco, alcohol, or marijuana/hashish between two groups: adolescents who had experienced homophobic stigmatization and those who had not. Separate analyses were conducted for girls and boys because the substance use literature has shown more substance use among males than females (e.g. Hicks

Table 1. Comparable measures of adolescent substance use – NLLFS and MTF.

NLLFS categories for questions related to the usage of tobacco, alcohol, marijuana/ hashish:	Corresponding MTF categories:		
	Tobacco ¹ Respondents who:	Alcohol ² Respondents who:	Marijuana/ hashish ² Respondents who:
“Never used” or “tried but quit”	(a) never smoked (lifetime) and had not smoked in the past 30 days; (b) smoked “once or twice” (lifetime) but had not smoked in the past 30 days; (c) smoked “regularly in the past” (lifetime) but not in the past 30 days.	never drank (lifetime) or had no use in the past 12 months.	never used (lifetime) or had no use in the past 12 months.
Occasionally in the past year (“several times a year”)	smoked “occasionally but not regularly” (lifetime) and had not smoked in the past 30 days.	drank in the past 12 months but not in the past 30 days.	used in the past 12 months but not in the past 30 days.
Monthly (“several times a month,” “weekends only,” or several times a week”)	smoked “regularly now” (lifetime) and smoked “less than one cigarette per day” during the previous 30 days.	drank in the past 30 days, but less than 20 times.	used in the past 30 days, but less than 20 times.
Daily (“daily” or “several times a day”)	smoked “regularly now” (lifetime) and “one to five cigarettes per day” in the past 30 days.	drank 20 or more times in the past 30 days.	used 20 or more times in the past 30 days.

¹Based on lifetime and past 30-day usage

²Based on lifetime, past 12-month, and past 30-day usage

et al., 2007). Finally, analyses of variances (ANOVAS) were computed to determine whether life satisfaction (dependent variable) was related to tobacco, alcohol, or marijuana/hashish usage (each as an independent variable).

Results

Comparison between NLLFS and MTF samples

As shown in Table 2, for both girls and boys, significant differences were found between the NLLFS and MTF samples in alcohol and marijuana/hashish use. There was also a significant difference in hallucinogen use between NLLFS and MTF boys, but this difference was not found for girls. For alcohol and marijuana/

hashish use, more NLLFS girls were in the category ‘occasionally in the past year’ and more MTF girls were in the category ‘never or tried but quit’; the same pattern was found in comparing the NLLFS and MTF boys. A higher percentage of NLLFS boys than MTF boys had ever used hallucinogens. No significant differences were found between NLLFS and MTF adolescents in ever having used cocaine, barbiturates, or tranquilizers (without a prescription for the latter two).

Comparison within the NLLFS sample

Due to the low number of NLLFS adolescents reporting hallucinogen, cocaine, barbiturate, or

Table 2. Adolescent substance use in the National Longitudinal Lesbian Family Study (NLLFS) and Monitoring the Future (MTF) survey, separately for girls and boys.

	Girls		Boys					
	NLLFS	MTF	NLLFS versus MTF		NLLFS	MTF	NLLFS versus MTF	
	N = 39	N = 39	χ^2	<i>p</i>	N = 39	N = 39	χ^2	<i>p</i>
Smoke tobacco (n, %):			02.99	0.393 ¹			07.20	.066 ¹
Never or tried but quit	28 (71.8)	35 (89.7)			27 (73.0)	32 (82.1)		
Occasionally in the past year	04 (10.3)	02 (05.1)			05 (13.5)	02 (05.1)		
Monthly	04 (10.3)	00 (00.0)			05 (13.5)	00 (00.0)		
Daily	03 (07.7)	02 (05.1)			00 (00.0)	05 (12.8)		
Drink alcohol (n, %):			26.56	<.001 ¹			16.96	<.001
Never or tried but quit	06 (15.4)	21 (53.8)			09 (24.3)	18 (46.2)		
Occasionally in the past year	12 (30.8)	00 (00.0)			13 (35.1)	00 (00.0)		
Monthly	21 (53.8)	18 (46.2)			15 (40.5)	21 (53.8)		
Daily	00 (00.0)	00 (00.0)			00 (00.0)	00 (00.0)		
Smoke marijuana or hashish (n, %):			18.43	<.001 ¹			11.91	.007 ¹
Never or tried but quit	15 (48.5)	33 (84.6)			16 (43.2)	29 (74.4)		
Occasionally in the past year	12 (30.8)	00 (00.0)			09 (24.3)	00 (00.0)		
Monthly	08 (20.5)	06 (15.4)			10 (27.0)	05 (12.8)		
Daily	04 (10.3)	00 (00.0)			02 (05.4)	05 (12.8)		
Ever used LSD, MDA, mushrooms peyote or other hallucinogens (n, %)	07 (17.9)	4 (10.3)	5.95	0.329 ¹	09 (25.0)	02 (05.1)	5.91	.015
Ever used cocaine (n, %)	06 (15.4)	01 (02.6)	2.51	0.113 ¹	04 (10.3)	04 (10.3)	0.07	.799 ¹
Ever used barbiturates without Rx (n, %)	02 (05.1)	01 (03.8)	0.00	1.000 ¹	00 (00.0)	02 (05.1)	01.90	.168 ¹
Ever used Valium, Prozac or other tranquilizers without Rx (n, %)	04 (10.3)	03 (07.7)	0.00	1.000 ¹	03 (07.7)	3 (07.7)	0.11	.746 ¹

¹Yates's chi-square and Yates's *p* value

Note: Percentages for NLLFS boys who smoked marijuana are based on a sample sizes of 37; the percentages for NLLFS boys for LSD and cocaine use are based on a sample size of 36

tranquilizer usage, comparisons within the NLLFS sample were restricted to tobacco, alcohol and marijuana/hashish usage.

Homophobic stigmatization. Forty-six percent of NLLFS girls and 35.9% of the NLLFS boys reported experiences of homophobic stigmatization. There were no significant differences in the number of girls and boys who reported these experiences, $\chi^2(1, N = 78) = .89, p = .347$. For girls and boys no associations were found between experienced homophobic stigmatization and tobacco, alcohol, or marijuana/hashish in the NLLFS sample (see Table 3).

Life satisfaction. On average, the NLLFS girls scored 8.03 ($SD = 1.67$) on life satisfaction, and boys scored 8.06 ($SD = 1.74$). The difference in life satisfaction scores between girls and boys was not significant, $F(1, 74) = .006, p = .937$. Due to the low numbers of NLLFS adolescents reporting tobacco, alcohol, and marijuana/hashish usage, the ANOVAs used to determine whether the use of these substances was related to life satisfaction were done for the total group and not for girls and boys separately. Life satisfaction was not significantly related to tobacco smoking (never or tried but quit: $M = 8.22, SD = 1.72$; occasionally in the past year:

Table 3. NLLFS adolescent girls and boys: tobacco, alcohol, and marijuana or hashish use, separately for those who experienced stigmatization and those who did not.

	Girls				Boys			
	Stigmatization				Stigmatization			
	No	Yes	X^2	p	No	Yes	X^2	p
Life Satisfaction								
Smoke tobacco:			3.95	.267 ¹			.12	.940 ¹
Never or tried but quit	16 (76.2)	12 (66.7)			16 (72.7)	08 (66.7)		
Occasionally in the past year	02 (09.5)	02 (11.1)			03 (13.6)	02 (16.7)		
Monthly	00 (00.0)	04 (22.2)			03 (13.6)	02 (16.7)		
Daily	03 (14.3)	00 (00.0)			00 (00.0)	00 (00.0)		
Drink alcohol:			0.06	.972 ¹			3.07	.215 ¹
Never or tried but quit	03 (14.3)	02 (16.7)			05 (22.7)	04 (33.3)		
Occasionally in the past year	07 (33.3)	05 (27.8)			10 (45.5)	01 (08.3)		
Monthly	10 (52.4)	10 (55.6)			07 (31.8)	07 (58.3)		
Daily	00 (00.0)	00 (00.0)			00 (00.0)	00 (00.0)		
Smoke marijuana or hashish:			0.50	.920 ¹			2.18	.535 ¹
Never or tried but quit	09 (42.9)	06 (33.3)			11 (50.0)	05 (41.7)		
Occasionally in the past year	07 (33.3)	05 (27.8)			05 (22.7)	02 (16.7)		
Monthly	03 (14.3)	05 (27.8)			06 (27.3)	04 (33.3)		
Daily	02 (09.5)	02 (11.1)			00 (00.0)	01 (08.3)		

¹Yates's chi-square and Yates's p value

$M = 7.70$, $SD = 1.37$; monthly: $M = 7.41$, $SD = 1.93$; daily: $M = 7.78$, $SD = 1.35$), $F(4,74) = .75$, $p = .524$, drinking alcohol (never or tried but quit: $M = 7.62$, $SD = 2.54$; occasionally in the past year: $M = 8.38$, $SD = 1.51$; monthly: $M = 7.99$, $SD = 1.35$), $F(4,74) = .94$, $p = .394$, or marijuana/hashish smoking (never or tried but quit: $M = 8.45$, $SD = 1.76$; occasionally in the past year: $M = 8.03$, $SD = 1.18$; monthly: $M = 7.70$, $SD = 1.91$; daily: $M = 8.04$, $SD = 1.69$), $F(4,74) = 1.91$, $p = .136$.

Discussion

The current study provides a nuanced picture of substance use by adolescents raised in planned lesbian families. Overall, the NLLFS adolescents reported occasional substance use. Very few adolescents reported high frequency substance use, and they were no more likely than their matched peers from a national probability sample to report heavy use. Compared to their matched peers, the NLLFS adolescents were

more likely to report alcohol and marijuana/hashish use in the past year. These differences between NLLFS and MTF adolescents were the same for girls and boys. The NLLFS adolescent boys were also more likely to have ever used hallucinogens than the MTF adolescent boys. Yet, this substance use was not associated with experiences of homophobic stigmatization or a lower life satisfaction rating.

The differences in reported substance use by the NLLFS and the MTF 17-year olds might reflect methodological variations in survey methodology. The NLLFS adolescents have been willing participants in the longitudinal study for many years, and as a result, they have established a sense of trust in the researchers. Also, the NLLFS adolescents were able to complete their surveys via the Internet at a place of their choosing. Because they knew that personal details of their lives would be kept in confidence, they may have felt more comfortable disclosing substance use than the MTF adolescents, who completed their surveys in

classrooms with both a teacher and a survey representative present.

While the NLLFS adolescents report slightly higher rates of alcohol, and marijuana/hashish usage than matched adolescents from the MTF national sample, this occasional substance use was not associated with experiences of homophobic stigmatization or lower life satisfaction. These findings are significant because they do not fit with the minority stress model that shows increased substance use associated with decreased life satisfaction. Instead, they suggest that other factors may enable the NLLFS adolescents to cope with homophobic stigmatization so these experiences do not result in high levels of substance use.

Studies on resiliency in lesbian- and gay-parent families have found that contact with peers who also have lesbian mothers or gay fathers protect offspring from the destructive effects of stigmatization on self-esteem (Bos and Van Balen, 2008). Similarly, a study of sexual minority and transgender adolescents found that greater parental acceptance was predictive of positive physical and mental health and reduced likelihood of substance abuse (Ryan et al., 2010). In fact, in the T4 wave, stigmatized NLLFS children whose mothers participated in the lesbian community were found to be more resilient (Bos et al., 2008). The NLLFS adolescents at T5 scored higher on tests of overall psychological adjustment when compared to children in heterosexual families (Gartrell and Bos, 2010), despite experiences of homophobic stigmatization. And the NLLFS adolescents who report having close, positive relationships with their mothers demonstrated greater well-being despite having experienced stigmatization, suggesting that such relationships fosters greater resilience (Bos and Gartrell, 2010).

The NLLFS is a prospective study, which is one of its key strengths. Families were recruited before the birth of the child participating in the study, so the findings are not skewed by overrepresentation of families who volunteer when it is already clear that their offspring are functioning well. Additionally, the retention rate is

very high after 25 years. Finally, these data (T5) were gathered through confidential adolescent self-reports, which increases the likelihood of candid responses on sensitive topics including substance use. Because the NLLFS is an ongoing longitudinal study, information about substance use will be collected again at a later point in time. At T6, when the index offspring are 25 years old, it will be possible to document changes or continuity in their substance use over time.

There are several limitations inherent in the NLLFS. The NLLFS is a nonrandom sample. At the time that the NLLFS began in the mid-1980s, due to the long history of discrimination against lesbian and gay people, the prospect of recruiting a representative sample of planned lesbian families was even more remote than it is today (Bos et al., 2007). A second limitation is that the NLLFS families reside primarily in the northeastern and western regions of the United States. The 2009 National Survey on Drug Use and Health, conducted by the US Department of Health and Human Services, found that illicit substance and alcohol use rates were higher in large metropolitan areas and in the West and Northeast regions, where the NLLFS families are largely concentrated. Although the NLLFS is the largest, longest running prospective study of planned lesbian families, the findings would be strengthened by replication in a larger and more diverse sample, including more families of color and more families from across the United States. A third limitation of the current investigation pertains to the comparison of the NLLFS adolescents to the MTF adolescents. Responses to the questions were collapsed to allow for comparability, despite variation in the exact wording of the questions in the two survey instruments. As a result, it is possible that some nuance in the responses of the NLLFS and MTF adolescents may have been compromised.

Despite these limitations, the NLLFS and the current paper provide important contributions to our understanding of the experiences of adolescents raised in planned lesbian families. The adolescent offspring of lesbian mothers

reported occasional substance use, but were not more likely to report problematic substance use when compared to their matched peers from the MTF national probability survey. Additionally, stigmatization and experiences of homophobic discrimination were not related to substance use, suggesting that the supportive social environments in which the NLLFS adolescents have been raised may have contributed to their overall resilience.

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