ORIGINAL ARTICLE: MENTAL HEALTH

The stability of psychological adjustment among donor-conceived offspring in the U.S. National Longitudinal Lesbian Family Study from childhood to adulthood: differences by donor type

Nicola Carone, Ph.D.,[a] Nanette K. Gartrell, M.D.,[b,c] Esther D. Rothblum, Ph.D.,[d] Audrey S. Koh, M.D.,[e] and Henny M. W. Bos, Ph.D.[c]

[a] Department of Brain and Behavioral Sciences, Lab on Attachment and Parenting - LAG, University of Pavia, Pavia, Italy; [b] Williams Institute, School of Law, University of California Los Angeles, Los Angeles, California; [c] Research Institute of Child Development and Education, University of Amsterdam, Amsterdam, the Netherlands; [d] Department of Women's Studies, San Diego State University, San Diego; and [e] School of Medicine, Department of Obstetrics, Gynecology and Reproductive Sciences, University of California, San Francisco, California

Objective: To study differences by sperm donor type in the psychological adjustment of the U.S. National Longitudinal Lesbian Family Study (NLLFS) offspring across three time periods from childhood to adulthood.
Design: U.S.-based prospective cohort study.
Setting: Paper-and-pencil questionnaires and protected online surveys.
Patient(s): A cohort of 74 offspring conceived by lesbian parents using an anonymous (n = 26), a known (n = 26), or an open-identity (n = 22) sperm donor. Data were reported when offspring were ages 10 (wave 4), 17 (wave 5), and 25 (wave 6).
Intervention(s): None.
Main Outcome Measure(s): Achenbach Child Behavior Checklist administered to lesbian parents when offspring were ages 10 and 17 and the Achenbach Adult Self-Report administered to offspring at age 25.
Result(s): In both relative and absolute stability, no differences were found in internalizing, externalizing, and total problem behaviors by donor type over 15 years. However, both externalizing and total problem behaviors significantly declined from age 10 to 17 and then increased from age 17 to 25. Irrespective of donor type, among the 74 offspring, the large majority scored continuously within the normal range on internalizing (n = 62, 83.8%), externalizing (n = 62, 83.8%), and total problem behaviors (n = 60, 81.1%).
Conclusion(s): The results reassure prospective lesbian parents and provide policy makers and reproductive medicine practitioners with empirical evidence that psychological adjustment in offspring raised by lesbian parents is unrelated to donor type in the long term. (Fertil Steril® 2020;■:■–■. ©2020 by American Society for Reproductive Medicine.)
Keywords: Sperm donation, anonymity, open-identity, psychological adjustment, lesbian parents

Discuss: You can discuss this article with its authors and other readers at https://www.fertstertdialog.com/posts/31061

Received July 22, 2020; revised and accepted December 11, 2020.
Reprint requests: Nicola Carone, Ph.D., Department of Brain and Behavioral Sciences, University of Pavia, Piazza Botta 11, 27100 Pavia, Italy (E-mail: nicola.carone@unipv.it).

Fertility and Sterility® Vol. ■, No. ■, ■ 2020 0015-0282/$36.00

https://doi.org/10.1016/j.fertnstert.2020.12.012

The U.S. National Longitudinal Lesbian Family Study (NLLFS) was initiated in 1986 to provide empirical data on the long-term experiences and outcomes of the first generation of donor-conceived offspring and their lesbian parents (1). At the time of the first wave of data collection, when parents were either pregnant or inseminating, the donor preferences among the 84 participating planned families were almost equally divided between an anonymous donor (whose identity at the time of treatment was meant to never be known), a known donor (i.e., a relative of the nongenetic parent or a friend or an acquaintance), and an open-identity donor (whose identifiable information offspring could receive upon turning 18). When discussing pros and cons in relation to their family arrangement, however, some prospective parents were concerned about the chance that donor insemination (DI) in itself might one day be a problem for their offspring and that some offspring might regret the use of an anonymous donor (1).

Of note, nowadays donor anonymity no longer exists (2), since direct-to-consumer genetic testing and online registries are making it possible for donor-conceived offspring to identify their genetic relatives, including a sperm donor who initially donated in an anonymous program but might now be traced. Yet the issue of whether anonymous donation should be permitted since it denies offspring the basic human right of knowing half their genetic history is still highly debated (3). While this view led to the enactment of legislation in a number of countries (e.g., the UK, the Netherlands, Sweden, Norway, Switzerland, New Zealand, Australia) to remove donor anonymity, there is no such legislation in the United States (with the exception of the states of Washington and California), and decisions over the type of donation are left to sperm banks and prospective parents.

The concern over anonymity has arisen partly from research on adoption, which has shown that adopted children benefit from information about their genetic parents and that some children who are not given such information develop emotional, behavioral, and identity problems (4). Although it has been suggested that it is not ideal to draw comparisons between adoptive and donor-conceived people as the origins for the two groups are very different (5), it cannot be overlooked that donor-conceived people grow up within a culture that "valorizes genes" and that they "may feel cheated of their heritage and suffer a crisis of identity" (6) (p. 2231). Existing research has emphasized the importance for donor-conceived people of being able to access their genetic origins, with the majority of adolescents (7) and adults (8–14) expressing curiosity and wanting to know more about their ancestry when questioned about their donor. Furthermore, in a recent study examining the characteristics and motivations of the first 10-year cohort of DI adults (ages 18–27 years) from single, lesbian, and heterosexual parent families who were eligible to receive their donor's identifying information, about a third (36.8%) of those with lesbian parents requested their donor's identity (13). The main motivations included wanting to "have the information" (p. 488), to express gratitude and show him how things turned out and update him on their life, and to know who he was as a person and what he looked like. This interest in knowing more about the donor as a person (i.e., inherited traits, resemblance with the offspring), his genealogy, and identity issues was also reported by NLLFS emerging adults at wave 6 (10).

Lesbian parents may use, alternatively, the sperm from a known donor with whom they have some preexisting relationship and whom they consider trustworthy. Women who choose known donors often do so because they are uncomfortable with the idea of conceiving their child with genetic material from someone they have never met or because they believe that it is important for their child to have ongoing contact with the donor or, ultimately, to know who their genetic father is, however peripheral a social role he might have (1, 15, 16). In some cases, the choice of a known donor is also motivated by the wish to ensure that their child will have at least one male role model (17). Although anonymous donors may be "out of sight, out of mind" (18), potentially deemed unimportant, or imagined as whomever the parents or child want them to be (19–21), the nature of the known donor's role must be negotiated on an ongoing basis. In this vein, anxieties about the legal rights and responsibilities of known donors are often quite salient to lesbian parents, who fear that the donor may wish to take on or establish a parenting role in the future, even though he does not wish to do so at the time of donation (15, 22). In these cases, known donation may represent a risk for clear psychological boundaries between the donor and the lesbian parent families and may complicate the donor-child relationship, as well as undermine the parents' ability to feel secure in their role (16, 17). Whether this, in turn, will affect offspring psychological adjustment still remains to be seen.

A third option is that lesbian parents select an open-identity sperm donor, particularly when they want their offspring to have the chance of future contact with the donor (1, 17). This type of donation occupies an uncertain middle ground between anonymous and known donation in that recipients have some basic information about the donor at the time of insemination, but they, and their child, will have access to identifying information and potential contact with the donor in the future. While it can be argued that open-identity donation would prevent offspring from experiencing a sense of genetic discontinuity typically applied to anonymous donation (14), this arrangement does not guarantee that the donor will be willing to meet or be contacted by the donor-conceived offspring many years later (13, 23). Under these circumstances, it is possible that feelings of frustration, grief, and loss of control about their donor conception may result in psychological difficulties for offspring, as shown by adoption research indicating the positive association between open adoption (i.e., any form of contact or information sharing across the adoptee, adoptive family members, and birth family members) and offspring well-being (4).

It is reasonable, therefore, that the three types of donor arrangements may result in different psychological outcomes. However, most of what is known about the different

meanings and implications for lesbian parents and their offpsring of having an anonymous, a known, or an open-identity donor derives from qualitative research (16, 18–22), and empirical evidence on the risks and benefits of each donor type for offspring psychological adjustment is still lacking. The NLLFS is one of the first and only studies to have examined the influence of sperm donors on offspring psychological adjustment from a longitudinal perspective. When NLLFS offspring were ages 10 and 17 (waves 4 and 5, respectively), Bos and Gartrell (24) found no differences in their parent-reported problem behaviors by donor type (categorized as "known" vs. "as-yet-unknown donor"), with 83.8% and 91.9% of all offspring scoring in the normal range for internalizing and externalizing behaviors, respectively. Similar findings have been reported by cross-sectional studies with younger offspring (25, 26). Findings reported by Bos and Gartrell (24) are particularly meaningful since at age 10 most donor-conceived children are able to give clear accounts of the nature of their conception (27). This is also the age when children of lesbian parents develop an appreciation for diversity and feel pride in their family arrangement (28). As offspring enter adolescence, their increasingly sophisticated metacognitive abilities allow them to process the meaning making of their donor conception in relation to their identity (7, 29).

At wave 6, the NLLFS offspring were 25 years old, and those with an open-identity donor had been eligible to receive identifiable information about their donor for 7 years. This group of emerging adults showed similar levels of adaptive functioning and behavioral problems when compared with a U.S. matched normative sample (30). Whether differences in their psychological adjustment based on donor type become apparent in emerging adulthood, however, is currently unknown. Emerging adulthood is perhaps the most heterogeneous and the least structured period of life since it is "the age of identity explorations, the age of instability, the self-focused age, the age of feeling in-between, and the age of possibilities" (31) (p. 69). Also, while identity issues were once thought to be limited to adolescence, they are now considered more preeminent in emerging adulthood (31). Finally, as the developing reproductive identity intensifies in this period (31), the possibility of having information on and access to the donor (or not) might influence the psychological adjustment of NLLFS offspring.

The main aim of the present study was to examine differences in the stability of psychological adjustment—operationalized as internalizing, externalizing, and total problem behaviors—among NLLFS offspring who had an anonymous, a known, or an open-identity sperm donor across three developmental stages, namely, at 10, 17, and 25 years. As recommended when studying developmental trajectories of psychological adjustment (32), both relative stability (i.e., consistency of an individual's rank order within a group) and absolute stability (constancy in the absolute level of problem behavior over time) were assessed. Although previous research did not detect any differences by donor type (24), on the basis of the developmental consideration on emerging adulthood mentioned above, it was expected that offspring with anonymous donors would show less absolute stability in their psychological adjustment, with an increase in behavioral problems over time relative to offspring with a known or an open-identity donor. Conversely, no differences were expected in relative stability across donor types, because relative and absolute stability are conceptually independent and the former has been found to be mainly susceptible to the passage of time rather than other factors (e.g., donor type) (32).

MATERIALS AND METHODS

Participants

The present longitudinal investigation is based on waves 4, 5, and 6 of the U.S. NLLFS, when offspring were ages 10, 17, and 25, respectively. The family retention rate since wave 1 is 92%, with an initial cohort of 84 families (33). Given the current study aim, only data available from the three time points were used, for a total sample of 74 offspring. Detailed demographics for waves 4 and 5 are reported elsewhere (34, 35). At wave 6, 37 offspring (50%) were cisgender females and 37 (50%) were cisgender males; all were 25 years old and born in the United States. All were conceived through DI: 26 (35.1%) had an anonymous donor, 26 (35.1%) a known donor, and 22 (29.8%) an open-identity donor. A majority of NLLFS offspring identified as white (n = 67, 90.5%), with the remaining identifying as African American/black (n = 3, 4.1%), Latina/o or Hispanic (n = 1, 1.4%), or other/mixed (n = 3, 4.1%). Most (n = 51, 68.9%) had completed a bachelor's or registered nurse's degree. Of the remainder, nine (12.2%) reported some college but no college degree, two (2.7%) an associate's degree, seven (9.5%) some graduate school but no graduate degree, and five (6.8%) a master's degree. Regarding their sexual orientation, a majority self-identified as heterosexual (n = 59, 79.7%) and a smaller number as lesbian, gay, or bisexual (n = 15, 20.3%).

Procedure

At waves 4 and 5, informed consent was obtained from the parents before the offspring were interviewed or completed questionnaires; at wave 6, the offspring were legal adults and provided written informed consent to participate. Each participant who completed a wave 5 or 6 survey received the equivalent of $60 in compensation (e.g., gift card). The Institutional Review Board at Sutter Health approved this study (SHIRB no. 20.070-2; IRBNet no. 348911-17).

Measures

Donor type. At wave 4, parents were asked about the sperm donor type used to conceive (i.e., anonymous, known, or open-identity).

Offspring psychological adjustment. At waves 4 and 5, parents completed the Child Behavior Checklist (CBCL) (36) as a paper-and-pencil measure to assess their offspring's psychological adjustment during the previous 6 months. The CBCL is a standardized, internationally validated behavioral 113-item checklist used to assess behavioral/emotional problems on a 0–2 scale (0 = not true, 1 = somewhat or sometimes true, and 2 = very true or often true); the three broad-band scales

of internalizing problem behavior (32 items assessing children's somatic complaints, anxiety, depression, and withdrawn behaviors; Cronbach's α: wave 4 = .88; wave 5 = .84), externalizing problem behavior (35 items assessing children's disruptive, aggressive, and delinquent behaviors; Cronbach's α: wave 4 = .80; wave 5 = .90), and total problem behavior (113 items representing a summary score of the internalizing and externalizing behavior problems in addition to attention, thought, and social problems; Cronbach's α: wave 4 = 0.89; wave 5 = 0.92) were used. In most cases (n = 69), the birth parent completed the questionnaire, but in cases where she was not available (e.g., because she was too busy), the coparent did.

At wave 6, offspring themselves rated their psychological behavior during the prior 6 months by completing the 120-item Achenbach Adult Self-Report (ASR) (37) on a 3-point Likert scale (0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true) through a protected online portal. Scores were tabulated on the 39 items related to internalizing problems (comprising anxious/depressed, withdrawn, and somatic complaints subscales; Cronbach's α = .89) and the 35 items pertaining to externalizing problems (comprising aggressive, rule breaking, and intrusive behavior subscales; Cronbach's α = .85). Furthermore, all 120 individual items were summed into a total problem behavior scale (inclusive of internalizing and externalizing behavior problems in addition to thought and attention problems; Cronbach's α = .95).

In both the CBCL and the ASR, for each scale the total raw score is a sex- and age-specific summary of all items and is converted to a standard *T* score, with higher total *T* scores indicating more internalizing, externalizing, and total problem behaviors. *T* scores were used in all analyses to account for sex and age specificities across waves, as well as to control for the two different, although related, measures of psychological adjustment. Following the procedures indicated in the CBCL and ASR manuals (36, 37), the *T* scores for internalizing, externalizing, and total problem behaviors were used to determine whether offspring fell within the deviant or normal ranges. Deviant scores are defined by Achenbach and Rescorla (36, 37) as greater than or equal to the 93rd percentile (T $\geq$ 65) in the combined borderline and clinical ranges.

Data Analysis

All analyses were conducted using R software (*lme4* package) (38). Given evidence indicating gender differences in psychological adjustment (36, 37), three linear mixed models (one for each outcome) were preliminarily run to verify a potential gender effect on internalizing, externalizing, and total problem behaviors. Relative stability coefficients of internalizing, externalizing, and total problem behaviors between wave 4 and wave 6 and between wave 5 and wave 6 were calculated by Pearson's correlation coefficients. By computing these stability coefficients, it was possible to determine to what extent NLLFS offspring preserved their rank orders, regardless of changes in the group scores. Stability coefficients were conducted for offspring with an anonymous, a known, or an open-identity donor separately. Fisher's *Z* transformations were used to determine differences in donor type for the stability coefficients. The absolute stability was examined in two ways. First, changes in internalizing, externalizing, and total problem behaviors over time, by donor type, were investigated, resulting in three growth curve models, one for each outcome. Second, internalizing, externalizing, and total problem behavior scores at the three time intervals were dichotomized as falling in the deviant (*T* score $\geq$ 65) or normal range, separately for anonymous, known, and open-identity donors. Given that some expected cell counts were lower than 5, Fisher's exact test was used to compare the percentages of offspring in each developmental pathway for internalizing, externalizing, and total behavior problems, by donor type.

RESULTS

Psychological Adjustment of NLLFS Offspring by Gender and Donor Type

Table 1 shows means and standard deviations of NLLFS T scores for psychological adjustment by gender and donor type, across the three waves. Linear mixed models indicated that female and male offspring did not differ on their internalizing, estimate = 2.95, standard error (SE) = 1.52, P = .057; externalizing, estimate = 0.53, SE = 1.45, P = .718; and total problem behaviors, estimate = 1.30, SE = 1.58, P = .414, over time. Therefore, offspring gender was excluded from the following analyses.

Relative Stability of Psychological Adjustment

To determine to what extent offspring maintained their rank order irrespective of changes in mean level of the group scores, Pearson correlation coefficients were computed (Table 2); the larger the coefficients were, the more problem behaviors were stable over time. For offspring with anonymous and known donors, the coefficients were very small (lower than 0.10) or small (between 0.10 and 0.30), ranging from 0.02 to 0.14 and from –0.04 to 0.18, respectively, whereas for offspring with open-identity donors, the coefficients were very small, small, or medium, ranging from –0.21 to 0.35 (39). Overall, considering the coefficients' size and Fisher's *Z* transformations, offspring in the three donor groups showed equally relative low stability (i.e., consistency of their rank order within the group) in their internalizing, externalizing, and total problem behaviors across each developmental stage comparison.

Changes in Psychological Adjustment by Donor Type over Time

Changes in psychological adjustment by donor type over time were examined using three growth curve models—one for each outcome. In cases of overall significant difference in means (i.e., fixed effects were significant), within-subjects contrasts were examined to understand where those differences occurred and whether problem behavior changed over time in a linear fashion (i.e., linear relationship) or following a curve with variable degrees of steepness and corresponding

TABLE 1

Means (standard deviations [SD]) of internalizing, externalizing, and total problem behavior *T* scores at ages 10 (wave 4), 17 (wave 5), and 25 (wave 6) by offspring gender and donor type (N = 74).

	Anonymous donors (n = 26)		Known donors (n = 26)		Open-identity donors (n = 22)	
	Males (n = 11)	Females (n = 15)	Males (n = 11)	Females (n = 15)	Males (n = 15)	Females (n = 7)
Age 10 (wave 4)						
Internalizing behavior	52.45 (12.98)	46.13 (9.75)	52.25 (12.80)	47.87 (8.73)	54.68 (13.18)	48.29 (8.29)
Externalizing behavior	52.48 (10.18)	50.70 (9.14)	50.82 (11.82)	48.39 (8.70)	52.12 (9.18)	44.86 (6.23)
Total problem behavior	50.30 (11.10)	47.37 (9.16)	50.19 (14.23)	47.13 (7.87)	50.64 (10.66)	43.91 (6.42)
Age 17 (wave 5)						
Internalizing behavior	48.55 (10.16)	49.13 (9.37)	46.55 (9.32)	49.87 (10.34)	49.53 (9.56)	47.43 (5.94)
Externalizing behavior	44.73 (11.22)	48.73 (9.45)	43.36 (7.83)	46.73 (9.25)	46.47 (10.83)	42.86 (6.62)
Total problem behavior	44.73 (12.37)	47.13 (9.46)	41.82 (9.59)	48.13 (10.22)	45.67 (11.48)	41.86 (6.52)
Age 25 (wave 6)						
Internalizing behavior	51.73 (8.78)	51.00 (12.05)	53.82 (9.00)	49.33 (8.33)	54.47 (8.63)	45.86 (10.72)
Externalizing behavior	44.64 (8.36)	50.27 (9.47)	49.82 (8.94)	47.13 (6.95)	51.20 (7.89)	46.71 (8.30)
Total problem behavior	48.45 (9.43)	49.87 (12.17)	52.73 (10.95)	48.00 (8.49)	53.13 (8.29)	47.29 (13.12)

Carone. Long-term adjustment of NLLFS offspring. Fertil Steril 2020.

to an acceleration or deceleration in a particular age (i.e., quadratic growth). Plots are displayed in Supplemental Figures 1–3. Internalizing behaviors were similar among offspring with anonymous, known, and open-identity donors, $F(2,69) = 0.303$, $P = .740$, and stable over time, $F(2,71) = 2.069$, $P = .134$. Likewise, they did not change by donor type across offspring age, $F(4,71) = 0.356$, $P = .839$. Overall, the model explained 47% of variance (R^2 conditional = .470). Conversely, externalizing behaviors did change over time, $F(2,69) = 6.807$, $P = .002$, following a quadratic growth, estimate = 2.851, SE = 0.869, $P = .002$; that is, they showed a significant decline from age 10 to 17 but a significant increase from age 17 to 25. No differences were seen in externalizing problems either by donor type, $F(2,70) = 0.243$, $P = .785$, or by donor type across offspring age, $F(4,70) = 0.318$, $P = .865$. Overall, the model explained 77% of variance (R^2 conditional = .772). Finally, total problem behavior further changed over time, $F(2,72) = 5.494$, $P = .006$, declining significantly from age 10 to 17, but increasing significantly from age 17 to 25 (i.e., quadratic growth), estimate = 3.247, SE = 0.980, $P = .001$. Offspring with anonymous, known, and open-identity donors reported similar levels of total problem behaviors, $F(2,70) = 0.011$, $P = .990$; likewise, total problem behavior scores did not vary by donor status across offspring ages, $F(4,83) = 0.196$, $P = .940$. Overall, the model explained 48% of variance (R^2 conditional = .480).

Developmental Pathways from Ages 10 to 17 to 25

None of the NLLFS offspring had a deviant score from age 10 to 17 to 25 in any of the psychological adjustment variables studied. Rather, among the 74 offspring, the large majority scored continuously within the normal range on internalizing (n = 62, 83.8%), externalizing (n = 62, 83.8%), and total problem behaviors (n = 60, 81.1%), with no differences between those who had an anonymous, a known, or an open-identity donor. Detailed developmental pathways by donor type are shown in Table 3.

DISCUSSION

This study provided the unique opportunity to assess the stability of psychological adjustment over 15 years in the first cohort of offspring of lesbian parents who used an anonymous, a known, or an open-identity sperm donor. (Dis)continuity in problem behaviors, by donor type, was assessed as both relative stability and absolute stability. In line with our hypothesis, irrespective of donor type, internalizing, externalizing, and total problem behaviors showed low relative stability (i.e., consistency of an individual's rank order within a group) over time. When viewed within the overall positive adjustment of NLLFS offspring (30, 40), this result does not raise particular concern and simply means that individuals' rank order within their donor type group did not remain constant over time. It is also in line with evidence indicating that the wider the time frame is when problem behaviors are assessed, the lower the relative stability (32).

In terms of absolute stability, there was only a significant change over time for externalizing and total problem behaviors, which declined from age 10 to 17 and then increased from age 17 to 25, although remaining under the cutoff for clinical relevance; neither donor type nor the interaction between donor type and offspring age had a significant effect on any of the behavioral domains considered. The increases in externalizing and total problem behaviors from adolescence to emerging adulthood in all three donor type groups may be the result of offspring adaptions to this new period of life in which they have limited familial or occupational obligations, are open to possibility, have left the dependency of childhood and adolescence, but have not yet assumed the enduring responsibilities that are normative in adulthood (31, 41). It might also be that NLLFS 25-year-old offspring felt they could behave less responsibly or more impulsively (e.g., demanding attention, being argumentative, getting drunk) than when they were 17-year-olds because they were less likely to be monitored by their parents. This idea seems plausible given that more than 80% of them no longer lived with their parents (40); it further aligns with prior studies indicating that

TABLE 2

Relative stability of psychological adjustment from age 10 (wave 4) to 25 (wave 6), and from age 17 (wave 5) to 25 (wave 6), separately for each problem behavior scale for NLLFS offspring with anonymous, known, and open-identity donors (N = 74).

	Anonymous donors (n = 26)	Known donors (n = 26)	Open-identity donors (n = 22)	Z, anonymous vs. known donors	Z anonymous vs. open-identity donors	Z known vs. open-identity donors
Wave 4–wave 6						
Internalizing behavior	.09	.05	−.21	0.14	−0.98	0.85
Externalizing behavior	−.04	.14	.09	−0.61	0.42	0.16
Total problem behavior	.13	.09	−.16	0.14	−0.94	0.81
Wave 5–wave 6						
Internalizing behavior	.06	.07	.35	−0.03	0.99	−0.95
Externalizing behavior	.18	.04	.18	0.48	0	−0.46
Total problem behavior	.08	.02	.08	0.20	0	−0.19

Note. Z = Fisher r-to-z transformation, applied to assess the significance of the difference between the two correlation coefficients, across each developmental stage comparison (wave 4 vs. wave 6; wave 5 vs. wave 6), for the three groups (anonymous vs. known donors; anonymous vs. open-identity donors; known vs. open-identity donors).

Carone. Long-term adjustment of NLLFS offspring. Fertil Steril 2020.

increased stress and sensitivity to environmental inputs during transitional periods such as emerging adulthood may contribute to increased risk taking (41, 42). In a similar vein, it is possible that once the NLLFS emerging adults leave home, they may feel less pressure to be exemplary in response to public homophobic scrutiny (43). Finally, an informant effect might also be possible, insofar as behavioral problems at ages 10 and 17 were reported by parents, whereas at age 25 they were reported by offspring themselves.

The lack of differences by donor type, however, says little about its clinical relevance if not paired with developmental pathways of behavioral problems over time. For this reason, we further examined the extent of NLLFS offspring consistency in the absolute level of externalizing, internalizing, and total problem behaviors from ages 10 to 17 to 25 by comparing those who scored in the normal and deviant range in each of the donor type groups. Considering the entire NLLFS sample, irrespective of donor type, more than 80% of NLLFS offspring scored in the normal range for internalizing, externalizing, and total problem behaviors in all three waves, whereas none continuously fell in the deviant (i.e., borderline or clinical) range. Recalling the variety of experiences offspring have with their donor conception helps shed further light on the healthy developmental trajectories found in this study. In this vein, it is relevant that of the 23 offspring with an open-identity donor,[1] about one-third (n = 8, 34.8%) contacted him when they turned 18, whereas about two-thirds (n = 15, 65.2%) did not. On the other hand, regardless of their donor type, NLLFS offspring who did not know their donor expressed more comfort than discomfort about not knowing him (10).

Several limitations are worth noting. First, when the study began in the 1980s, the long history of discrimination against sexual minority people prevented the recruitment of a representative sample of prospective lesbian parents (1). It cannot be ruled out, therefore, that the NLLFS convenience sample consisted of families in which parents were more interested in the research topic. Second, the small sample size when considered by donor type and the homogeneity in the offspring demographics (i.e., mostly white, well-educated, urban residents, and heterosexual) precluded analyses from an intersectional approach. Third, these findings are context specific to those countries where recipients and donors may still opt to enter into an anonymous or open-identity sperm donor program.

Despite these limitations, however, the three-wave design offered empirical data on both interindividual and intraindividual changes in the psychological adjustment of donor-conceived offspring with lesbian parents over 15 years. Furthermore, given the prospective nature of the NLLFS and its 92% ongoing participation rate, the sample has not been biased by the attrition of those who have not functioned well across waves. Finally, while prior studies provided evidence on the (ir)relevance of donor

[1] This figure is slightly different from that reported in Koh et al. (10), where all 76 NLLFS offspring were included. In the current study, two offspring (one with an open-identity donor, one with a known donor) were excluded since they had missing data at wave 4.

TABLE 3

Distribution by longitudinal changes in psychological adjustment by donor type from age 10 (wave 4) to 17 (wave 5) to 25 (wave 6; N = 74).

	Total group (n = 74)	Anonymous donors (*n* = 26)	Known donors (*n* = 26)	Open-identity donors (*n* = 22)	Fisher's exact test, *P* value
Internalizing behavior					.634
Deviant W4 → deviant W5 → normal W6	2 (2.7)	1 (3.8)	1 (3.8)	0	
Deviant W4 → normal W5 → normal W6	5 (6.8)	1 (3.8)	1 (3.8)	3 (13.6)	
Normal W4 → deviant W5 → normal W6	2 (2.7)	0	1 (3.8)	1 (4.5)	
Normal W4 → normal W5 → deviant W6	3 (4.1)	2 (7.7)	0	1 (4.5)	
Normal W4 → normal W5 → normal W6	62 (83.8)	22 (84.6)	23 (88.5)	17 (77.3)	
Externalizing behavior					.948
Deviant W4 → normal W5 → normal W6	7 (9.5)	3 (11.5)	3 (11.5)	1 (4.5)	
Normal W4 → deviant W5 → normal W6	3 (4.1)	1 (3.8)	1 (3.8)	1 (4.5)	
Normal W4 → normal W5 → deviant W6	2 (2.7)	0	1 (3.8)	1 (4.5)	
Normal W4 → normal W5 → normal W6	62 (83.8)	22 (84.6)	21 (80.8)	19 (86.4)	
Total problem behavior					.986
Deviant W4 → deviant W5 → normal W6	2 (2.7)	1 (3.8)	1 (3.8)	0	
Deviant W4 → normal W5 → normal W6	5 (6.8)	1 (3.8)	2 (7.7)	2 (9.1)	
Deviant W4 → normal W5 → deviant W6	1 (1.4)	1 (3.8)	0	0	
Normal W4 → deviant W5 → normal W6	2 (2.7)	1 (3.8)	1 (3.8)	0	
Normal W4 → normal W5 → deviant W6	4 (5.4)	1 (3.8)	1 (3.8)	2 (9.1)	
Normal W4 → normal W5 → normal W6	60 (81.1)	21 (80.8)	21 (80.8)	18 (81.8)	

Note. Data are presented as n (%). W = wave. Deviant scores indicate scores greater than or equal to the 93rd percentile ($T \geq 65$) in the combined borderline and clinical ranges (36, 37). Some percentages may not equal 100 due to rounding.

Carone. Long-term adjustment of NLLFS offspring. Fertil Steril 2020.

type for offspring psychological adjustment until adolescence (24–26), this study was the first to provide empirical data on emerging adulthood, after NLLFS offspring were allowed to receive identifiable information about their donor for the first time, as desired.

Conclusions

Sperm banks in the United States are still offering both anonymous and open-identity sperm donor programs; an exception is the Sperm Bank of California, which stopped offering donor anonymity in 2016 (44). Additionally, lesbian-identified women are increasingly using DI to have children (45); thus, some may be concerned about the long-term consequences of choosing an anonymous donor (46), which was the case for some NLLFS prospective parents when the study began (1). This issue is particularly relevant for those offering psychological counseling insofar as unmet needs have been found to be associated with mental health difficulties in prospective parents (47). Likewise, some offspring may voice the need to know their donor's identity, and even contact him, sooner or later in life and feel angry or frustrated if they are not able to do so (8, 9, 11, 12, 14). However, in spite of adoption literature suggesting that the impossibility of accessing one own's genetic origins likely results in identity problems and behavioral maladjustment (4), our findings indicated that the NLLFS offspring have developed healthy adjustment across the age periods of 10, 17, and 25 years, regardless of their donor type. Our findings, therefore, fill a gap in the research literature and provide unique and valuable information for prospective parents, policy makers, reproductive medicine practitioners, and patient organizations that a one-size-fits-all approach based on the assumption that a known or an open-identity donor is preferred over an anonymous donor to increase offspring adjustment (3) lacks empirical support. These findings are even more relevant at the current time when direct-to-consumer genetic testing and online registries are making donor categories increasingly complicated (2).

REFERENCES

1. Gartrell NK, Hamilton J, Banks A, Mosbacher D, Reed N, Sparks CH, et al. The National Lesbian Family Study: 1. Interviews with prospective mothers. Am J Orthopsychiatry 1996;66:272–81.
2. Harper JC, Kennett D, Reisel D. The end of donor anonymity: how genetic testing is likely to drive anonymous gamete donation out of business. Hum Reprod 2016;31:1135–40.
3. Ravitsky V. Knowing where you come from: the rights of donor-conceived individuals and the meaning of genetic relatedness. Minn J Law Sci Technol 2010;11:665–84.
4. Farr RH, Grotevant HD. Adoption. In: Fiese BH, editor. APA handbook of contemporary family psychology: Vol. 1. Foundations, methods, and contemporary issues across the lifespan. Washington, D.C.: American Psychological Association; 2019:725–41.
5. Shenfield F. "To know or not to know the identity of one's genetic parent(s): a question of human rights?". In: Healy D, Kovacs G, McLachlan R, Rodrguez-Armas O, editors. Reproductive medicine in the twenty-first century. Nashville, TN: Parthenon Publishing Group; 2002.
6. Kirkman M. Parents' contributions to the narrative identity of offspring of donor-assisted conception. Soc Sci Med 2003;57:2229–42.
7. Scheib JE, Riordan M, Rubin S. Adolescents with open-identity sperm donors: reports from 12–17 year olds. Hum Reprod 2005;20:239–52.
8. Beeson DR, Jennings PK, Kramer W. Offspring searching for their sperm donors: how family type shapes the process. Hum Reprod 2011;26:2415–24.
9. Jadva V, Freeman T, Kramer W, Golombok S. The experiences of adolescents and adults conceived by sperm donation: comparisons by age of disclosure and family type. Hum Reprod 2009;24:1909–19.
10. Koh AS, van Beusekom G, Gartrell NK, Bos HMW. Adult offspring of lesbian parents: how do they relate to their sperm donors? Fertil Steril 2020;114:879–87.
11. Indekeu A, Hens K. Part of my story. The meaning and experiences of genes and genetics for sperm donor-conceived offspring. New Genet Soc 2019;38:18–37.
12. Mahlstedt PP, LaBounty K, Kennedy WT. The views of adult offspring of sperm donation: essential feedback for the development of ethical guidelines within the practice of assisted reproductive technology in the United States. Fertil Steril 2010;93:2236–46.
13. Scheib JE, Ruby A, Benward J. Who requests their sperm donor's identity? The first ten years of information releases to adults with open-identity donors. Fertil Steril 2017;107:483–93.
14. Turner AJ, Coyle A. What does it mean to be a donor offspring? The identity experiences of adults conceived by donor insemination and the implications for counselling and therapy. Hum Reprod 2000;15:2041–51.
15. 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;53:348–56.
16. Goldberg AE, Allen KR. Donor, dad, or . . . ? Young adults with lesbian parents' experiences with known donors. Fam Process 2013;52:338–50.
17. Goldberg AE, Allen KR. Lesbian mothers' ideas and intentions about male involvement across the transition to parenthood. J Marriage Fam 2007;69:352–65.
18. Nordqvist P. Out of sight, out of mind: family resemblances in lesbian donor insemination. Sociology 2010;44:1128–44.
19. Grace VM, Daniels KR, Gillett W. The donor, the father, and the imaginary constitution of the family: parents' constructions in the case of donor insemination. Soc Sci Med 2008;66:301–14.
20. Lingiardi V, Carone N, Morelli M, Baiocco R. "It's a bit too much fathering this seed": the meaning-making of the sperm donor in Italian lesbian mother families. Reprod BioMed Online 2016;33:412–24.
21. Wyverkens E, Provoost V, Ravelingien A, De Sutter P, Pennings G, Buysse A. Beyond sperm cells: a qualitative study on constructed meanings of the sperm donor in lesbian families. Hum Reprod 2014;29:1248–54.
22. Nordqvist P. "Dealing with sperm": comparing lesbians' clinical and non-clinical donor conception processes. Sociol Health Illn 2011;33:114–29.
23. Van den Broeck U, Vandermeeren M, Vanderschueren D, Enzlin P, Demyttenaere K, D'Hooghe T. A systematic review of sperm donors: demographic characteristics, attitudes, motives and experiences of the process of sperm donation. Hum Reprod Update 2013;19:37–51.
24. Bos HMW, Gartrell NK. Adolescents of the US National Longitudinal Lesbian Family Study: the impact of having a known or an unknown donor on the stability of psychological adjustment. Hum Reprod 2011;26:630–7.
25. Bos HMW, Hakvoort EM. Child adjustment and parenting in planned lesbian families with known and as-yet unknown donors. J Psychosom Obstet Gynaecol 2007;28:121–9.
26. Vanfraussen K, Ponjaert-Kristofferson I, Brewaeys A. Why do children want to know more about the donor? The experience of youngsters raised in lesbian families. J Psychosom Obstet Gynecol 2003;24:31–8.
27. Golombok S. Modern families: parents and children in new family forms. Cambridge: Cambridge University Press; 2015.
28. Gartrell NK, Rodas C, Deck A, Peyser H, Banks A. The National Lesbian Family Study: 4. Interviews with the 10-year-old children. Am J Orthopsychiatry 2005;75:518–24.
29. Slutsky J, Jadva V, Freeman T, Persaud S, Steele M, Steele H, et al. Integrating donor conception into identity development: adolescents in fatherless families. Fertil Steril 2016;106:202–8.
30. Gartrell NK, Bos HMW, Koh AS. National Longitudinal Lesbian Family Study—Mental health of adult offspring. N Engl J Med 2018;379:297–9.

31. Arnett JJ. Emerging adulthood: what is it, and what is it good for? Child Dev Perspec 2007;1:68–73.
32. Reitz E, Deković M, Meijer AM. The structure and stability of externalizing and internalizing problem behavior during early adolescence. J Adolesc 2005;34:577–88.
33. Gartrell NK. Overview of the 35-year U.S. National Longitudinal Lesbian Family Study and its 92% retention rate. J GLBT Fam Stud 2020; https://doi.org/10.1080/1550428X.2020.1861573.
34. Bos HMW, Gartrell NK, Peyser H, van Balen F. The USA National Longitudinal Lesbian Family Study (NLLFS): homophobia, psychological adjustment, and protective factors. J Lesb Stud 2008;12:455–71.
35. Gartrell NK, Bos HMW. US National Longitudinal Lesbian Family Study: psychological adjustment of 17-year-old adolescents. Pediatrics 2010;126:28–36.
36. Achenbach TM, Rescorla LA. Manual for ASEBA School-Age Forms and Profiles. Burlington: University of Vermont, Research Center for Children, Youth, and Families; 2001.
37. Achenbach TM, Rescorla LA. Manual for the ASEBA Adult Form and Profiles. Burlington: University of Vermont, Research Center for Children, Youth, and Families; 2003.
38. R Development Core Team. R: a language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing; 2019.
39. Cohen J. Statistical power analysis for the behavioural sciences. New York: Academic Press; 1977.
40. Koh AS, Bos HMW, Gartrell NK. Predictors of mental health in emerging adult offspring of lesbian-parent families. J Lesbian Stud 2019;23:257–78.
41. Arnett JJ, Zukauskiene R, Sugimura K. The new life stage of emerging adulthood at ages 18–29 years: implications for mental health. Lancet Psychiat 2014;1:569–76.
42. Mulye TP, Park MJ, Nelson CD, Adams SH, Irwin CE, Brindis CD. Trends in adolescent and young adult health in the United States. J Adolesc Health 2009;45:8–24.
43. Garner A. Families like mine: children of gay parents tell it like it is. New York: Harper Collins; 2005.
44. The Sperm Bank of California, Identity-Release Program. Available at: https://www.thespermbankofca.org/content/identity-release-program. Accessed December 7, 2020.
45. Arocho R, Lozano EB, Halpern CT. Estimates of donated sperm use in the United States: National Survey of Family Growth 1995–2017. Fertil Steril 2019;112:718–23.
46. Van Parys H, Wyverkens E, Provoost V, De Sutter P, Pennings G, Buysse A. Family communication about donor conception: a qualitative study with lesbian parents. Fam Process 2016;55:139–54.
47. Schrijvers AM, van Rooij FB, de Reus E, Schoonenberg M, van der Veen F, Visser M, et al. Psychosocial counselling in donor sperm treatment: unmet needs and mental health among heterosexual, lesbian and single women. Reprod BioMed Online 2020;41:885–91.