

## Supplementary Appendix

This appendix has been provided by the authors to give readers additional information about their work.

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## Supplementary Appendix

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## **Supplementary Methods**

### **NLLFS Study Design**

The U.S. National Longitudinal Lesbian Family Study (NLLFS) is an ongoing, community-based, longitudinal cohort, prospective study that was initiated in 1986. During the first epoch (1986-1992), lesbians who were inseminating or pregnant through donor insemination were recruited via announcements in lesbian newspapers, in women's bookstores, and at lesbian events throughout the metropolitan areas of Boston, Washington, D.C., and San Francisco. All interested callers were enrolled, resulting in a total of 154 prospective lesbian mothers in 84 families (70 birth mothers, 70 co-mothers, and 14 single mothers). The study was closed to new participants in 1992.<sup>1</sup> The 84 pregnancies resulted in an offspring cohort of 85, including one set of twins.<sup>2</sup> The parents have been interviewed or surveyed from Epoch 1 to Epoch 6, and the offspring have been interviewed or surveyed (with parental assent when they were minors) since Epoch 4.<sup>2</sup> The Epoch 6 survey was the first one conducted since the offspring became legal adults. The NLLFS has a retention rate of 92%, with 77 families still participating (Supplementary Figure 1).

### **Sample**

Data gathering for Epoch 6, when the offspring were 25 years old, was finalized in October, 2017. Excluding one offspring with an incomplete survey, 77 adult NLLFS offspring (including one set of twins) completed the Adult Self-Report. Each participant was sent a \$60 gift card after completion of the survey. The NLLFS offspring consisted of 49.4% ( $n = 38$ ) females and 50.6 % ( $n = 39$ ) males. As shown in Supplementary Table 1, their mean age was 25.01 ( $SD = 0.11$ ). A majority (90.9%,  $n = 70$ ) had a White (non-Latina/o or Hispanic) background. Eighty-seven

percent ( $n = 67$ ) had an associate's degree or higher (i.e., associate's, bachelor's or registered nurse degree, some graduate school but no graduate degree, master's, doctoral, or law degree).

For consistency with Epoch 4 and Epoch 5,<sup>2,3</sup> the psychological health of the NLLFS offspring was compared with that of a normative, national probability sample. Dr. Thomas Achenbach and associates provided access to the raw data from their Adult Self-Report normative sample of 18- to 59-year-olds, a subset of their U.S. national sample. Their normative sample ( $n = 2,020$ ) excluded all participants who had received any mental health or substance abuse service during the prior 12 months (12.5%,  $n = 253$ ).<sup>4</sup>

To minimize any potential confounding effect of demographic differences between the NLLFS and Achenbach samples on the psychological health of the participants, case-control matching (random sampling without replacement) was used for all Adult Self-Report demographic variables—age, sex, race/ethnicity, and education (SPSS version 22.0, FUZZY extension command; IBM Corp., Chicago, IL).<sup>5</sup> Because the Adult Self-Report does not include a variable for socioeconomic status, we used education as a proxy since it is highly correlated.<sup>6</sup>

Supplementary Table 1 provides the demographic characteristics of the NLLFS adult offspring sample and the matched Achenbach normative sample; matching was possible on age, sex, and race/ethnicity. Although we matched on education, there was still a significant difference between the two samples. Significantly more of the NLLFS participants than Achenbach participants had an associate's degree or higher (Supplementary Table 1).

### **Outcome Variables**

The Adult Self-Report consists of five Adaptive Functioning Scales—Family, Friends, Spouse/Partner, Education, and Job.<sup>4</sup> The Spouse/Partner, Education, and/or Job Scales were completed only by participants for whom the items were relevant in the preceding 6 months (i.e.,

the participant lived with a spouse/partner, or had student or job status). For the Adaptive Functioning Scales, higher scores indicate better functioning. The Family Scale focuses on compatibility with sibling(s), (step)child(ren), and parent(s) (in the NLLFS, modified to refer to the birth mother and co-mother; in the Achenbach, the mother and father). Participants rated these relationships on a Likert Scale (1 = worse than average, to 3 = better than average). On the Friends Scale, participants indicated the number of friends (0 = none, to 3 = four or more), frequency of contact (0 = less than once per month, to 3 = five or more times per month), compatibility (0 = not as well as I'd like, to 3 = far above average), and frequency of visits with both friends and family (0 = less than once per month, to 3 = five or more times per month). A Likert Scale (0 = not true, 1 = somewhat or sometimes true, 2 = very or often true) was used for the Spouse/partner Scale (eight items, e.g. "I get along with my partner"); the Education Scale (five items, e.g. "I achieve what I am capable of"); and the Job Scale (eight items, e.g. "I work well with others").

The Adult Self-Report also consists of 120 behavioral/emotional problem items. Participants were asked to indicate how applicable each statement was for them during the prior 6 months, and each item was rated on the same 0-1-2 Likert Scale, with higher scores indicating poorer psychological functioning. Achenbach-conducted factor analyses based on U.S. data for the 120 problem items showed eight Empirical Small Band Scales,<sup>4</sup> namely Anxious/Depressed (18 items, e.g., "I worry a lot"), Withdrawn (nine items, e.g., "I keep from getting involved with others"), Somatic Complaints (12 items, e.g., "I feel dizzy or lightheaded"), Thought Problems (10 items, e.g., "I can't get my mind off certain thoughts"), Attention Problems (15 items, e.g., "I have trouble concentrating or paying attention for long"), Aggressive Behavior (15 items, e.g., "I physically attack people"), Rule-Breaking Behavior (14 items e.g., "I steal"), and Intrusive (six

items, e.g., “I try to get a lot of attention”). In accordance with the Achenbach protocol, two Empirical Broad Band Scales were computed based on subsets of the Small Band Scales: Internalizing (Anxious/Depressed, Withdrawn, Somatic Complaints) and Externalizing Problems (Aggressive, Rule-Breaking, Intrusive). For the Empirical Band Scales, the Cronbach’s alphas ranged from 0.62 (Withdrawn) to 0.88 (Internalizing Problems).

The Achenbach protocol also makes it possible to compute scores based on the *Diagnostic and Statistical Manual of Mental Disorders*. Achenbach’s “DSM-oriented Scales” use a subset of the 120 problem items.<sup>4</sup> These six mental health diagnostic scales were derived from the ratings of psychiatrists and psychologists from 10 cultures, all experts in adult psychopathology: Depressive Problems (14 items, e.g., “I think about killing myself”), Anxiety Problems (seven items, e.g., “I am nervous or tense”), Somatic Problems (nine items, e.g., “Vomiting, throwing up”), Avoidant Personality Problems (seven items, e.g., “I would rather be alone than with others”), Attention Deficit/Hyperactivity Problems (13 items, e.g., “I have trouble sitting still”), and Antisocial Personality Problems (20 items, e.g., “I don’t feel guilty after doing something I shouldn’t”). Scores on these six scales are based on the sums of the items, and higher scores indicate poorer psychological functioning.<sup>4</sup> For the DSM-oriented Scales, the Cronbach’s alphas ranged from 0.65 (Somatic Problems) to 0.81 (Attention Deficit/Hyperactivity Problems).

The NLLFS and Achenbach adults were also compared on the proportion of participants with one or more syndromes in the borderline or clinical range.<sup>4</sup> This was done for the Adaptive Functioning, Empirical Small Band, and the DSM-oriented Scales.

### **Statistical Analysis**

Because the studied variables were not normally distributed in the NLLFS and the Achenbach normative samples, nonparametric statistics were used in the analyses.<sup>7</sup> In all analyses, education

was used as a control variable because there were still significant differences after matching (see sample description). There were no missing data on the Empirical Band or DSM-oriented Scales, but one NLLFS and two Achenbach participants skipped one or more questions on the Family Scale. These three participants were included in the remaining analyses. Quade's rank analysis<sup>8</sup> of covariance test was used for continuous variables and Fisher exact tests for categorical variables. A Bonferroni correction was calculated to reduce the chance of a Type I error due to multiple testing (24 comparisons); differences with a  $P < 0.002$  were considered significant ( $\alpha = 0.05/24$  comparisons = 0.002). The second author conducted the analyses.

## **Supplementary Results**

### **Adaptive Functioning**

Supplementary Table 2 shows the Adaptive Functioning Scale scores for the NLLFS and the Achenbach samples, respectively. These findings indicate that the NLLFS adult offspring were functioning as well as their matched counterparts from the Achenbach normative sample with respect to family, friends, spouse/partner relationships, school/college, and job performance.

### **Behavioral/Emotional Problems and DSM-oriented Scales**

There were no significant differences between the NLLFS adult offspring and Achenbach normative samples on the eight Empirical Small Band Scales or the Internalizing or Externalizing Broad Band Scales. Similar mean scores were found for both samples on the DSM-oriented Scales (Supplementary Table 2).

### **Scores in the Borderline or Clinical Range**

Supplementary Table 2 shows the percentages of participants in both samples with a score in the borderline or clinical range on the Adaptive Functioning, Empirical Small Band, and DSM-oriented Scales. There were no significant differences between the two samples on the percentages with a deviant score.

### **Supplementary Discussion**

In the sixth epoch of the NLLFS, we found no significant differences in the mental health of the 25-year-old offspring of lesbian mothers compared to adults from a national probability sample who were matched for age, sex, race/ethnicity, and education. There were no significant differences between the NLLFS offspring and the Achenbach normative sample in adaptive functioning or behavioral/emotional problems, or on the DSM-oriented Scales. There were also no differences in the proportion of adults in each sample with scores in the borderline or clinical range on the Adaptive Functioning, Empirical Small Band, or DSM-oriented Scales.

The findings of the current investigation are consistent with the psychological adjustment of the NLLFS offspring during the fourth and fifth epochs as assessed through standardized tests completed by the parents and offspring.<sup>2,3,10</sup> Among numerous factors potentially associated with these favorable psychological health outcomes,<sup>11</sup> data gathered during the first epoch revealed that the NLLFS offspring were highly desired and intentionally conceived.<sup>1,2</sup> Their birth mothers and co-mothers took parenting classes and formed support groups to educate themselves about childrearing.<sup>3</sup> They prepared their offspring for the prospect of stigmatization and discrimination, and facilitated the development of anti-bullying programs within their school systems.<sup>2,3,12</sup>

Over the 32 years since the NLLFS was initiated, the participating families have also experienced the greater visibility and acceptance of lesbian, gay, bisexual, and transgender (LGBT) people.<sup>2,13</sup> Improved access to healthcare and fertility services, increased opportunities to adopt and foster children, and the legalization of marriage have been societal milestones for LGBT people.<sup>14</sup> Many of these factors may have contributed to the psychological health of the NLLFS offspring.<sup>15</sup>

A strength of the NLLFS is that it has followed offspring conceived through donor insemination by sexual minority parents, longitudinally and prospectively, from birth to adulthood. As such, its findings are not influenced by overrepresentation of offspring who were enrolled by their parents or volunteered as adults after they were already functioning well. With its 92% retention rate, the current results are also not biased by the attrition of offspring who were experiencing mental health difficulties.<sup>15</sup> Furthermore, unlike the Achenbach normative sample, none of the NLLFS offspring were excluded from the sample on the basis of mental health or substance use treatment. It is possible that the NLLFS sample might have scored higher on some measures if we had employed Achenbach's exclusion criteria.

A limitation of the present investigation is that the NLLFS is a nonrandom sample. When the study was initiated in 1986, recruiting a representative sample was unrealistic due to longstanding discrimination against lesbian parents and an unwillingness of sexual minority parents to be identified for fear of losing child custody.<sup>1,15</sup> Also, due to the sample size, the effect sizes and power in the *post hoc* power analyses for differences between the NLLFS and Achenbach normative samples were modest for some yet low for most variables (Table 1, main text). Thus, the results should be interpreted cautiously. Additional limitations are that the NLLFS offspring are predominantly White and well educated, and most grew up in middle class

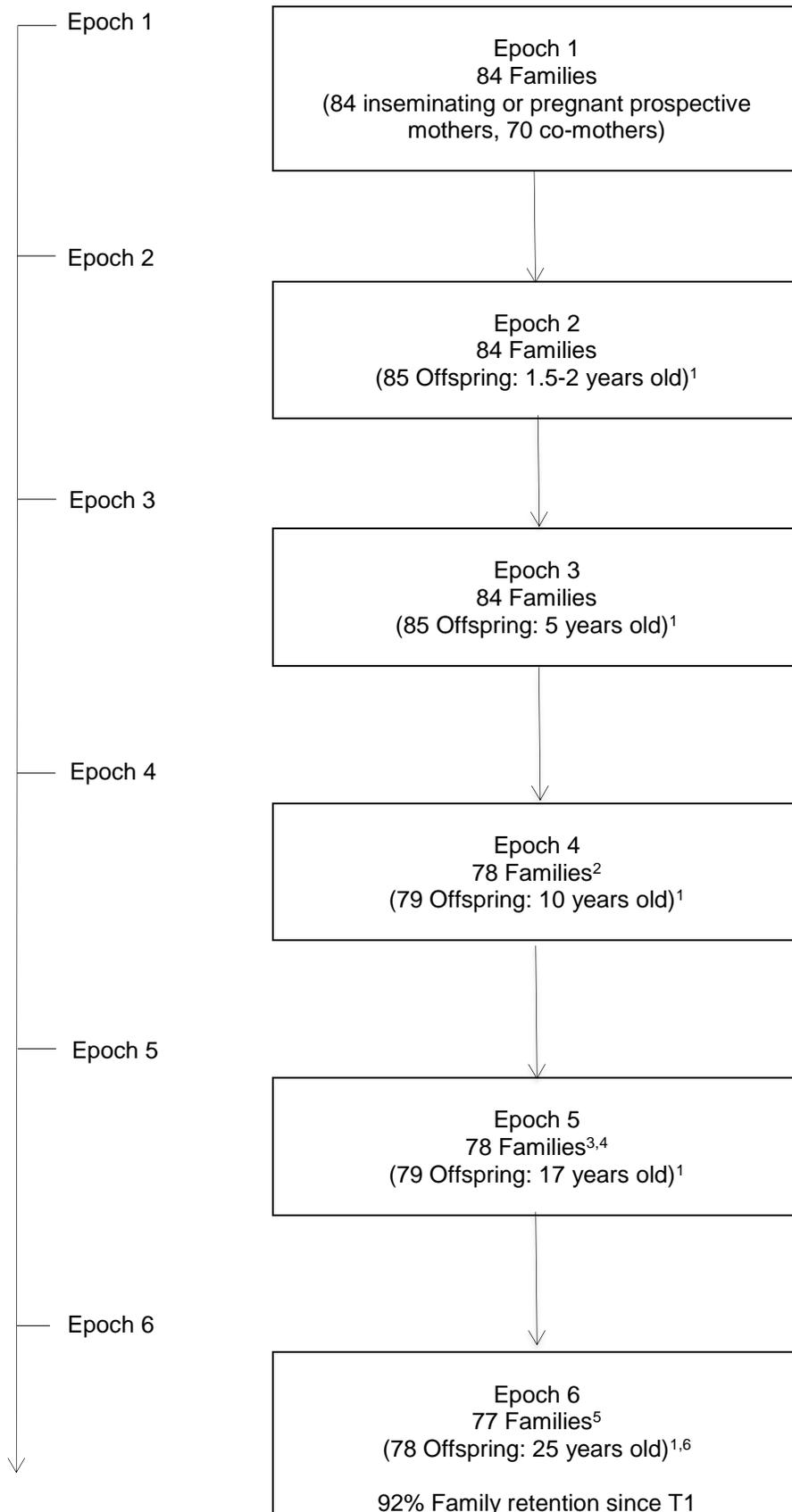
families.<sup>3</sup> The findings need replication with larger and more diverse samples of sexual and gender minority parent families, ideally in longitudinal population-based studies with multiple informants.

In conclusion, compared to peers in a normative sample of U.S. adults, we found no differences in the mental health of 25-year-old adults whose lesbian mothers enrolled them before they were born in a large prospective study of sexual minority parent families. These findings have implications for clinicians who are consulted about mental health disparities in the adult offspring of sexual minority parents.<sup>16,17</sup> This investigation underscores the importance of longitudinal data collection in monitoring the health of LGBT parent families.<sup>14,18</sup>

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**Supplementary Figure 1. Study Samples for the First, Second, Third, Fourth, Fifth, and Sixth Epochs.**

Data were collected between 1986 and 1992 for the first epoch, between 1988 and 1993 for the second, between 1992 and 1997 for the third, between 1997 and 2002 for the fourth, between 2004 and 2009 for the fifth, and between 2012 and 2017 for the sixth. <sup>1</sup> One set of twins. <sup>2</sup> 6 families unavailable at Epoch 4 (4 families too busy to participate; 2 families moved, no forwarding address, no response to emails). <sup>3</sup> 2 families dropped (1 single parent deceased to cancer; 1 single parent withdrew without explanation); 2 families unavailable at Epoch 4 participated at Epoch 5. <sup>4</sup> 78 families, but the analytic sample included only 77 because one family with an incomplete survey was excluded from analyses. <sup>5</sup> The family with an incomplete survey at Epoch 5 did not respond to Epoch 6 emails. <sup>6</sup> 78 offspring, but the analytic sample included only 77 because one family with an incomplete survey was excluded from analyses.

**Supplementary Table 1. Demographic Characteristics of the Study Participants**

<b>Characteristic</b>	<b>NLLFS Offspring Sample (N = 77<sup>1,2</sup>)</b>	<b>Achenbach Normative Sample (N = 77<sup>3</sup>)</b>
Age – yr <sup>4</sup>		
Mean ± SD	25.01 ± 0.11	25.03 ± 0.95
Female sex – no. (%)	38 (49.4)	38 (49.4)
Race/ethnicity – no. (%) <sup>5</sup>		
White	70 (90.9)	70 (90.9)
Black	3 (3.9)	2 (2.6)
Hispanic	1 (1.3)	3 (3.9)
Other or mixed	3 (3.9)	2 (2.6)
Educational level – no. (%) <sup>6</sup>		
No college degree <sup>7</sup>	10 (13.0)	39 (50.6)
College degree or higher <sup>8</sup>	67 (87.0)	38 (49.4)

<sup>1</sup>Total sample N = 78, but one participant with an incomplete survey was excluded from analyses.

<sup>2</sup>Including 1 set of twins. <sup>3</sup>After matching on age, gender, race/ethnicity, and education. <sup>4</sup>NLLFS versus Achenbach normative sample:  $F(1, 152) = 0.01$ ,  $P = 0.905$ . <sup>5</sup>NLLFS: 70 White and 7 nonwhite (Black, Hispanic, other or mixed) and Achenbach normative sample: 70 White and 7 nonwhite (Black, Hispanic, other or mixed). <sup>6</sup> $\chi^2$  – Test: 25.17,  $P < .001$ . <sup>7</sup>No high school or General Equivalency diploma, General Equivalency Diploma, high school graduate, some college but no college degree. <sup>8</sup>Associate's degree, bachelor's or registered nurse degree, some graduate school but no graduate degree, master's, doctoral or law degree.

**Supplementary Table 2. Adult Self-Report for the NLLFS Offspring and Achenbach Normative Samples**

	NLLFS Offspring		Achenbach Normative		NLLFS Offspring	
	Sample (N = 77 <sup>1,2</sup> )		Sample (N = 77 <sup>3</sup> )		versus Achenbach	
	Means ± SE <sup>6</sup>	95% CI <sup>6</sup>	Means ± SE <sup>6</sup>	95% CI <sup>6</sup>	F	P Value <sup>7,8</sup>
<b>Adaptive Functioning Scales<sup>9</sup></b>						
Family	1.90 ± 0.18	1.55 – 2.26	1.65 ± 0.18	1.29 – 2.01	0.01	0.91
Friends	9.80 ± 0.26	9.28 – 10.31	9.00 ± 0.26	8.48 – 9.51	2.56	0.11
Spouse/Partner <sup>10</sup>	5.49 ± 0.53	4.42 – 6.55	5.52 ± 0.34	4.85 – 6.19	0.25	0.62
Education <sup>11</sup>	4.35 ± 0.33	3.68 – 5.03	4.20 ± 0.43	3.34 – 5.06	0.29	0.59
Job <sup>12</sup>	2.46 ± 0.22	2.03 – 2.89	2.09 ± 0.24	1.63 – 2.56	0.00	0.98
<b>Empirical Small Band Scales<sup>13</sup></b>						
Anxious/Depressed	8.27 ± 0.65	6.99 – 9.55	5.65 ± 0.65	4.38 – 6.93	6.77	0.01
Withdrawn	2.68 ± 0.23	2.22 – 3.13	1.85 ± 0.23	1.39 – 2.30	3.00	0.09
Somatic Complaints	2.73 ± 0.33	2.09 – 3.37	2.79 ± 0.33	2.15 – 3.43	0.21	0.65
Thought Problems	2.40 ± 0.26	1.88 – 2.92	2.20 ± 0.26	1.68 – 2.72	0.61	0.44
Attention Problems	7.58 ± 0.59	6.42 – 8.74	5.77 ± 0.59	4.61 – 6.93	3.65	0.06
Aggressive	4.12 ± 0.50	3.14 – 5.11	4.48 ± 0.50	3.49 – 5.46	0.05	0.83
Rule-Breaking	3.13 ± 0.31	2.51 – 3.75	2.53 ± 0.31	1.91 – 3.15	2.31	0.13
Intrusive	2.20 ± 0.26	1.68 – 2.72	2.74 ± 0.26	2.22 – 3.26	2.40	0.12
<b>Empirical Broad Band Scales<sup>13</sup></b>						
Internalizing	13.67 ± 0.98	11.74 – 15.60	10.29 ± 0.98	8.36 – 12.22	5.22	0.02
Externalizing	9.46 ± 0.84	7.80 – 11.12	9.75 ± 0.84	8.09 – 11.41	0.01	0.91
<b>DSM-oriented Scales<sup>13,14</sup></b>						
Depressive	5.19 ± 0.41	4.38 – 5.99	4.07 ± 0.41	3.27 – 4.88	1.02	0.31
Anxiety	4.37 ± 0.35	3.69 – 5.05	4.65 ± 0.35	3.96 – 5.33	0.01	0.94
Somatic	1.51 ± 0.24	1.05 – 1.98	1.57 ± 0.24	1.10 – 2.03	0.02	0.89
Avoidant Personality	2.77 ± 0.26	2.26 – 3.29	2.36 ± 0.26	1.84 – 2.87	0.91	0.34
ADHD <sup>15</sup>	5.84 ± 0.51	4.84 – 6.85	5.47 ± 0.51	4.46 – 6.48	0.03	0.87
Antisocial Personality	3.48 ± 0.36	2.76 – 4.20	3.72 ± 0.36	3.00 – 4.43	0.61	0.44

Supplementary Table 2. Continued

	NLLFS Offspring		Achenbach Normative		NLLFS Offspring versus Achenbach Normative Sample <sup>16</sup>	
	Sample		Sample		X <sup>2</sup>	P Value <sup>7</sup>
	N (%)	95% CI <sup>17</sup>	N (%)	95% CI <sup>17</sup>		
<b>≥ 1 Syndrome in Borderline or Clinical Range:</b>						
Adaptive Functioning	7 (9.1)	0.04 – 0.18	14 (18.2)	0.11 – 0.28	2.70	0.16
Empirical Small Band	23 (29.9)	0.21 – 0.41	24 (31.2)	0.22 – 0.42	0.03	1.00
<b>Scales</b>						
DSM-oriented Scales <sup>14</sup>	18 (23.4)	0.15 – 0.34	21 (27.3)	0.19 – 0.38	0.31	0.71

<sup>1</sup>Total sample N = 78, but one participant with an incomplete survey was excluded from analyses. <sup>2</sup> Including 1 set of twins. <sup>3</sup> After matching on age, gender, race/ethnicity, and education. <sup>4</sup> Nonparametric Quade's<sup>8</sup> rank analysis of covariance test. <sup>5</sup> There were no missing data on the Empirical Band or DSM-oriented Scales, but one NLLFS and two Achenbach participants skipped one or more questions on the Family Scale. <sup>6</sup> SE denotes standard error, and CI confidence interval. <sup>7</sup> P value is significant at < .002, based on Bonferroni correction of 0.05/24 comparisons. <sup>8</sup> Post hoc power analyses (all based on  $\alpha$  error = 0.05): Family = 1-  $\beta$  error probability = 0.05, f = 0.00 (N = 151); Friends = 1-  $\beta$  error probability = 0.37, f = 0.13 (N = 154); Spouse/Partner = 1-  $\beta$  error probability = 0.08, f = 0.06 (N = 69); Education = 1-  $\beta$  error probability = 0.08, f = 0.08 (N = 44); Job = 1-  $\beta$  error probability = 0.05, f = 0.00 (N = 132); Anxious/Depressed = 1-  $\beta$  error probability = 0.74, f = 0.21 (N = 154); Withdrawn = 1-  $\beta$  error probability = 0.40, f = 0.14 (N = 154); Somatic Complaints = 1-  $\beta$  error probability = 0.07, f = 0.03 (N = 154); Thought Problems = 1-  $\beta$  error probability = 0.12, f = 0.06 (N = 154); Attention Problems = 1-  $\beta$  error probability = 0.47, f = 0.15 (N = 154); Aggressive = 1-  $\beta$  error probability = 0.05, f = 0.00 (N = 154); Rule-Breaking = 1-  $\beta$  error probability = 0.33, f = 0.12 (N = 154); Intrusive = 1-  $\beta$  error probability = 0.35, f = 0.13 (N = 154); Internalizing = 1-  $\beta$  error probability = 0.62, f = 0.18 (N = 154); Externalizing = 1-  $\beta$  error probability = 0.05, f = 0.00 (N = 154); Depressive = 1-  $\beta$  error probability = 0.18, f = 0.08 (N = 154); Anxiety = 1-  $\beta$  error probability = 0.05, f = 0.00 (N = 154); Somatic = 1-  $\beta$  error probability = 0.05, f = 0.00 (N = 154); Avoidant Personality = 1-  $\beta$  error probability = 0.16, f = 0.08 (N = 154); ADHD = 1-  $\beta$  error probability = 0.05, f = 0.00 (N = 154); Antisocial Personality = 1-  $\beta$  error probability = 0.12, f = 0.06 (N = 154); Adaptive Functioning = 1-  $\beta$  error probability = 0.29, w = 0.13 (N = 154); Empirical Small Band Scales = 1-  $\beta$  error probability = 0.05, w = 0.01 (N = 154); DSM-oriented Scales = 1-  $\beta$  error probability = 0.07, w = 0.05 (N = 154). <sup>9</sup> Higher scores reflect better functioning. <sup>10</sup> Completed by 21 NLLFS and 48 Achenbach sample participants. <sup>11</sup> Completed by 27 NLLFS and 17 Achenbach sample participants. <sup>12</sup> Completed by 71 NLLFS and 61 Achenbach sample participants. <sup>13</sup> Higher scores reflect poorer psychological functioning. <sup>14</sup> DSM denotes *Diagnostic and Statistical Manual of Mental Disorders*, with associated scales based on the scores of Depressive Problems, Anxiety Problems, Somatic Problems, Avoidant Personality Problems, Attention Deficit/Hyperactivity Problems, Antisocial Personality Problems. <sup>15</sup> ADHD denotes Attention Deficit/Hyperactivity. <sup>16</sup> Based on X<sup>2</sup> – Test, and P value based on Fisher's exact. <sup>17</sup> Based on the Wilson<sup>9</sup> CI method for small n.