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Prevalence and Stability of Sexual Orientation Components During Adolescence and Young Adulthood

Ritch C. Savin-Williams · Geoffrey L. Ream

Abstract Analyses of three waves (6 years) of the National Longitudinal Survey of Adolescent Health data explored the prevalence and stability of sexual orientation and whether these two parameters varied by biologic sex, sexual orientation component (romantic attraction, sexual behavior, sexual identity), and degree of component. Prevalence rates for nonheterosexuality varied between 1 and 15% and depended on biologic sex (higher among females), sexual orientation component (highest for romantic attraction), degree of component (highest if "mostly heterosexual" was included with identity), and the interaction of these (highest for nonheterosexual identity among females). Although kappa statistics testing for temporal stability across waves were significant, they failed to reach acceptable levels of agreement and could be largely attributable to the stability of opposite-sex rather than same-sex attraction and behavior. Migration over time among sexual orientation components was in both directions, from opposite-sex attraction and behavior to same-sex attraction and behavior and vice versa. To assess sexual orientation, investigators should measure multiple components over time or abandon the general notion of sexual orientation and measure only those components relevant for the research question.

R. C. Savin-Williams (✉)
Department of Human Development, MVR Hall,
Cornell University,
Ithaca, New York 14853-4401
e-mail: rsw36@cornell.edu

G. L. Ream
School of Social Work, Adelphi University,
Garden City, New York

Introduction

Sexual orientation is generally defined by whether one is erotically attracted to males, females, or both (LeVay & Valente, 2006). Assumed to be present from birth, either because of genetics or prenatal hormones (Ellis, 1996; Mustanski, Chivers, & Bailey, 2002), sexual orientation is discernible through verbal and nonverbal indicators of sexual and romantic attractions, erotic fantasies, sexual behaviors, romantic relationships, and sexual identity labels. Based on responses to inquiries about these components or markers of sexual orientation, researchers group individuals into sexual populations. The questions of who belongs in a particular sexual group, on what basis, and for how long are central for any viable paradigm for research on sexual orientation (Diamond, 2003a; McConaghy, 1999; Savin-Williams, 1990, 2001, 2005). Without these answers, it is difficult to characterize with much confidence individuals within sexual groups.

Prevalence rate of nonheterosexuality

The cross-cultural empirical literature reveals wide variations regarding the prevalence of sexual orientation groups, based largely on definitional considerations. One review of same-sex populations over the past decade (Black, Gates, Sanders, & Taylor, 2000) found that the proportion of those identifying as gay/bisexual was far smaller—often by a factor of at least one half—than those engaging in same-sex behavior. In the United States, the United Kingdom, and France,

exclusive same-sex behavior rarely characterized more than 1% of the adult population (Sell, Wells, & Wypij, 1995). If the definition was broadened, however, to include individuals who had sex with both sexes, had some degree of same-sex attraction, or had at least one of the two, then the proportion of "gays" expanded to nearly one fifth of the national population. In a representative survey of U.S. adults, 8% reported at least some degree of same-sex attraction, 7% had at least one same-sex behavior since puberty, and 2% identified as gay/lesbian/bisexual (Laumann, Gagnon, Michael, & Michaels, 1994). In adolescent and young adult populations, the data are consistent with studies of older adults. Sixteen percent of Norwegian adolescents had some degree of same-sex attraction, 7% if counting same-sex sexual contact, and 3% if identifying those with a bisexual/gay self-label (Wichstrøm & Hegna, 2003). Among Turkish university students, 7% had sexual desire for the same sex but only 2% had an orgasmic same-sex relationship and 2% considered themselves to be homosexual or bisexual (Eskin, Kaynak-Demir, & Demir, 2005).

In these studies, the sexes seldom differed regarding the proportion who reported same-sex behavior or identity, usually in the 2–4% range and consistent with an earlier cross-cultural review of adolescents and adults (Diamond, 1993). When considering sexual/romantic attraction, however, sex differences were more marked. Whereas males seldom reported prevalence rates of sexual interest or attraction to other males above 5%, females were far more likely to endorse same-sex attraction: 21% of Norwegian adolescent females were interested in, attracted to, or had fantasies about other females (Wichstrøm & Hegna, 2003); 23% of New Zealand young females were sexually attracted to other females (Dickson, Paul, & Herbison, 2003); and 14% of U.S. young adult females reported having some sexual attraction to other females (Mosher, Chandra, & Jones, 2005).

Stability of nonheterosexuality

Although Laumann et al. (1994) expressed doubt about the extent to which nonheterosexual sexual categories, behaviors, and attractions remained stable over time, most investigators presume the stability of sexual orientation and thus assess it at one point in time. This might be a particularly problematic tactic with adolescent and young adult populations, a time in which individuals experiment with their sexuality, deceive themselves or others about their unconventional sexuality because of the stigma attached to nonheterosexuality, or lack the prerequisite experience to know the long-term directionality of their sexuality. Yet, researchers readily acknowledge the existence of such sexual groups ("gay youth") with little evidence that these individuals will be in the same group a month, a year, or a decade henceforth.

Evidence to support sexual orientation stability among nonheterosexuals is surprisingly meager. In a short-term longitudinal study among pre- and early adolescents, a Cronbach's alpha coefficient of .75 was reported over a school year in "sexual questioning," which was defined as having low expectations in the future of participating or experiencing heterosexual attractions and heterosexual relationships (Carver, Egan, & Perry, 2004). Support for the instability of sexual orientation is far more prevalent–in both adult and adolescent populations. Among the 14% of Dutch adult males who reported ever having physical attraction to other males, about half noted that these feelings disappeared later in life (Sandfort, 1997). Comparing sexual attraction in a New Zealand birth cohort at two time periods, first when participants were 21-year olds and then later as 26-year olds, Dickson et al. (2003) found that the proportion of males who reported at least occasional same-sex attraction increased 50% (from 4–6%) and 78% among females (from 9–16%). Nearly all heterosexual males (98%) kept their opposite-sex attraction; 12% of heterosexual females experienced at least occasional same-sex attraction. Migration was in both directions–from heterosexuality to homosexuality and vice versa. Only 38% of exclusive same-sex attracted females stayed in this group with the rest moving into "occasional" same-sex attraction (38%) or exclusive opposite-sex attraction (25%). One half of female and one third of male 21-year olds with occasional same-sex attraction only had opposite-sex attraction as 26-year olds.

Stability of sexual orientation depends on which component is assessed. Consistent with the assertions of adolescent focus groups (Friedman et al., 2004), sexual identity and behavior are subject to considerable change during adolescence and young adulthood for reasons that range from sexual behavior opportunities that are more available in college and the work world than in high school to developmental changes in the meaning of sexual feelings for a sexual identity (Rodríguez Rust, 2002; Savin-Williams, 1998; Weinberg, Williams, & Pryor, 1994). Diamond's (2003b) longitudinal study of young females is one of the few to assess long-term stability differences in sexual orientation components. Most (62%) young women changed their identity labels at least once because sexual identity categories did not adequately represent the diversity of their circumstantial sexual and romantic feelings. Over time, lesbian and bisexual identities lost the most adherents and heterosexual and unlabeled identities gained the most. What remained relatively unchanged were reports of sexual and romantic attraction. That is, a young woman might change her identity from bisexual to heterosexual without undergoing a comparable change in her attraction to females.

A retrospective study of adults assessed perceived changes in multiple dimensions of sexuality, including sexual fantasy, romantic attraction, sexual behavior, and sexual

identity (Kinnish, Strassberg, & Turner, 2005). Change scores were derived from participants' ratings of their sexuality for every 5-year period beginning with ages 16–20 years. Although most (97%) heterosexuals maintained their heterosexual identity, nonheterosexuals frequently changed their identity label over the life course: 39% of gay males, 65% of lesbians, 66% of male bisexuals, and 77% of female bisexuals. The dimensional assessments of fantasy, attraction, and behavior reflected similar trends. Although roughly 90% of heterosexually identified individuals had none or one point changes during their lifetime, the majority of gay (52%), lesbian (80%), and bisexual (90%) identified individuals had multiple changes on the dimensional variables. For nonheterosexuals, sexual behavior changed more often than romantic attraction and for all sexual identity categories, except bisexuals, women changed more than men.

Research questions

Through secondary analyses of a longitudinal data set, the present study examined the prevalence of sexual orientation components (romantic attraction, sexual behavior, sexual identity) and the extent to which two components (romantic attraction, sexual behavior) were stable over time. Consistent with the empirical literature, the prevalence of same-sex behavior and identity was expected to be roughly equal (2–4% range) and considerably less than that of same-sex romantic attraction (greater than 10%). Females were expected to evidence greater rates of nonheterosexuality than males, especially when assessed by romantic attraction.

Although we predicted substantially greater agreement in same-sex attraction and behavior between waves than would be expected if raw prevalence was held constant and migration between categories was random, previous research indicated that this stability would be considerably lower than opposite-sex attraction and behavior. We expected same-sex attraction would be more stable than sexual behavior if only because behavior depends on opportunity while attraction does not. Over time, migration in romantic attraction and sexual behavior should be bi-directional, from heterosexual to nonheterosexual and vice-versa although to what degree was uncertain. Males and heterosexuals were expected to be the most stable.

Cohen's kappa inter-rater statistics were used as an inferential test of temporal stability. Kappa is 0 if observed and expected agreements are the same and approaches 1 as observed agreement exceeds expected agreement. Theoretically, kappa can be negative if observed is lower than expected agreement. Consistent with the interpretation scale for standard levels of acceptable agreement for kappa statistics provided by Landis and Koch (1977), in this study we defined "good" stability as a level of .70.

Method

Participants

Data for this study were drawn from the first three waves of the National Longitudinal Survey of Adolescent Health (Add Health) (Udry & Bearman, 1998). The study was designed to assess contextually mediated positive and negative effects on adolescent (grades 7 through 12) health. The primary sampling frame was school-based, with a nationwide sample of 80 high schools selected and a 70% response rate. Comparable replacement schools were selected for schools that declined to participate. If the recruited high school was not for all grades 7 through 12, younger students were recruited from middle and junior high schools that fed into the sample high schools. A total of 132 public and private schools in 80 communities participated.

In selecting students for the in-home interviews, the within-school sample was split into sex by grade strata and a random sample was taken within each stratum. Roughly 17 students per stratum per school pair were selected for a total of 12,105 students in the core sample. Over-samples of Chinese, Cuban, Puerto Rican, disabled, twins, and Black youth with at least one parent holding a college degree were also collected. Additionally, the entire student body of 16 diverse schools was selected for in-home interviews to provide data on peer networks. The total Wave 1 in-home interview sample (M age = 15.8 years) included 20,747 individuals. At Wave 2, one year later, 14,738 participants who had not been in the 12th grade at Wave 1 were re-interviewed (M age = 16.7 years). Wave 3 data were follow-up interviews with 15,170 original Wave 1 respondents located by field interviewers between August 2001 and April 2002 when participants were between the ages of 18 and 26 years (M age = 21.7 years). To be included in this study's analyses, cases had to have valid data for all three waves plus a valid "grand sample weight" value ($n = 18,924$ for comparisons using only Wave 1, $n = 13,570$ for comparisons using only Waves 1 and 2, $n = 14,322$ for comparisons using only Waves 1 and 3, $n = 10,828$ for comparisons using Waves 2 and 3 or all three waves), indicating a positive probability, however small, of inclusion in a national probability sample of American adolescents.

Measures

Add Health interviews were conducted in two different modes, one with interviewers asking questions and entering participants' answers on a laptop computer and another (audio computer-assisted self-interview, or ACASI) with participants listening to recorded interview questions via headphones and entering their responses into the laptop. ACASI was used for romantic attraction, sexual behavior, and sexual

identity questions and when special candor was needed from respondents.

Romantic attraction

Based on responses to the questions "Have you ever had a romantic attraction to a female" and "Have you ever had a romantic attraction to a male" at Wave 1 and "Since [time of Wave 1 or 2 interview], have you had a romantic attraction to a [male/female]" at Waves 2 and 3, participants' attraction was classified as opposite-sex, same-sex, both-sex, or none.

Sexual behavior

In Waves 1 and 2, participants could list up to six romantic relationships that they had in the past 18 months, three romantic relationships and three non-romantic sexual relationships, plus additional catch-all questions at the end. They were asked for their partner's sex and were given a stack of cards with various relationship activities listed on them and invited to keep or reject cards indicating events that had happened in their relationships. Romantic relationships were coded as sexual based on whether participants kept or rejected the card "We had sexual intercourse." Because participants had read a definition of sexual intercourse that was limited to penile-vaginal penetration in a previous section, this was not an ideal operationalization of same-sex sexual behavior. Non-romantic sexual relationships were classified as sexual based on whether participants listed them as such. Third, participants were asked about the biologic sex of additional sex partners from the past 18 months not listed on the previous two rosters. Youth were classified according to whether their sex partners in the three assessments were male, female, or both.

In Wave 3, participants reported information about all romantic relationships since the beginning of Wave 1, including the question, "Please indicate whether [initials of person] is male or female" and "Have you ever had sexual relations with [initials of person]." Sexual relations were defined as "vaginal intercourse (a man inserts his penis into a woman's vagina), oral sex (a person puts his or her mouth on another person's sex organs), or anal sex (a man inserts his penis into his partner's anus or asshole)." Although this assessment of the sexual nature of a relationship was not substantially different from the other waves, its greater sensitivity and specificity may have contributed to Wave 3 results.

Sexual identity

In Wave 3 only, participants were given six possible responses to the question "Please choose the description that best fits how you think about yourself:" "100% heterosexual (straight)," "mostly heterosexual (straight), but somewhat attracted to people of your own sex," "bisexual—that is, attracted to men and women equally," "mostly homosexual (gay), but somewhat attracted to people of the opposite sex," "100% homosexual (gay)," and "not sexually attracted to either males or females."

Statistical procedures

The Add Health data set was designed as a survey data set with four sampling strata (north, south, east, and west regions), 132 primary sampling units (schools), and a probability of each student within any school to be included in the sample (grand sample weight). When possible, survey procedures in STATA 8/SE (Statacorp, 2001) were used to adjust for clustering and unequal probability of inclusion in the sample. Survey estimation procedures weigh the data and adjust the denominator *df* of *F*-tests to be more realistically strict. Because survey-adjusted kappa is not available in Stata 8/SE, it was based on unweighted counts, although the cell proportions were survey-adjusted.

Results

Table 1 presents the prevalence rates of romantic attraction and sexual behavior at all three waves and of sexual identity at Wave 3. Reports of having some degree of same-sex romantic attraction ranged from 4.5–12.9%; the proportion of participants reporting same-sex behavior was lower and more constricted (1 to 3%). In Wave 3, 5.6% of males and 14.5% of females reported nonexclusive heterosexuality; the majority of these individuals did not identify as gay/bisexual but as "mostly heterosexual." Thus, 97.2% of males and 95.8% of females self-labeled as predominantly or exclusive heterosexual.

Tables 2 and 3 report stability across waves in attraction and behavior, separately by sex. Analyses of attraction in Table 2 included all participants but Table 3 included only participants who had been sexually active both before Wave 1 and between Wave 1 and Wave 2. Confidence intervals of kappas were thus wider in Table 3 than in Table 2 because the valid N was smaller.

Although the between wave agreement data were high (usually around 70% for attraction and 95% for sexual behavior), this was largely because of the stability of opposite-sex attraction and behavior. The kappa statistics, reflecting similarity between observed and expected levels of agreement, were notably below the .70 level considered acceptable. The data in Tables 2 and 3 also highlight the high proportion of participants with same- and both-sex attraction and behavior that migrated into opposite-sex categories between waves. A much smaller percentage (but larger total number) of opposite-sex attracted and behaving

Table 1 Prevalence of romantic attraction, sexual behavior, and sexual identity across Waves by sex

	Male						Female					
	Wave 1		Wave 2		Wave 3		Wave 1		Wave 2		Wave 3	
	Adj. %	Real n	Adj. %	Real n	Adj. %	Real n	Adj. %	Real n	Adj. %	Real n	Adj. %	Real n
Attraction												
None	15.5	1283	23.4	1478	3.8	255	12.4	1115	16.9	1183	3.7	270
Both-sex	6.3	560	3.1	205	4.3	297	3.9	374	3.5	258	12.3	904
Same-sex	0.9	74	1.4	85	1.0	77	1.4	130	1.0	72	0.6	45
Opposite-sex	77.4	7371	72.1	4786	91.1	6138	82.3	8015	78.6	5407	83.3	6336
Behavior												
None	67.8	6074	64.4	4113	23.8	1666	68.8	6519	64.4	4416	19.9	1568
Both-sex	0.7	65	0.6	35	1.0	62	0.8	75	0.5	26	2.5	168
Same-sex	0.4	38	0.7	59	1.3	93	0.4	42	0.5	40	0.5	47
Opposite-sex	31.2	3111	34.3	2405	74.0	4946	30.1	2998	34.6	2474	77.1	5772
Identity												
Heterosexual					94.0	6314					85.1	6392
Mostly heterosexual					3.2	207					10.7	761
Bisexual					0.6	41					2.6	188
Mostly homosexual					0.6	48					0.7	45
Homosexual					1.2	86					0.5	39
No attraction					0.4	23					0.5	45

Note. "Adj. %" refers to sample proportions weighted using survey procedures in Stata/SE 9.1 to reflect, as accurately as possible, actual population proportions. They do not correspond exactly to proportions based on the unweighted sample.

individuals migrated to nonheterosexual categories; a similar migration occurred for those without attraction and/or sexual behavior.

Explaining the variance in stability was undertaken in a series of logistic regressions. Tables 4 and 5 report results predicting, from biologic sex and the response in the earlier wave, the likelihood of a consistent response in the later wave. They each show the results of nine models, three for each between-wave comparison. One model was run with only biologic sex as the independent variable (reference category = male), one was run with only sexual orientation as the independent variable (reference category = heterosexual), and one was run with the interaction between sexual orientation and biologic sex. Each included the overall, main, and interaction effects of sexual orientation component and biologic sex.

Analyses reported in Table 4 revealed significant biologic sex, romantic attraction, and biologic sex by attraction differences. All attraction categories other than opposite-sex were associated with a lower likelihood of stability over time. That is, individuals reporting any same-sex attractions were more likely to report subsequent shifts in their attractions than were individuals without any same-sex attractions. Female sex had an overall effect of greater stability between Wave 1 and Wave 2 but no overall effect on stability between either Wave 1 or Wave 2 with Wave 3. Female sex had a main effect for lower stability. Combined with the null overall effects, this indicated that Wave 1 and Wave 2 opposite-sex attracted females were less likely than opposite-sex attracted males to give a consistent report of opposite-sex attraction in Wave 3,

but both-sex and no-sex attracted females were more likely than comparable males to give a consistent report in Wave 3.

Analyses in Table 5 included youth who reported sexual activity to test hypotheses about change (not the initiation) in sexual activity. Same- and both-sex behavior was collapsed into one category because exclusively same-sex behavior was so rare in all three waves (usually <1%) that an adequate cell number to perform analyses could not be achieved. During Wave 1 and Wave 2, same/both-sex behavior was the only important predictor of an instability report; there was no effect for biologic sex. Those who engaged in same/both-sex behavior during the first two waves were more likely to report Wave 3 exclusive opposite-sex behavior than those who engaged in opposite-sex behavior were to later report same/both-sex behavior.

Discussion

Prevalence rates

The prevalence rate for nonheterosexuality varied between 1% (Wave 1 youth engaging in same-sex behavior) and 15% (Wave 3 females with any nonheterosexual identity) and depended on biologic sex (higher among females), sexual orientation component (highest for romantic attraction), degree of component (highest if "mostly heterosexual" is included with identity), and the interaction of these (highest for nonheterosexual identity among females). As young adults, females reported the highest rates of

Table 2 Across-wave agreement in romantic attraction by sex

Male (%)

Wave 1	Wave 2 None/missing	Both	Same	Opposite
None/missing	47.1	2.6	1.9	48.4
Both-sex	19.7	14.5	4.5	61.4
Same-sex	32.5	5.3	10.3	51.9
Opposite-sex	18.7	2.2	0.9	78.1
	Percent agree 68.7%	Exp. % agree 60.2%	Cohen's kappa .212	95% CI (.193, .230)

Wave 1	Wave 3 None/missing	Both	Same	Opposite
None/missing	12.0	4.0	1.0	83.0
Both-sex	4.1	8.7	4.8	82.4
Same-sex	1.2	22.9	4.3	71.7
Opposite-sex	2.2	3.7	0.6	93.5
	Percent agree 75.6%	Exp. % agree 72.6%	Cohen's kappa .109	95% CI (.094, .124)

Wave 2	Wave 3 None/missing	Both	Same	Opposite
None/missing	8.6	3.6	0.7	87.1
Both-sex	2.7	18.7	8.7	70.0
Same-sex	4.8	8.2	17.2	69.8
Opposite-sex	2.0	3.9	0.5	93.6
	Percent agree 70.8%	Exp. % agree 67.5%	Cohen's kappa .104	95% CI (.088, .120)

Female (%)

Wave 1	Wave 2 None/missing	Both	Same	Opposite
None/missing	40.6	2.0	0.8	56.6
Both-sex	16.0	20.3	5.4	58.2
Same-sex	19.8	13.7	6.7	59.8
Opposite-sex	13.3	2.9	0.7	83.2
	Percent agree 74.3%	Exp. % agree 66.8%	Cohen's kappa .225	95% CI (.206, .243)

Wave 1	Wave 3 None/missing	Both	Same	Opposite
None/missing	11.5	5.4	0.2	82.9
Both-sex	3.0	41.1	3.2	52.6
Same-sex	5.0	36.5	3.2	55.3
Opposite-sex	2.6	11.6	0.5	85.3
	Percent agree 74.4%	Exp. % agree 71.0%	Cohen's kappa .114	95% CI (.100, .129)

Wave 2	Wave 3 None/missing	Both	Same	Opposite
None/missing	7.8	7.4	0.6	84.2
Both-sex	2.3	43.5	4.4	49.9
Same-sex	12.6	45.2	1.1	41.1
Opposite-sex	2.2	11.6	0.5	85.7
	Percent agree 71.0%	Exp. % agree 67.6%	Cohen's kappa .107	95% CI (.091, .123)

Table 3 Across-wave agreement in sexual behavior by sex

	Male			Female		
	Both	Same	Opposite	Both	Same	Opposite
Wave 1	Wave 2			Wave 2		
Both-sex	8.8%	17.3%	73.9%	16.5%	0.1%	83.4%
Same-sex	0.0%	39.0%	61.0%	26.1%	18.8%	55.0%
Opposite-sex	1.0%	0.6%	98.4%	1.1%	1.7%	97.3%
	Percent Agree 95.71%	Exp. % Agree 93.93%	Cohen's kappa .293	Percent Agree 93.76%	Exp. % Agree 92.88%	Cohen's kappa .124
	95% CI (.254,.332)			95% CI (.087,.161)		
Wave 1	Wave 3			Wave 3		
Both-sex	2.1%	10.2%	87.7%	9.0%	2.4%	88.7%
Same-sex	0.0%	28.4%	71.6%	22.9%	0.3%	76.8%
Opposite-sex	1.4%	0.5%	98.1%	3.2%	0.3%	96.5%
	Percent Agree 95.63%	Exp. % Agree 95.05%	Cohen's kappa .116	Percent Agree 93.24%	Exp. % Agree 92.60%	Cohen's kappa .086
	95% CI (.081,.151)			95% CI (.051,.120)		
Wave 2	Wave 3			Wave 3		
Both-sex	4.3%	0.0%	95.7%	0.0%	3.9%	96.1%
Same-sex	5.2%	48.1%	46.8%	0.6%	6.1%	93.4%
Opposite-sex	1.3%	0.4%	98.3%	3.7%	0.6%	95.7%
	Percent Agree 95.84%	Exp. % Agree 93.85%	Cohen's kappa .324	Percent Agree 94.31%	Exp. % Agree 93.93%	Cohen's kappa .064
	95% CI (.285,.362)			95% CI (.030,.097)		

Table 4 Binary logistic regressions predicting likelihood of stability between attraction in a later Wave and attraction in an earlier Wave from attraction in the earlier wave with biologic sex and attraction as predictors

Independent variable			
Romantic attraction during a Wave	Wave 1	Wave 2	Wave 1
Dependent variable			
Stability with attraction during a Wave	Wave 2	Wave 3	Wave 3
Female	0.297***	−0.024	−0.091
Constant	0.774***	0.906***	1.118***
Model $F(1,128)$	31.49***	0.19	2.76
No attraction	−1.665***	−4.548***	−4.138***
Both-sex attraction	−3.055***	−2.896***	−3.460***
Same-sex attraction	−3.860***	−4.206	−5.399***
Constant	1.431***	2.143***	2.124***
Model $F(3,126)$	248.55***	347.27***	340.10***
Female	0.324***	−0.894***	−4.658***
No attraction	−1.389***	−5.044***	−5.017***
Both-sex attraction	−3.048***	−4.155***	−5.770***
Same-sex attraction	−3.434***	−4.252***	−0.909***
Female × no attraction	−0.589***	0.785**	0.864***
Female × both-sex attraction	0.087	2.102***	2.903***
Female × same-sex attraction	−0.792	−2.063*	0.593
Constant	1.272***	2.683***	2.664***
Model $F(7,122)$	119.95***	196.51***	164.57***
N	13474	10766	14322

$*p < .05, **p < .01, ***p < .001.$

nonheterosexuality. Both the component per se and the degree to which each component must be present to count as "gay" were critical. If a heterosexual identity included only those individuals who characterized themselves as 100% heterosexual, then the prevalence rate of nonheterosexuality tripled the number who identified as gay/lesbian/bisexual. So, too, if having romantic attraction to both sexes counted as same-sex oriented, then the prevalence rate was nine times higher than if the criterion was exclusive same-sex attraction.

This "how much" consideration has seldom been addressed in previous reports of homosexuality, despite Kinsey, Pomeroy, and Martin's (1948) early argument, renewed by McConaghy (1999), against a dichotomous construction of sexual orientation. Dunne, Bailey, Kirk, and Martin (2000) concluded that "there was little evidence for true bipolarity in

sexual orientation" (p. 556). If sexual orientation is a continuous construct, then the relevant research question is, "How frequent should sexual behavior with one or the other sex be, and/or how strong or frequent should sexual attraction to one or the other sex be in order to classify a respondent as homosexual, bisexual, or heterosexual?" (Sell et al., 1995, p. 245). Subjects who are "bisexual leaning toward the heterosexual side" are nearly always excluded from gay/bisexual samples (e.g., D'Augelli, Hershberger, & Pilkington, 2001). That is, although individuals with a significant amount of homosexuality (however defined) are usually treated as belonging to the class identified as gay, the critical consideration is whether having "any" same-sex sexuality qualifies as nonheterosexuality. How much of a dimension must be present to tip the scales from one sexual orientation to another was not

Table 5 Binary logistic regressions predicting likelihood of stability between sexual behavior in a later Wave and sexual behavior in an earlier Wave from sexual behavior in the earlier Wave with biologic sex and sexual behavior as predictors

Independent variable			
Sexual behavior during a Wave	Wave 1	Wave 2	Wave 1
Dependent variable			
Stability with sexual behavior during a Wave	Wave 2	Wave 3	Wave 3
Female	−0.323	−0.412	−0.422
Constant	3.161***	3.100***	3.064***
Model $F(1,123)$	1.72	2.95	3.64
Same- or both-sex behavior	−4.795***	−4.675***	−5.229***
Constant	3.794***	3.461***	3.573***
Model $F(1,123)$	201.91***	175.12***	217.09***
Same- or both-sex behavior	−4.868***	−4.744***	−5.488***
Female	−0.517	−0.960**	−0.610*
Female × same- or both-sex behavior	0.068	−1.232	0.446
Constant	4.091***	4.068***	3.920***
Model $F(3,121)$	68.69***	63.81***	72.58***
N	2965	3337	3938

$*p < .05, **p < .01, ***p < .001.$

resolved with the present data, only that such decisions matter in terms of prevalence rates.

The present data were also consistent with cross-cultural investigations which reported that the proportion of non-heterosexual participants dropped steeply as the inclusion criteria became more singularly same-sex focused. The 16% of Norwegian youth who reported some attraction to the same sex was reduced to 5% if only those with bisexual and same-sex attraction were included and to 1% if only those with exclusive same-sex attraction was the criterion. Similarly, the proportion dropped from 11% to 3% to .50% if the criteria were "not exclusively heterosexual," "bisexual or homosexual identity," and "exclusive homosexual identity," respectively (Wichstrøm & Hegna, 2003). In a study with New Zealander adults (Fergusson, Horwood, Ridder, & Beautrais, 2005), the construction of nonheterosexual groups depended on the stringency of the criteria applied and on biologic sex. Females were far more likely than males to be included in the nonheterosexual groups: 14% versus 5% in the predominantly heterosexual group and 4% versus 2% in the predominantly homosexual group. The sex difference—females more likely than males to report minor degrees of same-sex sexuality—has been a common finding across various cultures and age groups, including Australia (Smith, Rissel, Richters, Grulich, & de Visser, 2003), Great Britain (Wellings, Field, Johnson, & Wadsworth, 1994), Thailand (Van Griensven et al., 2004), and the United States (Lippa, 2000). Thus, the answer to the question "How many gays are there?" depends on which component of sexual orientation (behavior, attraction, identity) is used, how much of a component must be present to determine the cut-off point, and which biologic sex is being assessed.

Stability of sexuality

Although the stability of sexual orientation components over time was relatively high, this was primarily due to the stability of opposite-sex attraction and behavior. Participants indicating nonheterosexuality in Wave 1 were often not the same individuals who indicated nonheterosexuality one and five years later. Despite this heterosexual migration, nonheterosexual prevalence rates did not decline, indicating that even as individuals were abandoning the ranks of nonheterosexuality to join the heterosexual majority, a small proportion (but larger number) of opposite-sex attracted and behaving individuals and those with no attraction or sexual behavior were replacing them.

The instability of same-sex romantic attraction and behavior (plus sexual identity in previous investigations) presents a dilemma for sex researchers who portray nonheterosexuality as a stable trait of individuals. This is problematic not only in the Add Health data—which have been used to define "gay youth" in a large number of investigations (e.g., Russell & Joyner, 2001)—but also, as indicated in the literature reviewed in this article, for adults. That is, sexual orientation instability may not be simply a "developmental" issue (adolescents as experimenters) but a conceptual or measurement problem. Subjects might not understand what constitutes "romantic attraction"—is it romantic attraction to a specific male or female or to males or females in general? Engaging in same-sex behavior depends on the time frame that counts ("ever" or "last year"), opportunities to find desired sexual partners, pressures to fit in and act heterosexually, and understandings about what constitutes sex. Whether one identifies as gay might well be contingent on perceived stereotypes of gays ("I'm not one of those!") or political inclinations (lower for traditionalists).

Given that most sex researchers define a sexual population based on a single measure of sexual orientation at one point of time, it is highly likely that some same-sex oriented individuals are excluded and some heterosexuals (e.g., those with same-sex behavior) are misidentified as gay. Researchers would be best assured of a nonheterosexual sample if they included those with some degree of multiple sexual orientation components over time. Another alternative is to forsake the general notion of sexual orientation altogether and assess only those components relevant for the research question. For example, to assess HIV transmission, measure sexual behavior; to assess interpersonal attachments, measure sexual/romantic attraction; and to assess political ideology, measure sexual identity. Few data sets offer the amenities suitable for either approach.

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