Arch Sex Behav
DOI 10.1007/s10508-011-9761-1

ORIGINAL PAPER

Stability and Change in Sexual Orientation Identity Over a 10-Year Period in Adulthood

Steven E. Mock · Richard P. Eibach

Received: 5 March 2010 / Revised: 12 March 2011 / Accepted: 15 March 2011

Abstract We examined reports of sexual orientation identity stability and change over a 10-year period drawing on data from the National Survey of Midlife Development in the United States (MIDUS I and II) and tested for three patterns: (1) heterosexual stability, (2) female sexual fluidity, and (3) bisexual fluidity. Fifty-four percent of the 2,560 participants were female and the average age was approximately 47 years. At Wave 1, 2,494 (97.42%) reported a heterosexual identity, 32 (1.25%) a homosexual identity, and 34 (1.33%) a bisexual identity and somewhat more than 2% reported a different sexual orientation identity at Wave 2. Although some support for each hypothesis was found, initial sexual orientation identity interacted with gender to predict a more complex pattern. For the sample as a whole, heterosexuality was the most stable identity. For women, bisexuality and homosexuality were equally unstable and significantly less stable than heterosexuality, suggesting that sexual orientation identity fluidity is a pattern that applies more to sexual minority women than heterosexual women. For men, heterosexuality and homosexuality were both relatively stable compared to bisexuality, which stood out as a particularly unstable identity. This pattern of results was consistent with previous findings and helps to address methodological limitations of earlier research by showing the characteristics of a population-based sample of heterosexual, homosexual, and bisexual identified men and women over time.

S. E. Mock (✉)
Department of Recreation and Leisure Studies, Department of Health Studies and Gerontology, University of Waterloo, Burt Matthews Hall, 200 University Avenue West, Waterloo, ON N2L 3G1, Canada
e-mail: smock@uwaterloo.ca

R. P. Eibach
Department of Psychology, University of Waterloo, Waterloo, ON, Canada

Keywords Sexual orientation · Sexual identity · Heterosexuality · Homosexuality · Bisexuality

Introduction

Does sexual orientation change? Is sexual orientation more fluid for women than it is for men? Given the controversial debate on sexual orientation conversion therapy (Spitzer, 2003) and intriguing recent research on sexual fluidity among sexual minority women (Diamond, 2008), it is surprising how little research there has been on the patterns of stability and change of sexual orientation identity (LeVay, 2010; Savin-Williams, 2009). The research that has been conducted on this topic shows some consistent themes. First, heterosexuality is by far the predominant sexual orientation identity and least likely to change over time (Kinnish, Strassberg, & Turner, 2005). Second, there is evidence of greater fluidity in women's than in men's sexual orientation identity, particularly for sexual minority (i.e., non-heterosexual) women (Diamond, 2008; Dickson, Paul, & Herbison, 2003). Third, bisexual identity tends to be less consistently claimed over time than other sexual identities (Kinnish et al., 2005). However, these three major patterns are seldom examined together in the same study and few investigators have studied stability and change of sexual orientation prospectively with national data that include men and women, heterosexuals and sexual minorities. To help address these limitations, we draw on national longitudinal data from a U.S. sample (Brim et al., 1996; Ryff et al., 2006) that covers a 10-year span to assess patterns of stability and change in heterosexual, homosexual,[1] and bisexual identity among a sample of men and women.

[1] Here and throughout the text the term homosexual refers to gay male or lesbian identity since homosexual was the identity term used in the survey from which we drew all of our analyses.

Published online: 17 May 2011

Components of Sexual Orientation

Sexual orientation is typically defined by the nature of one's sexual attraction to men, women, or both (LeVay & Valente, 2006). Beyond this basic definition, various components of sexual orientation include sexual behavior, romantic attraction, and sexual orientation identity (Laumann, Gagnon, Michael, & Michaels, 1994; Savin-Williams, 2009). Measures of behavior, attraction, and identity and the overlap among these components yield differing estimates of various kinds of sexual orientation, depending on whether sexual behavior or self-reported sexual orientation identity is the focus of the question (Savin-Williams, 2009). For example, rates of any experience of same-sex sexual behavior are typically higher (e.g., 4–6%) than rates of same-sex sexual orientation identity (e.g., 1–3%) (Mosher, Chandra, & Jones, 2005). Further, measures of behavior, attraction, and identity are not strongly correlated with each other (Savin-Williams, 2009).

For the present analyses, we focus on self-reported sexual orientation identity (e.g., heterosexual, homosexual, and bisexual) defined by attraction to the opposite sex, same sex, or both (Mays & Cochran, 2001). Although our emphasis is on identity (i.e., heterosexual, homosexual, and bisexual), the measure used for the present analyses is defined by a consideration of attraction. Some studies have measured sexual orientation identity without qualifiers related to attraction (e.g., from Diamond, 2008: "How do you currently label your sexual identity to yourself, even if it's different from what you might tell other people?;" from Mosher et al., 2005: "Do you think of yourself as heterosexual, homosexual, bisexual, or something else?"). However, it is also common to define measures of identity with attraction or behavior (e.g., from Savin-Williams & Ream, 2007: "bisexual—that is, attracted to men and women equally;" from Rosario, Schrimshaw, Hunter, & Braun, 2006: "When you think about sex, do you think of yourself as lesbian/gay, bisexual, or straight?"). Thus, although the various components of sexual orientation are not isomorphic (Savin-Williams, 2009), attraction and behavior are sometimes used to define sexual orientation identity.

Heterosexual Stability

In survey research, reports of heterosexual identity typically range from 90 to 98% (Dickson et al., 2003; Herbenick et al., 2010; Mosher et al., 2005). In a retrospective study of sexual orientation identity among a group of heterosexual, bisexual, and homosexual men and women, heterosexuals reported less lifetime change in sexual orientation than sexual minorities did (Kinnish et al., 2005). There is little research specifically on stability and change of sexual orientation identity. Thus, we look to research on the related topics of sexual attraction and behavior for some suggestions regarding how consistent ratings of sexual orientation identity might be expected to be. In a 6-year longitudinal study of sexual attraction and behavior from adolescence to early adulthood, Savin-Williams and Ream (2007) found a high degree of stability for opposite-sex attraction and behavior but little consistency for same-sex attraction and behavior. Similarly, in a 5-year study of same- and opposite-sex attraction in a national sample of young adults (Dickson et al., 2003), 95% of opposite-sex attracted men and 84% of opposite-sex attracted women maintained a consistent rating of attraction over 5 years (i.e., no change), but only 65% of the men with same-sex attraction and 40% of the women with same-sex attraction did so. Although these results suggest greater stability for heterosexuality compared to sexual minority orientations, they also suggest sexual orientation identity may be less stable for women than men (Dickson et al., 2003).

Female Sexual Orientation Fluidity

Among women, detailed tracking of sexual orientation components over time generally finds considerable evidence of sexual fluidity (Diamond, 2003, 2008). For example, in a longitudinal study of women who identified as lesbian, bisexual, or unlabeled at the first time point, 67% had changed their identity at least once over a period of 10 years (Diamond, 2008). Diamond proposed that the fluidity found in women's sexual identities was a reflection of their relationship experiences. Specifically, changes from bisexual or unlabeled to heterosexual or lesbian tended to be preceded by sexual involvement with an opposite- or same-sex partner, respectively. In a study conducted over a shorter period of time than Diamond's research, same- and opposite-sex attracted women rated their sexual orientation on a 7-point Kinsey scale and over the period of 1 year 80% of these women did not change their original rating and, when they did, it was never more than a point away from their original rating (Pattatucci & Hamer, 1995), suggesting somewhat less variability in sexual orientation identity, albeit over the period of 1 year.

Bisexual Fluidity

In addition to potential gender differences in stability of sexual orientation identity, within sexual minority identities, bisexual identity may be less consistently claimed over time. Studies of sexual orientation stability offer some support for the hypothesis that bisexual identity may be especially unstable over time, at least for men. For example, in a retrospective study, bisexual men reported less stability in their sexual and romantic attractions than either heterosexual or homosexual men (Weinberg, Williams, & Pryor, 1994). However, both bisexual and homosexual women reported similarly low levels of stability in their sexual and romantic feelings compared to heterosexual women. In another retrospective study (Kinnish et al., 2005), the two groups with the highest self-report of consistency in sexual orientation identity were heterosexuals (97%) and homosexual

men (61%), who reported considerably more consistency than bisexual men (34%), homosexual women (35%), and bisexual women (23%). Prominent models of bisexual identity suggest that bisexuals may be especially likely to remain uncertain about their sexual orientation identity during adulthood, in part because they receive little normative support for their sexual orientation identity in either the heterosexual or homosexual communities (Weinberg et al., 1994). Thus, these findings suggest that bisexual identity may be claimed less consistently than homosexuality, perhaps especially so for men.

Methodological Limitations of Previous Research

Despite the progress that has been made in documenting patterns of stability and change in sexual orientation, many of these studies have methodological limitations. Some previous investigations of sexual orientation stability have been cross-sectional studies that relied on retrospective self-reports (e.g., Kinnish et al., 2005; Spitzer, 2003; Weinberg et al., 1994). Some studies, although longitudinal, have sampled only men (e.g., Stokes, Damon, & McKirnan, 1997) or only women (e.g., Diamond, 2008; Pattatucci & Hamer, 1995; Sophie, 1986), precluding gender comparisons. Many have recruited only sexual minorities (e.g., Diamond, 2003; Rosario et al., 2006), precluding comparisons of stability with heterosexuals. Some have covered a short time span (Pattatucci & Hamer, 1995; Rosario et al., 2006), raising questions about how people identify over the longer-term. Finally, many of the studies recruited convenience samples of sexual minorities which may have been unrepresentative of sexual minorities in general (e.g., Diamond, 2008; Rosario et al., 2006; Spitzer, 2003). Two longitudinal studies tracked romantic attraction and behavior over time, but only from adolescence to young adulthood (Savin-Williams & Ream, 2007) or a brief span of young adulthood (Dickson et al., 2003) and without longitudinal measures of sexual orientation identity. It is unclear whether the patterns of sexual orientation stability documented in these studies would generalize to later periods of the lifespan or to sexual orientation identity.

Research Questions

To examine the stability and change of sexual orientation identity over time and to help address several of the methodological limitations described above, we draw on the National Survey of Midlife Development in the United States (MIDUS I and II; Brim et al., 1996; Ryff et al., 2006). The MIDUS is a national longitudinal study of men and women in adulthood that included an assessment of sexual orientation identity at two time points 10 years apart. It is unlikely that the stability of a participant's sexual orientation was an influential factor in the decision to participate in the study since it was advertised as a study of health and well-being during the middle years of life and sexual orientation was not mentioned in recruitment. The MIDUS data can thus be used to test consistency of sexual orientation identity across genders and across heterosexual, homosexual, and bisexual identities.

Three broad patterns of sexual orientation stability and change that have received some support in the existing literature are outlined above. Taking these patterns into account, we tested whether (1) heterosexual identity would be the most prevalent and most stable sexual orientation identity (heterosexual stability hypothesis), (2) compared to men, women would be more likely to change sexual orientation identity over time, particularly women who claimed a sexual minority identity at the first time point (female sexual orientation fluidity hypothesis), and (3) bisexual identity would be the least consistently claimed sexual orientation identity (bisexual fluidity hypothesis).

Method

Participants

Data were drawn from the two waves of the National Survey of Midlife Development in the United States (MIDUS I and II; Brim et al., 1996; Ryff et al., 2006). Wave 1 consisted of a nationally representative, multistage probability sample of community dwelling adult English speakers (main sample; $n = 3{,}487$), oversamples of older adults from five urban areas (urban oversample; $n = 757$), a sample of siblings of main-sample respondents (sibling sample; $n = 950$), and an additional twin sample (twin sample; $n = 1{,}914$). Approximately 70% of Wave 1 participants took part in Wave 2 and, of those who did not participate in Wave 2, 842 refused to participate at Wave 2, and the remainder ($n = 1{,}334$) were not successfully contacted either due to informant refusal (i.e., refusal by household member who was not the participant), confirmed or unconfirmed mortality, or inability to contact (Ryff et al., 2006).

Although sexual orientation is seldom assessed in population-based studies, when it is, the percentage of sexual minorities in most studies is typically very low (i.e., 1–3%; Mosher et al., 2005). Thus, to maximize the number of sexual minorities for statistical analyses, we included the urban over sample and first-listed twin from the twin sample. The sibling sample and half the twin sample were excluded in order to maintain the independence of responses. The urban oversample may be particularly helpful for enhancing the number of sexual minority individuals, found in census data to be more likely to reside in urban areas rather than rural areas (Smith & Gates, 2001). Restricting the sample to Wave 1 and Wave 2 participants from the main sample, the urban oversample and half of the twin

sample (first-listed twin from each pair) yielded a sample size of 2,950 and we further limited the sample to those with complete information on sexual orientation at Wave 1 and Wave 2. Approximately 13% had missing or incomplete responses for sexual orientation at Wave 1 and Wave 2, yielding a final sample size of 2,560,[2] consisting primarily of main sample respondents (64%), with the remainder drawn from the urban oversample (14%) and the twin sample (22%). In supplemental analyses (not shown), controlling for sample source (i.e., urban oversample, twin sample) with the main sample as the reference group did not change the pattern of findings reported in this article and the probability of changing sexual orientation identity did not differ by sample source.

Procedure

Wave 1 data were collected by the MacArthur Midlife Research Network from 1994 to 1995 and recruitment focused on adults between the ages of 25 and 74 living in the continental United States (Brim et al., 1996). The purpose of the study was to investigate behavioral, psychological, and social factors related to physical and mental health in adulthood. Using a random digit dialing telephone sampling method, one randomly selected individual from each household who met the age criterion was interviewed over the phone and then mailed a survey for self-administration. Taking into account the response rate for the phone interview and self-administered mailed survey, the over all response rate was approximately 61%. Oversampling of older adults (age 65–74) from five urban areas (Atlanta, Boston, Chicago, Phoenix, and San Francisco) was carried out in a similar manner as the recruitment for the main sample. Data for the twin sample were collected by screening 50,000 nationally representative U.S. households for the presence of a twin. Of the approximately 15% of households who reported the presence of a twin, 60% agreed to participate. Wave 2 data were collected between 2004 and 2006 by the Institute on Aging at the University of Wisconsin-Madison supported by the National Institute on Aging (Ryff et al., 2006). Wave 2 was a longitudinal follow-up of all the Wave 1 samples using a telephone interview and self-administered questionnaire to assess many of the same behavioral, psychological, and social factors assessed in Wave 1.

Measures

Sexual orientation identity was measured at both Wave 1 and Wave 2 with responses of yes (1) or no (0) to the options for the following question: "How would you describe your sexual orientation? Would you say you are *heterosexual* (sexually attracted only to the opposite sex), *homosexual* (sexually attracted only to your own sex), or *bisexual* (sexually attracted to both men and women)?" As discussed above, we restricted the sample to participants with complete information for sexual orientation identity. Previous research has found that refusals and non-response for the questions on sexual orientation in population-based surveys is more a reflection of low cooperativeness with the survey than a reflection of attitudes toward homosexuality (Smith, 1992).

Drawing on this sexual orientation identity measure, sexual orientation identity change was constructed as a dichotomous variable to assess change in self-reported sexual orientation identity (e.g., heterosexual Wave 1 to homosexual Wave 2; homosexual Wave 1 to bisexual Wave 2) compared to consistency in sexual orientation identity from Wave 1 to Wave 2 (e.g., heterosexual Wave 1 and heterosexual Wave 2) (change = 1, consistency = 0).

Demographic factors used in the analyses were measured at Wave 1 and included gender (0 = male, 1 = female), age, a dichotomous measure of visible minority status (0 = white; 1 = Black, Asian, Hispanic, Native American, and Mixed Race combined), and education (from 1 = less than a high school diploma to 6 = Ph.D. or professional degree). To more fully describe the nature of the sample, marital status was reported in the results, but not used in statistical analyses, since, at the time of data collection, state-recognized marriage was not an option for most sexual minorities in the United States and would only have had an influence on heterosexuals or sexual minorities who were most likely in heterosexual relationships, not sexual minorities who were in same-sex relationships. Marital status was coded such that married = 1 and unmarried = 0 (i.e., separated, divorced, widowed, and never married).

[2] To assess the comparability of the final sample used for the present analysis with the characteristics of Wave 1 MIDUS participants not included in the present analyses, the gender, age, and sexual orientation identity of the 2,560 participants included in the present analyses were compared with the 3,591 participants in Wave 1 of the MIDUS (core sample, urban oversample, and first-listed twin of the twin sample) who were not included in the present analyses either due to attrition from Wave 1 to Wave 2 or incomplete sexual orientation identity information at Wave 1 or Wave 2. The sample used for the present analyses had a significantly higher percentage of women (53.51%) compared to Wave 1 participants not included in the analyses (49.31%) ($\chi^2 = 10.45$, $p < .01$), consistent with research analyzing survey response rates by gender (e.g., Eaker, Bergström, Bergström, Adami, & Nyren, 1998; Green, 1996). There was a significantly lower percentage of visible minorities in the analyzed sample (6.89%) compared to those not in the analyses (12.52%) consistent with previous findings regarding survey research response rates (Green, 1996). There were no significant differences found between those included in the analyses and those not in the analyses in terms of age or likelihood of heterosexual identity, homosexual identity, or bisexual identity. Although only 26 participants refused to answer the question about sexual orientation identity at Wave 1 or had missing values for this question, compared to those who reported a sexual orientation identity, those who refused to respond or had missing values were significantly more likely to be male, $\chi^2(1) = 5.83$, $p < .05$, had a visible minority race or ethnicity, $\chi^2(1) = 69.99$, $p < .001$, and had a significantly lower level of education ($M = 2.04$, $SD = 1.06$ vs. $M = 3.54$, $SD = 1.64$; $t(2864) = 4.58$, $p < .001$) but were not significantly different in terms of age.

Analysis Plan

Analyses began with the calculation of descriptive statistics of all study variables. Next, frequencies and percentages for change of sexual orientation identity from Wave 1 to Wave 2 were examined by gender. To examine potential differences in the likelihood of sexual orientation identity change, we conducted 3 (sexual orientation identity) by 2 (change: yes vs. no) chi-square analyses for women and then for men. Since sexual minority identity is seldom claimed (i.e., 1–3% of most population-based samples) and some cell sizes would be too small for statistical methods designed for large samples (Greenland, Schwartzbaum, & Finkle, 2000) Yates' chi-square procedure was used when some cells were expected to be less than five (e.g., sexual minority identities) and other cell sizes in the same comparison would be large (e.g., heterosexual identity) (Preacher, 2001; Yates, 1934). Then, if a significant overall chi-square was found, patterns of sexual orientation identity stability and change were investigated with 2×2 analyses (i.e., heterosexual vs. homosexual, heterosexual vs. bisexual, homosexual vs. bisexual). For the homosexual vs. bisexual comparisons we used Fischer's Exact Test, an analytic method considered to be a conservative and accurate test for comparison of cells with small sample sizes (Agresti, 2001; Preacher & Biggs, 2001).

Next, the likelihood of changing sexual orientation identity was examined with three logistic regression models with change of sexual orientation identity as the dichotomous dependent variable. In the first model, the predictors included demographic variables of age, gender (female with male as the reference group), visible minority status, and level of education. The inclusion of gender in the first model allowed us to test the female sexual fluidity hypothesis. In the next model, homosexual identity and bisexual identity were added as predictors with heterosexual identity as the comparison group. In the third model, gender by sexual minority status interactions tested for potential differences by gender and sexual minority status.

The logistic regression models were structured in such a way as to show the statistical significance and direction of likelihood of change for both genders and all sexual orientation identities. According to Jaccard (2001), the coefficients for the constant, main effects and interactions can be used additively to show the contribution of main effects and proposed interactions to probability of change. Using the third model outlined above as an example, the constant represented heterosexual men. A main effect for gender (female vs. male) would suggest heterosexual women were significantly different in likelihood of change than heterosexual men and any main effects for homosexual or bisexual identity would suggest homosexual or bisexual status was significantly associated with likelihood of change. In addition, significant results for the proposed female by homosexual and female by bisexual interactions would suggest that homosexual or bisexual women were significantly different in likelihood of change than what might be suggested by any previous findings for the main effects.

Table 1 Means and frequencies of demographics, sexual orientation identity, and sexual orientation identity change from Wave 1 to Wave 2 by sex

Variables	Women (n = 1,370)		Men (n = 1,190)	
	M or %	*SD*	*M* or %	*SD*
Demographics				
Age Wave 1	46.41	12.31	47.59	12.48
Age Wave 2	55.55	12.27	56.69	12.43
Visible minority Wave 1	8.61	–	6.47	–
Education Wave 1	3.41	1.59	3.84	1.68
Married Wave 1	65.90	–	75.00	–
Sexual orientation identity				
Heterosexual Wave 1	97.96	–	96.81	–
Homosexual Wave 1	0.80	–	1.76	–
Bisexual Wave 1	1.24	–	1.43	–
SOI change Wave 1–Wave 2	2.63	–	1.60	–

Results

Means, SDs, and frequencies for demographics and key study variables are shown by sex in Table 1. A detailed overview of sexual orientation identity frequencies by gender and the patterns of change in reports of sexual orientation identity from Wave 1 to Wave 2 is shown in Table 2. Overall, 55 (2.15%) participants reported a different sexual orientation identity at Wave 2 compared to Wave 1. Among women, 1.36% with a heterosexual identity changed, 63.63% with a homosexual identity changed, and 64.71% with a bisexual identity changed. Among men, 0.78% with a heterosexual identity changed, 9.52% with a homosexual identity changed, and 47.06% with a bisexual identity changed.

Likelihood of Change Comparisons

Among women, there was a significant overall difference across the sexual orientation identity groups in likelihood of change, Yates' $\chi^2(2) = 382.76$, $p < .001$. Specifically, heterosexual identity was less likely to change than homosexual identity, Yates' $\chi^2(1) = 200.38$, $p < .001$, or bisexual identity, Yates' $\chi^2(1) = 293.12$, $p < .001$. Fisher's Exact Test results showed that the likelihood of change was not significantly different between homosexual women and bisexual women.

Among men, there was a significant overall difference across sexual orientation identity groups in likelihood of change, Yates' $\chi^2(2) = 204.11$, $p < .001$. Men with a heterosexual identity at Wave 1 were significantly less likely to report a change

Table 2 Self-report of sexual orientation identity from Wave 1 to Wave 2 by gender

SOI Wave 1	SOI Wave 2					
	Women (n = 1,370)			Men (n = 1,190)		
	Heterosexual	Homosexual	Bisexual	Heterosexual	Homosexual	Bisexual
Heterosexual	1,324[a]	8	10	1,143[a]	3	6
Homosexual	3	4[a]	4	1	19[a]	1
Bisexual	7	4	6[a]	4	4	9[a]

SOI sexual orientation identity

[a] Consistent SOI Wave 1 to Wave 2

than those with a homosexual, Yates' $\chi^2(1) = 8.86, p < .01$, or a bisexual identity, Yates' $\chi^2(1) = 219.10, p < .001$. A Fisher's Exact Test analysis showed that Wave 1 homosexual men were less likely to report a different sexual orientation identity at Wave 2 compared to Wave 1 bisexual men ($p < .05$).

To summarize, consistent with the heterosexual stability hypothesis, among both women and men, those who identified as heterosexual at Wave 1 were less likely to report a change in sexual orientation identity at Wave 2 compared to those who reported a sexual minority identity. Among women, heterosexual identified women were less likely to change than women who reported either sexual minority identity, suggesting that the female sexual fluidity hypothesis applies to sexual minority women but not necessarily to heterosexual women. The bisexual fluidity hypothesis was supported only among men since men who reported a bisexual identity were significantly more likely to change sexual orientation identity than men who initially reported a homosexual identity whereas bisexual and homosexual women at Wave 1 did not significantly differ in their likelihood of changing sexual orientation identity.

Logistic Regression Analyses

Logistic regression analyses were used to examine the associations of gender and sexual orientation identity at Wave 1 with change in sexual orientation identity controlling for demographic variables (Table 3). Age, gender, visible minority status, and level of education were not significantly associated with sexual orientation identity change[3] (Table 3, Model 1). Those who identified as homosexual or bisexual at Wave 1 were significantly more likely to change sexual orientation identity than those who identified as heterosexual at Wave 1 (Table 3, Model 2). Of the two interactions tested, the homosexual Wave 1 by female interaction was statistically significant, but the bisexual Wave 1 by female interaction was not (Table 3, Model 3).

[3] To explore the possibility that the dichotomous race measure concealed a more complex pattern, additional analyses were conducted (not shown) comparing likelihood of sexual orientation identity change for African American, Hispanic, Asian, Native American, and "other" (includes multiracial) groups to white as the reference group, but no statistically significant associations were found.

In sum, the logistic regression analyses showed that those who identified as homosexual or bisexual at Wave 1 were significantly more likely to report a change in sexual orientation identity, in keeping with the heterosexual stability hypothesis (Table 3, Model 2). There was no main effect of gender (Table 3, Model 1), contrary to the female sexual fluidity hypothesis. Finally, the significant gender by homosexual interaction suggested that the likelihood of change for homosexual women was significantly greater than what was accounted for by the main effects for gender and homosexual identity. This finding suggests homosexual women are more likely to change than homosexual men, consistent with the substantially different percentages for change reported above for homosexual women (63.63%) and homosexual men (9.52%). Added to the findings that bisexual men were more likely to change than homosexual men, and bisexual and homosexual women do not differ in likelihood of change, the bisexual fluidity hypothesis applied better to men than it did to women.

Discussion

We tested three general patterns of sexual orientation identity stability and change, namely, heterosexual stability, female sexual orientation fluidity, and bisexual fluidity. Some support was found for each of these patterns and since we were able to make gender and sexual orientation identity comparisons, we can identify qualifications that need to be applied to these general patterns.

First, for both men and women heterosexuality was significantly more stable than homosexuality or bisexuality. This pattern was consistent with the hypothesis that heterosexuality is a more stable sexual orientation identity, perhaps because of its normative status. However, male homosexual identity, although less stable than heterosexual identity, was relatively stable compared to the other sexual minority identities.

Second, the results suggested that the female sexual orientation fluidity hypothesis applied to sexual minority women (Diamond, 2008), but the results did not support the notion that women's sexual orientation identity is generally less stable than

Table 3 Logistic regression of predictors of sexual orientation identity change over a 10-year period

Predictor	Model 1			Model 2			Model 3		
	B	SE	Wald	B	SE	Wald	B	SE	Wald
Constant	−3.07***	0.66	21.33	−4.51***	0.78	33.20	−4.08***	0.80	26.10
Age	−0.02	0.01	2.06	0.00	0.01	0.00	−0.01	0.01	0.06
Female	0.46	0.29	2.55	0.83*	0.35	5.82	0.48	0.41	1.34
Visible minority	0.13	0.53	0.06	0.02	0.62	0.01	−0.08	0.65	0.02
Education	−0.08	0.09	0.81	−0.16†	0.10	2.74	−0.17†	0.10	2.93
Homosexual Wave 1	–			3.93**	0.48	68.37	2.69**	0.83	10.50
Bisexual Wave 1	–			4.97***	0.43	135.35	4.87***	0.61	64.66
Interaction Terms									
Homosexual × Female	–			–			2.31*	1.07	4.69
Bisexual × Female	–			–			0.03	0.83	0.01

$n = 2{,}560$; $^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

men's sexual orientation identity. Indeed, we did not find a main effect for participant gender on sexual orientation identity change. Rather, gender interacted with initial sexual identity to predict identity change. Homosexual identity was less stable for women than it was for men, but there were no gender differences in the stability of either heterosexual identity or bisexual identity. Nearly half of the women who claimed a bisexual or a homosexual identity at Wave 1 claimed a different sexual identity label 10 years later. Research shows that women's sexuality tends to be more responsive to normative influences than men's sexuality (Baumeister, 2000) and this may be one explanation for why sexual minority women showed a pattern of sexual orientation identity fluidity.

Finally, there was evidence of bisexual fluidity, but it is important to note that the nature of this instability differed by gender. Specifically, for women, bisexuality was no less stable than homosexuality. In contrast, men's sexual identity showed more stability for both of the exclusive categories (i.e., heterosexual and homosexual) than for the bisexual category. The categorical nature of men's sexual arousal patterns (Chivers, Rieger, Latty, & Bailey, 2004) or low levels of support for bisexual identity in either the heterosexual or homosexual communities (Weinberg et al., 1994) may be potential reasons why bisexuality was a particularly fluid sexual orientation identity for men.

Although we had no specific predictions for the other demographic characteristics, it is perhaps surprising that there was no main effect for age. However, research on attitude stability and change suggests most change occurs in adolescence and young adulthood (Alwin & Krosnick, 1991; Krosnick & Alwin, 1989), which could explain the diminished impact of age after that point. Also, research on sexual orientation identity milestones among sexual minorities shows that age of self-identification as homosexual or bisexual tends to be in late adolescence and early adulthood (Floyd & Bakeman, 2006; Savin-Williams & Diamond, 2000). Thus, age may also play less of a role in sexual orientation identity stability and change among a midlife sample.

There were some limitations to the present analyses worth noting. Some key aspects of sexual orientation were not measured as distinct constructs in the MIDUS, including romantic attraction and the gender of a person's sexual partner or partners over time. Sexual identity, behavior, and attraction are not isomorphic and ideally each of these components of sexual orientation should be measured separately in the same study (Laumann et al., 1994; Savin-Williams, 2006). Also, an examination of stability and change of sexual identity would benefit from data collection at multiple time points (Diamond, 2008) as well as a broader range of sexual identity options (Diamond, 2003; Thompson & Morgan, 2008). A larger sample size would allow more detailed statistical analysis of potential explanatory factors or analysis of the potential direction of sexual orientation identity change rather than just presence or absence of change. Finally, in order to maximize the number of sexual minorities in the sample, we limited the nationally representative nature of the data by adding the urban oversample and half of the twin sample. Despite these limitations, the results of our analyses of heterosexual and sexual minority men and women over a 10-year period with national data suggest some important modifications to previous understandings of sexual identity stability and change.

References

Agresti, A. (2001). Exact inference for categorical data: Recent advances and continuing controversies. *Statistics in Medicine, 20*, 2709–2722.

Alwin, D. F., & Krosnick, J. A. (1991). Aging, cohorts, and the stability of sociopolitical orientations over the life span. *American Journal of Sociology, 97*, 169–195.

Baumeister, R. F. (2000). Gender differences in erotic plasticity: The female sex-drive as socially flexible and responsive. *Psychological Bulletin, 126*, 347–374.

Brim, O. G., Baltes, P. B., Bumpass, L. L., Cleary, P. D., Featherman, D. L., Hazzard, W. R., et al. (1996). *National survey of midlife development*

in the United States (MIDUS), 1995–1996. Boston: Department of Health Care Policy, Harvard Medical School.

Chivers, M. L., Rieger, G., Latty, E., & Bailey, J. M. (2004). A sex difference in the specificity of sexual arousal. *Psychological Science, 15*, 736–744.

Diamond, L. M. (2003). What does sexual orientation orient? A biobehavioral model distinguishing romantic love and sexual desire. *Psychological Review, 110*, 173–192.

Diamond, L. M. (2008). Female bisexuality from adolescence to adulthood: Results from a 10-year longitudinal study. *Developmental Psychology, 44*, 5–14.

Dickson, N., Paul, C., & Herbison, P. (2003). Same-sex attraction in a birth cohort: Prevalence and persistence in early adulthood. *Social Science and Medicine, 56*, 1607–1615.

Eaker, S., Bergström, R., Bergström, A., Adami, H.-O., & Nyren, O. (1998). Response rate to mailed epidemiologic questionnaires: A population-based randomized trial of variations in design and mailing routines. *American Journal of Epidemiology, 147*, 74–82.

Floyd, F. J., & Bakeman, R. (2006). Coming-out across the life course: Implications of age and historical context. *Archives of Sexual Behavior, 35*, 287–296.

Green, K. E. (1996). Sociodemographic factors and mail survey response. *Psychology & Marketing, 13*, 171–184.

Greenland, S., Schwartzbaum, J. A., & Finkle, W. D. (2000). Problems due to small samples and sparse data in conditional logistic regression analysis. *American Journal of Epidemiology, 151*, 531–539.

Herbenick, D., Reece, M., Schick, V., Sanders, S. A., Dodge, B., & Fortenberry, D. F. (2010). Sexual behavior in the United States: Results from a national probability sample of men and women ages 14–94. *Journal of Sexual Medicine, 7*(Suppl. 5), 255–265.

Kinnish, K. K., Strassberg, D. S., & Turner, C. W. (2005). Sex differences in the flexibility of sexual orientation: A multidimensional retrospective assessment. *Archives of Sexual Behavior, 34*, 173–183.

Krosnick, J. A., & Alwin, D. F. (1989). Aging and susceptibility to attitude change. *Journal of Personality and Social Psychology, 57*, 416–425.

Laumann, E., Gagnon, J. H., Michael, R. T., & Michaels, S. (1994). *The social organization of sexuality: Sexual practices in the United States*. Chicago: University of Chicago Press.

LeVay, S. (2010). *Gay, straight, and the reason why: The science of sexual orientation*. New York: Oxford University Press.

LeVay, S., & Valente, S. M. (2006). *Human sexuality* (2nd ed.). Sunderland, MA: Sinauer Associates.

Mays, V. M., & Cochran, S. D. (2001). Mental health correlates of perceived discrimination among lesbian, gay, and bisexual adults in the United States. *American Journal of Public Health, 91*, 1869–1876.

Mosher, W. D., Chandra, A., & Jones, J. (2005). Sexual behavior and selected health measures: Men and women 15–44 years of age, United States, 2002. *Advance Data (CDC), 362*. http://www.cdc.gov/nchs/data/ad/ad362.pdf. Accessed October 28, 2010.

Pattatucci, A. M. L., & Hamer, D. H. (1995). Development and familiality of sexual orientation in females. *Behavior Genetics, 25*, 407–420.

Preacher, K. J. (2001, April). Calculation for the chi-square test: An interactive calculation tool for chi-square tests of goodness of fit and independence [Computer software]. Available from http://quantpsy.org.

Preacher, K. J., & Biggs, N. E. (2001, May). Calculation for Fisher's Exact Test: An interactive calculation tool for Fisher's exact probability test for 2 × 2 tables [Computer software]. Available from http://quantpsy.org.

Rosario, M., Schrimshaw, E. W., Hunter, J., & Braun, L. (2006). Sexual identity development among lesbian, gay, and bisexual youths: Consistency and change over time. *Journal of Sex Research, 43*, 46–58.

Ryff, C., Almeida, D. M., Ayanian, J. S., Carr, D. S., Cleary, P. D., Coe, C., et al. (2006). *Midlife development in the United States (MIDUS II), 2004–2006*. Madison, WI: University of Wisconsin, Survey Center.

Savin-Williams, R. C. (2006). Who's gay? Does it matter? *Current Directions in Psychological Science, 15*, 40–44.

Savin-Williams, R. C. (2009). How many gays are there? It depends. In D. A. Hope (Ed.), *Nebraska symposium on motivation* (Vol. 54)*: Contemporary perspectives on lesbian, gay, and bisexual identities* (pp. 5–41). New York: Springer.

Savin-Williams, R. C., & Diamond, L. M. (2000). Sexual identity trajectories among sexual-minority youths: Gender comparisons. *Archives of Sexual Behavior, 29*, 607–627.

Savin-Williams, R. C., & Ream, G. (2007). Prevalence and stability of sexual orientation components during adolescence and young adulthood. *Archives of Sexual Behavior, 36*, 385–394.

Smith, T. W. (1992). A methodological analysis of the sexual behavior questions on the General Social Surveys. *Journal of Official Statistics, 8*, 309–325.

Smith, D. M., & Gates, G. J. (2001). *Gay and lesbian families in the United States: Same-sex unmarried partner households*. Washington, DC: Human Rights Campaign.

Sophie, J. (1986). A critical examination of stage theories of lesbian identity development. *Journal of Homosexuality, 12*, 39–51.

Spitzer, R. L. (2003). Can some gay men and lesbians change their sexual orientation? 200 participants reporting a change from homosexual to heterosexual orientation. *Archives of Sexual Behavior, 32*, 403–417.

Stokes, J. P., Damon, W., & McKirnan, D. J. (1997). Predictors of movement toward homosexuality: A longitudinal study of bisexual men. *Journal of Sex Research, 34*, 304–312.

Thompson, E. M., & Morgan, E. M. (2008). "Mostly straight" young women: Variations in sexual behavior and identity development. *Developmental Psychology, 44*, 15–21.

Weinberg, M. S., Williams, C. J., & Pryor, D. W. (1994). *Dual attraction: Understanding bisexuality*. New York: Oxford University Press.

Yates, F. (1934). Contingency table involving small numbers and the χ^2 test. *Journal of the Royal Statistical Society, 1*(Suppl.), 217–235.