Published in final edited form as:

J Adolesc. 2013 October ; 36(5): 953–961. doi:10.1016/j.adolescence.2013.07.008.

Multidimensional Characterization of Sexual Minority Adolescents' Sexual Safety Strategies

N. Tatiana Masters, Blair Beadnell, Diane M. Morrison, Marilyn J. Hoppe, and Elizabeth A. Wells

School of Social Work, Box 354900, University of Washington, Seattle, Washington 98105 USA

Abstract

Young adults have high rates of sexually transmitted infections (STIs). Sexual minority youths' risk for STIs, including HIV, is as high as or higher than sexual majority peers'. Sexual safety, while often treated as a single behavior such as condom use, can be best conceptualized as the result of multiple factors. We used latent class analysis to identify profiles based on ever-used sexual safety strategies and lifetime number of partners among 425 self-identified LGBTQ youth aged 14-19. Data collection took place anonymously online. We identified four specific subgroup profiles for males and three for females, with each subgroup representing a different level and type of sexual safety. Profiles differed from each other in terms of age and outness for males, and in outness, personal homonegativity, and amount of education received about sexual/romantic relationships for females. Youths' sexual safety profiles have practice implications for sexuality educators, health care professionals, and parents.

Keywords

Sexual minority youth; LGBTQ youth; STI/ HIV prevention; latent class analysis

The term "sexual minority youth" refers to a broad category of young people. One type includes those who identify as gay, bisexual, or unsure of their sexual orientation; report same-sex romantic attractions or relationships; or do both. Such individuals make up 3-7% of the youth population of the United States (Austin et al., 2004; IOM, 2011; Kann et al., 2011; Russell & Joyner, 2001). Additionally, some of these youth and yet others may identify as transgender, or otherwise perceive themselves as being other than their biological sex. While scientists have not yet estimated the number of such gender variant youth, population-based surveys suggest approximately 0.3 to 0.5 percent of US adults identify as transgender (Conron, 2011; Gates, 2011). These counts are tentative since sexual and gender identities can be fluid, especially during adolescence (Diamond, 2003), and there are a variety of pathways to a sexual minority identity (Rosario et al., 2008). While important differences exist among sexual minority youth (Diamond, 2003; Meezan & Martin, 2009), they have in common that society's reactions to them can put them in a position that includes heightened risks.

© 2013 The Association for Professionals in Services for Adolescents. Published by Elsevier Ltd. All rights reserved.

Corresponding author: N. Tatiana Masters, Mail: School of Social Work, Box 354900, University of Washington, Seattle WA 98105 USA, Phone: (206) 543-6764, tmasters@uw.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Adolescence is a time of high risk for sexually transmitted infections (STIs), including HIV. National estimates suggest that about half of each year's approximately 20 million new STI cases occur among 15 to 24 year olds (CDC, 2012). Additionally, although 13 to 29 year olds only make up about 21% of the US population, they represented 39% of new HIV infections in 2009 (CDC, 2011). Sexual minority youths' risk of STIs and HIV is at least as high as that of non-LGBTQ youth, and it may be even higher (Coker, Austin & Schuster, 2010; Garofalo et al., 1998; Goodenow, Netherland & Szalacha, 2002; Goodenow, Szalacha, Robin & Westheimer, 2008; Rosario, Meyer-Bahlburg, Hunter & Gwadz, 1999; Valleroy et al., 2000).

Examining sexual safety and risk behaviors among youth is important due to both short- and long-term implications. Behavioral patterns established during adolescence can have immediate harmful or beneficial effects on youths' health. Additionally, risk and safety practices may be carried forward into adulthood (Moore and Rosenthal, 2006; O'Sullivan et al., 2007). These practices create long-term implications given evidence of high STI/ HIV risk among sexual minority adults. For example, men who have sex with men continue to be more affected by HIV than any other group in the US (CDC, 2012), and other sexual minority adults (e.g., lesbian and transgender adults) are also vulnerable to STIs and HIV (Clements-Nolle et al., 2001; Marazzo, 2001; Marazzo et al., 2004). Knowledge regarding STI risk reduction among sexual minority youth has the potential to affect both youth themselves and the adults they will become.

Multidimensionally Characterizing Sexual Safety

Understanding factors relevant to STI risk reduction is challenging because they are interrelated and complex. Specifically, no single factor in isolation – such as condom use or number of partners – can fully explain an individual's level of safety versus risk. Sexual safety is best thought of as the outcome of a set of factors (such as sexual practices, partner numbers, and barrier use) that modify each other's influence on overall risk.

One way to grapple with the multivariate process by which sexual safety variables combine is to use approaches that emphasize patterns of behavior (Lanza & Collins, 2010). Doing so allows the identification of subgroups of people with similar patterns of sexual safety characteristics. Beadnell and colleagues (2005) identified three subgroup profiles for heterosexually active youth in grades 8 to 10 (Condom Users, Few Partners, and Risk-Takers) and four in grades 11 and 12 (Condom Users, One Partner, Two Partners, and Risk-Takers). Similarly, Lanza and Collins (2008) grouped adolescents according to multiple dimensions of their STI risk behavior. Both studies contribute to understanding multivariately determined safety and risk, but missing from the literature is the application of this approach to sexual minority youth.

Factors Associated with Sexual Safety

Understanding how multiple behaviors combine for groups of people is a first step that then raises other important questions. For example, researchers and practitioners can benefit from knowing what individual characteristics are associated with subgroup patterns of sexual safety and risk.

Several characteristics of youth may vary among sexual safety profile groups. For example, the combination of one's own sex and sex attracted to is an inherent part of the context for sexual behavior and sexual safety (Kaestle & Waller, 2011; Parkes et al., 2011; Pathela & Schillinger, 2010) because both are likely to affect the types of sex individuals have and their choices about safety strategies. Age is another factor likely to be associated with sexual risk and use of different safety strategies due to developmental changes and increased sexual

experience (Moilanen, Crockett, Raffaelli & Jones, 2010; Sales et al., 2012; Tubman, Windle & Windle, 1996; Tucker et al., 2012).

Two sexual minority-specific dimensions might also be expected to vary among sexual safety profile groups. One is youths' outness (degree to which their sexual minority status is known to others). While coming out is a complex process, overall, more outness is associated with less unprotected sex among sexual minority youth (Rosario, Hunter, Maguen, Gwadz & Smith, 2001). Another is personal homonegativity – internalization of social stigma based on sexual orientation (Mayfield, 2001) – which has been found to be associated with sexual risk. A qualitative study found that sexual minority youth reported that rejecting personal homonegativity protected them from harmful behaviors including unsafe sex (McDermott, Roen & Scourfield, 2008). Negative feelings regarding one's sexuality were also linked with riskier sexual behavior in some quantitative studies (e.g. Nakamura & Zea, 2010; Rosario et al., 2001).

Finally, a characteristic that may vary across different sexual safety profile groups is youths' level of knowledge regarding sexuality, particularly sexual minority-specific issues. Sexual minority youth at schools where sexuality and HIV-prevention education was sensitive to lesbian, gay, and bisexual issues reported less sexual risk behavior than those at schools where it was not (Blake et al., 2001).

Purpose and Research Questions

Safer sex interventions, including comprehensive sexuality education, often encourage increased condom use (Kirby, 2007; Mullen et al., 2002). While potentially very effective, no single sexual safety strategy is a one-size-fits-all proposition. Hence, multidimensional risk characterizations can inform sex education and safer sex interventions by providing information about the ways young people combine protective and risky behaviors.

The study examined two research questions regarding sexual minority youths' sexual safety strategies. First was whether we could use a latent variable approach to identify substantively meaningful sexual safety subgroups based on what strategies participants have used in their lifetimes. The latent variable method of mixture modeling allows not only the identification of subgroups that vary in their sexual safety, but also profiles describing exposures to risk and strategies for safety for each group. We derived empirical sexual safety profiles in a sample of self-identified lesbian, gay, bisexual, transgender, and queer or questioning (LGBTQ) youth aged 14 to 19. These profiles were based on eight variables – lifetime number of partners and use of seven different STI/ HIV risk reduction techniques. Given that males and females might differ in the types of profiles that exist, they were analyzed separately. The second question was whether profiles would be associated with variables linked with sexual safety or risk in LGBTQ youth. These questions are somewhat exploratory in nature, given that it is difficult to make firm hypotheses about differences between subgroups until their characteristics are known.

Method

The University of Washington's Institutional Review Board (IRB) approved all procedures. To decrease risk for participants, we obtained waivers of written and parental consent. Project participation was anonymous.

Recruitment

We recruited participants throughout the US via flyers sent to LGBTQ- and youth- focused organizations, email invitations sent to youth LGBTQ listservs, and Facebook. We aimed

Facebook ads at people whose online profiles identified them as 14 to 19 year old and interested in people of the same gender. Materials directed interested parties to the project website for screening. Eligibility criteria included being 14 to 19 years old, speaking English, and identifying as LGBTQ.

Procedures

Eligible participants were shown consent information and asked if they wished to participate. At the end of the survey, participants were asked if they wanted to receive a \$15 incentive, and if so, were logged out of the survey and directed to an independent company's website to select a gift card. Participants provided identifying information only to the gift card company and remained anonymous to the research team.

Because the study was carried out online, we took steps to ensure data integrity. Excluding two sets of cases determined by the incentive company to be multiple responding, a total of 710 individuals took the surveyⁱ. Of these, 109 (15.4%) were excluded from the final sample of 601. Forty-eight exited during the first quarter of the survey and did not have sufficient data for inclusion. Two others reported "intersex" as sex born as and were excluded since this was too small a subsample for meaningful analysis. Investigators used flags (e.g. repeated patterns of identical responses) to identify potential problem cases, reviewed them, and when most factors pointed to invalid data, dropped them from the data set. Fifty-nine cases were excluded in this way.

Measures

Number of sexual partners—Youth were asked if they had "ever had intimate physical experiences with another person." The examples provided were "kissing or making out, touching genitals, having a mouth on genitals, having a penis or finger in a vagina or anus (butthole), and using sex toys." If youth answered yes, they were asked "with how many people have you ever done any of these things?" Answer options ranged from "1" through "7 or more."

Sexual safety strategies—The questionnaire asked "Have you and someone you had intimate physical activities with ever..." The items that followed were "talked about safer sex," "discussed your sexual histories," "agreed to only do acts that you both feel are less risky," "agreed to make the acts you do be less risky," "agreed to be monogamous (neither person having sex with others)," "agreed to both get tested for HIV and STDs," "used condoms," and "used other kinds of 'barriers' like saran wrap, dental dams, or a female condom." Each item was answered "no," "yes," or "not sure." Rare "not sure" responses were recoded as "no." To remove partner gender from the last two items, we combined them by computing a barrier use variable that was "no" if youth had not used condoms or other barriers and "yes" if they had.

Sexual and romantic attractions—We asked "Who are you sexually attracted to? Check all that apply," and "Who would you like to be in a romantic relationship with? Check all that apply." Response options included "females," "males," "transgender FTM (born female but who see themselves as male)," "transgender MTF (born male but who see themselves as female)," "no one," and "not sure." We created a dichotomous variable that categorized participants as being sexually/romantically attracted to the same sex as

ⁱThe incentive company notified us if multiple incentives were requested within a short time span for the same email or postal address. We checked this information against the time stamps on survey completions and flagged these surveys as possibly invalid. This procedure retained anonymity.

themselves (sex born as) or to both sexes. No participants were attracted only to other-sex partners.

Gender identity—We asked participants to identify their sex assigned at birth with the prompt “I was born . . .” and the response categories “female,” “male,” or “intersex (born with both male and female genitals).” Participants specified gender identity by answering “Some people see themselves as the gender they were born as and some don’t. What gender or genders do you see yourself as? You can check more than one.” Response options were: “female,” “male,” “unsure,” and “none of these describe how I see myself.” We created a dichotomous variable that differentiated participants who identified as gender assigned at birth as one category, with the other category including those who identified as a different gender, as both genders, or as no gender or unsure (small numbers in these 3 groups prevented analyzing them separately).

Outness—Outness was assessed by asking “How many of these people know that you are LGBTQ?” For each group of people – extended family/relatives, heterosexual friends, LGBTQ friends, people in my religious community (e.g. church, temple), other heterosexual people, other LGBTQ people – response options were 0 “none,” 1 “some,” 2 “most,” 3 “all,” and 4 “does not apply”. We computed an outness scale that was the mean of these items (if a person answered 4, the item was not included in the mean score); its alpha was 0.87.

Personal homonegativity—We used the personal homonegativity scale of the Internalized Homonegativity Inventory (Mayfield, 2001), updating the language by substituting “being LGBTQ” for phrases like “my homosexuality.” The measure asked youth to “indicate how much you agree with these statements” and used response options of 0 “strongly disagree,” 1 “agree,” 2 “neither agree nor disagree,” 3 “disagree,” and 4 “strongly disagree.” The statements included 6 items such as “When I think of being LGBTQ I feel depressed.” The personal homonegativity score was the mean of these items, and had an alpha of 0.89.

Sexuality-related knowledge—Five items assessed how adequate youth found their knowledge about different aspects of sexual health. They used the stem “how much information have you received about...” followed by items such as “the ways that LGBTQ people can have satisfying romantic relationships,” and “how to protect yourself (from HIV, STDs, or pregnancy) during sexual activity.” Response options were 0 “none,” 1 “some, but there is more I could know,” 2 “I know most of what I need to know,” 3 “I know everything I need to know.” A small number of 4 “I don’t know” answers were recoded as 0 “none.”

Analytic Approach

We used mixture modeling to identify how sexual safety factors combined. Latent class analysis (LCA) is a mixture modeling approach that identifies groups of individuals, referred to as “classes”. Each class has a unique profile based on responses to a set of variables. LCA uses a latent variable approach that assumes the relationships among the set of indicator variables can be explained by a categorical latent variable. This variable identifies groups of people who are different from those in the other classes and similar to those in their own group.

We used MPlus 6.0 to conduct the LCA models. Given that male and female youth may differ in their safer sex strategies, we performed analyses separately by participants’ biological sex (assessed by responses to “I was born as male/ female”). While this strategy – which meant grouping transgender or gender questioning youth by sex at birth – is less-than-perfect, our sample contained too few such individuals to analyze separately. Accordingly,

to account for the role of gender identity, we examined the association between gender variance and the LCA profiles in the second analysis step.

We estimated several models for each sex, each specifying an increased number of classes, and compared models to identify the best solution using criteria recommended by Muthén and Muthén (2000): Classification quality, parametric bootstrapped likelihood ratio test, fit to data as calculated by the Bayesian Information Criterion value (BIC), interpretability, and classes' theoretical meaningfulness. We used Wald chi-square tests of equality (Muthén & Muthén, 2010) to examine whether and how class membership was associated with sexual attraction, gender variance, age, outness, personal homonegativity, and sexuality-related knowledge.

Results

Participants

The overall sample comprised 601 individuals. A total of 425 met the inclusion criterion for analyses presented here by having had at least one physically intimate experience with a partner. This group was 51% female (assessed by responses to “I was born as male/female”). Participants' mean age was 17 ($SD = 1.3$). The largest racial/ethnic group in the sample was white (70%); other participants were 6% African American, 2% Asian American/Pacific Islander, 5% Latino/a, and 17% multiracial. Sixty-three percent reported being sexually or romantically attracted to the same sex only, 37% to both sexes, and none to the other sex only. Participants' average number of lifetime sexual partners was 3.9 ($SD = 1.4$). Responses revealed some gender variance among participants: The majority (84%) identified their gender as same as assigned at birth, 5% saw themselves as a gender other than birth gender, 5% saw themselves as both male and female, and 6% reported gender as “none/unsure.”

Latent Class Analysis

Male youth—We identified four latent class groups among male youth (Table 1). Two had a relatively small number of sex partners. One had an average of 2 partners and reported relatively little use of any type of sexual safety strategy; we named this group Low Partner Numbers/Few Strategies. The other group, Low Partner Numbers/Many Strategies, reported a mean of 2.4 partners. They were likely to report having used a variety of safety strategies, most commonly those that involved communicating with partners. The other two male groups both had high partner numbers, but differed markedly on their use of sexual safety strategies. Relatively few youth in the first of these two groups reported use of strategies such as agreeing to avoid unsafe acts or to get tested. However, a moderate number reported use of barriers. We named this group High Partner Numbers/Few Strategies. In contrast, we characterized the second high partner number group as High Partner Numbers/Many Strategies based on relatively higher rates of having used most of the sexual safety strategies.

BIC values for the two, three, four, and five class models for male youth were 2679, 2671, 2650, and 2648. The BIC decreased between the 3- and 4-class models (21 points), but only negligibly between the 4- and 5-class models (2 points), suggesting that the 5-class model produced no further improvement in fit. Classification quality was good for the 4-class model, with class probabilities ranging from 0.89 to 0.94. Findings from the likelihood ratio tests were inconsistent. On one hand, the bootstrapped likelihood ratio test (BLRT) was significant at $p < .001$ for the three, four, and five class solutions (compared to the two, three, and four class models, respectively), suggesting that each solution was superior to the one with one fewer class. On the other hand, the Vuong-Lo-Mendell-Rubin likelihood ratio

test (LRT) was significant at $p < .01$ for the three (vs. two) class model and became nonsignificant for the four (vs. three) class model, suggesting that the three class model was best. Based on overall fit, classification quality, and theoretical meaningfulness, we chose the 4-class model as superior.

Female youth—We identified three latent class groups among female youth (Table 1). The young women's groups did not differ as strongly from one another regarding average partner numbers as did the young men's groups. The first group, characterized as Few Strategies, reported little use of most sexual safety strategies, but did report some use of discussing sexual histories and agreeing to be monogamous. Members of the second group, Many Strategies, were likely to report use of a variety of safety strategies, particularly those that involved negotiating with partners and restricting sexual behavior to decrease risk. The third group, Nearly All Strategies, had higher average partner numbers relative to other groups, along with high rates of use of nearly all sexual safety strategies.

BIC values for the two, three, and four class models were 2730, 2716, and 2714. The BIC decreased between 2- and 3-class models (14 points), but only negligibly between 3- and 4-class models (2 points). Classification quality was also good for the 3-class model with class probabilities ranging from 0.88 to 0.95. Findings from likelihood ratio tests were inconsistent. While the BLRT was significant at $p < .001$ for the two, three, and four class solutions, the LRT was significant at $p < .01$ for the two and three class models and became nonsignificant for the 4-class model. We selected the 3-class model as well-supported with clear theoretical meaningfulness.

Associations of Profile Group Membership

Male youth—Table 2 shows differences between classes among male youth. Male youth in the High Partner Numbers/Many Strategies and High Partner Numbers/Few Strategies groups were older on average than Low Partner Numbers/Few Strategies youth. Both “many strategies” groups had – as expected – larger numbers of strategies they used. Outness was higher on average in the High Partner Numbers/Many Strategies group compared to each other group. Not shown in Table 2, there were no significant differences between classes regarding either sexual attraction or gender variance. For sexual attraction, percents for each class respectively attracted to both sexes were 21%, 22%, 32%, and 22% ($\chi^2 = 1.46$, $df = 3$). For gender variance, the percent in each class who identified as gender variant (either a gender other than sex born as, both genders, or unsure) was 7%, 5%, 13%, and 8% ($\chi^2 = 1.45$, $df = 3$).

Female youth—Between-group comparisons appear in Table 3. Among female youth, age was not associated with group membership, nor was amount of information received about HIV and STI risk and protection. Outness was significantly higher, and personal homonegativity significantly lower, in the Nearly All Strategies group than among the Many Strategies group. Female youth in the Few Strategies group reported having less information about how LGBTQ people could have good romantic and sexual relationships than did youth in the other two groups. Not shown in Table 3, there were no significant differences between classes regarding either sexual attraction or gender variance. For sexual attraction, percents for each class respectively who were attracted to both sexes were 37%, 55%, and 59% ($\chi^2 = 5.86$, $df = 2$). For gender variance, the percent in each class who identified as gender variant was 21%, 35%, and 23% ($\chi^2 = 2.77$, $df = 2$).

Discussion

The profiles identified represent different levels of sexual safety, but as importantly, alternative ways youth approach sexual safety. By doing so, they capture the heterogeneity that exists among sexual minority youth, as well as the commonalities that exist within subgroups. The unique sexual safety profiles identified contain information that has important practice implications.

Youth in some groups used multiple sexual strategies in combination. Low Partner Numbers/Many Strategies young men had fairly low numbers of partners and used many sexual safety strategies; based on these factors, their risk exposure was likely very low. Youth with fewer partners, like those in this group, could be supported in their choice with the information that it may make them sexually safer. In contrast, High Partner Numbers/Many Strategies young men combined high average partner numbers with reported use of most sexual safety strategies, including barrier use. Youth in this group had higher average “outness” than male youth in any of the other groups. While their relatively high partner numbers could expose these youth to STIs, their diverse portfolio of sexual safety strategies seems to offer a strong measure of protection.

Among female youth, being in the Nearly All Strategies group was associated with being more “out” and having less personal homonegativity than young women in the other two groups. This finding suggests that the association between outness and sexual safety may not differ by gender, since both male and female groups who used multiple safety strategies with multiple partners were more out than youth in other groups. It makes sense that acknowledging and accepting oneself as a sexual minority individual would be linked with the frank communication required to use a variety of sexual safety strategies. The behavior patterns of the Nearly All Strategies group seemed likely to provide substantial protection against STIs.

One implication for practice with multiple strategy-using youth, regardless of their partner numbers, is the importance of helping them differentiate among and evaluate sexual safety strategies. Strategies such as monogamy require commitment and self-management from both partners to be effective. Others, such as discussing sexual histories, necessitate communication followed by action: If discussion reveals that one or both partners has been potentially exposed to an STI, effective risk reduction would also require some combination of using barriers, doing lower risk acts, and testing. Still other strategies, such as barrier use, can be more robustly reliable, but require building skills to make them work. This skills training could include explicit instruction in how to use barriers in ways that do not reduce sex’s emotional and physical pleasure, since not attending to these issues can reduce barrier use (Higgins & Hirsch, 2007; Philpott, Knerr, & Maher, 2006).

Two groups of young men, Low Partner/Few Strategies and High Partner/ Few Strategies, reported little use of most sexual safety strategies. While the first group appears to be at relatively low risk for STIs because of their low partner numbers, their nonuse of sexual safety practices potentially expose them to risk. There are many potential reasons for having a lower number of partners, ranging from conscious strategy to lack of opportunity, and it is likely some of these young men could easily move into a higher risk category. Hence, these male youth present a time-limited opportunity to inculcate sexual risk reduction techniques before increased sexual experience and partner accumulation begin making them vulnerable.

The second Few Strategies group combined minimal safety strategy use with high partner numbers. While these youths’ barrier use was higher than their use of other strategies, it was lower than that of most other male groups. Overall, their pattern of behavior was high risk. They were older, on average, than male youth in most of the other groups, and compared to

the High Partner Numbers/Many Strategies group, less out on average. Further research is needed to better understand the association of low outness and sexual risk-taking. In the meantime, interventions could provide non-judgmental education on the association of risk with having multiple sex partners. However, given that higher partner numbers are not inconsistent with gay male culture, equal attention should be paid to greater use of other sexual safety practices. A focus on increasing existing condom use may be profitable, since findings suggest this strategy may have slightly more traction with this subgroup than others.

Looking at young women, we identified a group we called Few Strategies. Few Strategies youth had moderate partner numbers but little use of most sexual safety strategies. They reported having less information about positive romantic and sexual relationships for LGBTQ people than female youth in the Many and Nearly All Strategies groups. These young women were at low-to-moderate risk for STIs from the perspective of partner numbers, but their other sexual practices exposed them to risk. Sex educators, parents, and health care providers could reach young women in this group with information about safer sex techniques that emphasized their use in the context of same- and (for sexual minority youth engaging in bisexual relationships) other-sex romantic and sexual relationships. Techniques such as instruction on integrating sexual safety strategies, e.g. dams, into a satisfying female-to-female encounter, skills-training on discussing safety strategies with partners, and guidance on creating healthy relationships could support these young women to be safer. Such education should take into account the variation among sexual minority individuals by not assuming that female sexual minority youth only have female sex partners.

Future Research Directions

Our study plants four seeds for future research. First, adolescence is a time of development and flux, and it seems likely that youths' sexual safety profiles may change over time. A longitudinal study could profitably examine sexual safety profiles at different ages and youths' transitions from one to another. Second – related to the first point – we found that sex of partner and gender identity did not differ across sexual safety subgroups. It is unclear whether those factors would remain unassociated with sexual safety profiles as people entered adulthood or if their identities or the sexes of their partners changed. Third, incorporating STI testing into future studies would better enable researchers to examine how profiles are associated with disease exposure. Finally, this study's focus on sexual minority youth was one of its strengths, as these young people's sexual safety strategies have not been characterized multidimensionally before. However, studies including both sexual majority and minority youth would allow areas of difference and similarity to be investigated, increasing our understanding of all youths' sexual safety needs.

Strengths and Limitations

Participation in this study was anonymous in hopes of encouraging a broader range of youth to participate. Our recruitment methods strove to account for within-group diversity among sexual minority youth (Diamond, 2003; Meezan & Martin, 2009). We recruited a national sample of youth, drawing participants from regional contexts with varying levels of political and social support for sexual minorities. Despite these strengths, it is important to keep in mind that the sample was largely composed of self-identified sexual minority youth, who may differ from those who do not openly label themselves as sexual minorities. It is also important to note that while we instituted strong monitoring and data cleaning procedures, we cannot be sure whether some cases of multiple responding occurred and were not detected. Additionally, participants answered only about sexual safety strategies they had ever used; future research should look at recent (e.g., previous several months) behavior.

It is important to note that the number of transgender and gender questioning youth in our sample was relatively small, so we could not perform LCA separately for them. Instead, we treated them according to their sex assigned at birth. While we identified no associations between gender variance and sexual safety subgroup, more research on this topic with larger samples is indicated.

Conclusion

This study's explication of the different sexual safety strategies of LGBTQ young people furthers our understanding of heterogeneity among sexual minority youth. Knowledge of youths' sexual safety profiles can shape the practices of sexuality educators and health care professionals in ways that may better meet each young person's specific needs. In addition to guiding practice, our findings also have implications for research on sexual risk reduction with youth.

Acknowledgments

This research was supported by a grant from the National Institute of Mental Health (R21 MH075030-02, Adolescent Challenges and Strengths in HIV Prevention) to Blair Beadnell.

References

- Austin SB, Ziyadeh N, Fisher LB, Kahn JA, Colditz GA, Frazier AL. Sexual orientation and tobacco use in a cohort study of US adolescent girls and boys. *Archives of Pediatric & Adolescent Medicine*. 2004; 158:317–322.
- Beadnell B, Morrison DM, Wilson A, Wells EA, Murowchick E, Hoppe M, Gillmore MR, Nahom D. Condom use, frequency of sex, and number of partners: Multidimensional characterization of adolescent sexual risk-taking. *Journal of Sex Research*. 2005; 42(3):192–202. [PubMed: 19817033]
- Blake SM, Lesky R, Lehman T, Goodenow C, Sawyer R, Hack T. Preventing sexual risk behaviors among gay, lesbian, and bisexual adolescents: The benefits of gay-sensitive HIV instruction in schools. *American Journal of Public Health*. 2001; 91:940–946. [PubMed: 11392938]
- Centers for Disease Control. [Accessed February 2012] HIV Surveillance Report, 2009. 2011. Published February 2011. Available at www.cdc.gov/hiv/surveillance/resources/reports/2009report/
- Centers for Disease Control. STD Trends in the United States, 2011: National data for chlamydia, gonorrhea, and syphilis. U.S. Department of Health and Human Services; Atlanta: 2012. Available at www.cdc.gov/std/stats11/trends-2011.pdf [Accessed July 2013]
- Centers for Disease Control. [Accessed August 2012] Fact sheet: HIV among gay and bisexual men. 2012. Published May 2012. Available at www.cdc.gov/hiv/topics/msm/pdf/msm.pdf
- Clements-Nolle K, Marx R, Guzman R, Katz M. HIV prevalence, risk behaviors, health care use, and mental health status of transgender persons: implications for public health intervention. *American Journal of Public Health*. 2001; 91(6):915–921. [PubMed: 11392934]
- Coker TR, Austin SB, Schuster MA. The health and health care of lesbian, gay, and bisexual adolescents. *Annual Review of Public Health*. 2010; 31:457–477.
- Conron KJ, Scott G, Stowell GS, Landers S. Transgender health in Massachusetts: Results from a household probability sample of adults. *American Journal of Public Health*. 2012; 102(1):118–122. [PubMed: 22095354]
- Diamond L. New paradigms for research on heterosexual and sexual minority development. *Journal of Clinical Child and Adolescent Psychology*. 2003; 32(4):490–498. [PubMed: 14710457]
- Garofalo R, Wolf RC, Kessel S, Palfrey SJ, DuRant RH. The association between health risk behaviors and sexual orientation among a school-based sample of adolescents. *Pediatrics*. 1998; 101:895–902. [PubMed: 9565422]
- Gates, GJ. How many people are lesbian, gay, and transgender?. The Williams Institute, UCLA School of Law; Los Angeles, CA: 2011.

- Goodenow C, Netherland J, Szalacha L. AIDS-related risk among adolescent males who have sex with males, females, or both: evidence from a statewide survey. *American Journal of Public Health*. 2002; 92(2):203–210. [PubMed: 11818292]
- Goodenow C, Szalacha LA, Robin LE, Westheimer K. Dimensions of sexual orientation and HIV-related risk among adolescent females: Evidence from a statewide survey. *American Journal of Public Health*. 2008; 98(6):1051–1058. [PubMed: 18445809]
- Higgins JA, Hirsch JS. The pleasure deficit: Revisiting the “sexuality connection” in reproductive health. *International Family Planning Perspectives*. 2007; 33(3):133–139. [PubMed: 17938096]
- IOM (Institute of Medicine). *The health of lesbian, gay, bisexual, and transgender people: Building a foundation for better understanding*. The National Academies Press; Washington, DC: 2011.
- Kaestle CE, Waller MW. Bacterial STDs and perceived risk among sexual minority young adults. *Perspectives on Sexual and Reproductive Health*. 2011; 43(3):158–163. [PubMed: 21884383]
- Kann, L.; O'Malley-Olsen, E.; McManus, T.; Kinchen, S.; Chyen, D.; Harris, WA.; Wechsler, H. Sexual identity, sex of sexual contacts, and health-risk behaviors among students in grades 9–12 – Youth Risk Behavior Surveillance selected sites, United States, 2001–2009. *Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report. Early Release*. Vol. 60. Office of Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control, U.S. Dept. of Health and Human Services; Atlanta GA: Jun 6. 2011
- Kirby, D. *Emerging answers 2007: Research findings on programs to reduce teen pregnancy and sexually transmitted diseases*. The National Campaign to Prevent Teen and Unplanned Pregnancy; Washington, DC: 2007. Available at http://www.thenationalcampaign.org/EA2007/EA2007_full.pdf [Accessed July 2013]
- Lanza ST, Collins LM. A new SAS procedure for latent transition analysis: Transitions in dating and sexual risk behavior. *Developmental Psychology*. 2008; 44(2):446–456. [PubMed: 18331135]
- Lanza, ST.; Collins, LM. *Latent class and latent transition analysis with applications in the social, behavioral, and health sciences*. John Wiley & Sons; Hoboken, NJ: 2010.
- Marrazzo JM, Koutsky LA, Handsfield HH. Characteristics of female sexually transmitted disease clinic clients who report same-sex behavior. *International Journal of STD-AIDS*. 2001; 12:41–46. [PubMed: 11177481]
- Marrazzo JM, Stine K. Reproductive health history of lesbians: Implications for care. *American Journal of Obstetrics and Gynecology*. 2004; 190:1298–1304. [PubMed: 15167833]
- Mayfield W. The development of an Internalized Homonegativity Inventory for gay men. *Journal of Homosexuality*. 2001; 41(2):53–76. [PubMed: 11482428]
- McDermott E, Roen K, Scourfield J. Avoiding shame: Young LGBT people, homophobia and self-destructive behaviours. *Culture, Health & Sexuality*. 2008; 10(8):815–829.
- Meezan, W.; Martin, JI. *Handbook of research with lesbian, gay, bisexual, and transgender populations*. Routledge; New York, NY: 2009.
- Moilanen KL, Crockett LJ, Raffaelli M, Jones BL. Trajectories of sexual risk from middle adolescence to early adulthood. *Journal of Research on Adolescence*. 2010; 20(1):114–139.
- Moore, S.; Rosenthal, D. *Sexuality in adolescence: Current trends*. 2nd ed.. Routledge; New York, NY: 2006.
- Mullen PD, Ramirez G, Strouse D, Hedges LV, Sogolow E. Meta-analysis of the effects of behavioral HIV prevention interventions on the sexual risk behavior of sexually experienced adolescents in controlled studies in the United States. *Journal of Acquired Immune Deficiency Syndromes*. 2002; 30:S94–S105. [PubMed: 12107363]
- Muthén B, Muthén LK. Integrating person-centered and variable-centered analyses: Growth mixture modeling with latent trajectory classes. *Alcoholism: Clinical and Experimental Research*. 2000; 24:882–891.
- Muthén, B.; Muthén, LK. Equality test of means across latent classes using Wald Chi-Square based on draws from posterior probabilities. 2010. Retrieved from Muthén & Muthén website: <http://www.statmodel.com/download/meantest2.pdf>
- Nakamura N, Zea MC. Experiences of homonegativity and sexual risk behaviour in a sample of Latino gay and bisexual men. *Culture, Health and Sex*. 2010; 12(1):73–85.

- O'Sullivan LF, Cheng MM, Harris KM, Brooks-Gunn J. I wanna hold your hand: The progression of social, romantic and sexual events in adolescent relationships. *Perspectives on Sexual and Reproductive Health*. 2007; 39(2):100–107. [PubMed: 17565623]
- Padian N, Hitchcock P, Fullilove R, Kohlstadt V, Brunham R. Report on the NIAID Study Group. Part I: Issues in defining behavioral risk factors and their distribution. *Sexually Transmitted Diseases*. 1990; 17:200–204. [PubMed: 2264009]
- Parkes A, Strange V, Wight D, Bonell C, Copas A, Henderson M, Buston K, Stephenson J, Johnson A, Allen E, Hart G. Comparison of teenagers' early same-sex and heterosexual behavior: UK data from the SHARE and RIPPLE studies. *Journal of Adolescent Health*. 2011; 48:27–35. [PubMed: 21185521]
- Pathela P, Schillinger JA. Sexual behaviors and sexual violence: Adolescents with opposite-, same-, or both-sex partners. *Pediatrics*. 2010; 126(5):879–886. [PubMed: 20974791]
- Philpott A, Knerr W, Maher D. Promoting protection and pleasure: Amplifying the effectiveness of barriers against sexually transmitted infections and pregnancy. *Lancet*. 2006; 368(9551):2028–2031. [PubMed: 17141710]
- Rosario M, Scrimshaw EW, Hunter J. Predicting different patterns of sexual identity development over time among lesbian, gay, and bisexual youths: A cluster analytic approach. *American Journal of Community Psychology*. 2008; 42:266–282. [PubMed: 18972204]
- Rosario M, Hunter J, Maguen S, Gwadz M, Smith R. The coming-out process and its adaptational and health-related associations among gay, lesbian, and bisexual youths: Stipulation and exploration of a model. *American Journal of Community Psychology*. 2001; 29(1):133–160. [PubMed: 11439825]
- Rosario M, Meyer-Bahlburg HF, Hunter J, Gwadz M. Sexual risk behaviors of Gay, Lesbian, and bisexual youths in New York City: Prevalence and correlates. *AIDS Education & Prevention*. 1999; 11(6):476–496. [PubMed: 10693645]
- Russell S. Beyond risk: resilience in the lives of sexual minority youth. *Journal of Gay & Lesbian Issues in Education*. 2005; 2(3):5–18.
- Russell ST, Joyner K. Adolescent sexual orientation and suicide risk: Evidence from a national study. *American Journal of Public Health*. 2001; 91(8):1276–1281. [PubMed: 11499118]
- Sales JM, Brown JL, DiClemente RJ, Davis TL, Kottke MJ, Rose ES. Age differences in STDs, sexual behaviors, and correlates of risky sex among sexually experienced adolescent African-American females. *Journal of Pediatric Psychology*. 2012; 37(1):33–42. [PubMed: 21933811]
- Savin-Williams, RC. *The new gay teenager*. Harvard University Press; Cambridge, MA: 2005.
- Tubman JG, Windle M, Windle RC. Cumulative sexual intercourse patterns among middle adolescents: Problem behavior precursors and concurrent health risk behaviors. *Journal of Adolescent Health*. 1996; 18:182–191. [PubMed: 8777194]
- Tucker JS, Hu J, Golinelli D, Kennedy DP, Green HD, Wenzel SL. Social network and individual correlates of sexual risk behavior among homeless young men who have sex with men. *Journal of Adolescent Health*. 2012; 51(4):386–392. [PubMed: 22999840]
- Valleroy L, MacKellar D, Karon J, Rosen DH, McFarland W, Shehan DA, Stoyanoff SR, LaLota M, Celentano DD, Koblin BA, Thiede H, Katz MH, Torian LV, Janssen RS, the Young Men's Survey Study Group. HIV prevalence and associated risks among young men who have sex with men. *Journal of the American Medical Association*. 2000; 284:198–204. [PubMed: 10889593]

Table 1

Sexual safety strategy profiles among male and female youth (n = 425): Proportions of latent class groups reporting use of strategy and mean number of lifetime sex partners

LCA indicator	Latent class groups					
	Male youth (n = 208)			Female youth (n = 217)		
	Low Partner Numbers (n = 47)		High Partner Numbers (n = 161)	Low Partner Numbers (n = 77)		Nearly All Strategies (n = 100)
	Few Strategies (n = 47)	Many Strategies (n = 77)	Few Strategies (n = 33)	Many Strategies (n = 51)	Few Strategies (n = 77)	Many Strategies (n = 40)
Talked about safer sex	0.21	0.82	0.62	0.91	0.22	0.63
Discussed sexual histories	0.49	0.83	0.62	0.92	0.69	0.72
Agreed to do only low risk acts	0.11	0.88	0.00	0.80	0.08	0.91
Agreed to make acts done lower risk	0.07	0.85	0.05	0.91	0.04	1.00
Agreed to be monogamous	0.22	0.71	0.54	0.84	0.59	0.61
Agreed to get HIV/STI testing	0.11	0.33	0.16	0.55	0.06	0.18
Used barriers (condoms or dams)	0.24	0.67	0.64	0.77	0.32	0.46
Number of lifetime partners	2.01	2.40	6.51	6.43	3.60	2.58
						4.79

Table 2

Between-class comparisons among male youth (n = 208) on demographic, sexual minority experience, and sex-related information factors and number of sexual safety strategies used

	Latent Class Groups									
	Low Partner Numbers					High Partner Numbers				
	Few Strategies (n = 47)		Many Strategies (n = 77)			Few Strategies (n = 33)		Many Strategies (n = 51)		
	M	SE	M	SE	M	M	SE	M	SE	Omnibus ² (df)
Age (years)	16.64 _{a, b}	.23	17.04	.15	17.43	.21	17.55 _b	.14	15.93 (3)	**
Outness (0-3)	1.91 _a	.13	1.98 _b	.09	1.87 _c	.14	2.25 _{a, b, c}	.10	7.96 (3)	*
Homonegativity (0-4) Information received about...	1.08	.16	1.28	.11	1.18	.18	1.02	.13	2.47 (3)	
LGBTQ romantic relationships (0-3)	1.64	.16	1.56	.13	1.76	.21	1.69	.14	.74 (3)	
LGBTQ sexual relationships (0-3)	1.89	.16	1.71	.12	1.88	.20	1.87	.14	.89 (3)	
Ways you could get HIV (0-3)	2.53	.11	2.55	.10	2.37	.18	2.59	.10	.75 (3)	
Ways you could get an STI (0-3)	2.48	.11	2.43	.10	2.47	.15	2.44	.11	.07 (3)	
How to protect yourself during sexual activity (0-3)	2.64	.09	2.52	.09	2.51	.16	2.67	.08	2.12 (3)	
Number of sexual safety strategies used (0-7)	1.43 _{a, b, c}	.20	5.08 _{a, d, e}	.16	2.63 _{b, d, f}	.30	5.69 _{c, e, f}	.18	238.42 (3)	***

Table notes:

There were no significant differences between classes regarding either sexual attraction (same-sex only versus both sexes) or gender variance (absent versus present); see text.

When the omnibus test is significant, values in a row that share the same subscripts differ at least at p < .05.

* p < .05,

** p < .01,

*** p < .001

Table 3

Between-class comparisons among female youth (n = 217) on demographic, sexual minority experience, and sex-related information factors and number of sexual safety strategies used

	Latent Class Groups						Omnibus ² (df)
	Few Strategies (n = 77)		Many Strategies (n = 40)		Nearly All Strategies (n = 100)		
	M	SE	M	SE	M	SE	
Age (years)	16.89	.17	16.63	.22	17.02	.14	2.34 (2)
Outness (0-3)	1.69	.10	1.44 _a	.13	1.93 _a	.08	10.51 (2) **
Homonegativity (0-4) Information received about...	1.07	.11	1.27 _a	.15	.80 _a	.08	8.35 (2) *
LGBTQ romantic relationships (0-3)	1.51 _{a, b}	.13	2.15 _a	.17	1.97 _b	.12	10.29 (2) **
LGBTQ sexual relationships (0-3)	1.52 _{a, b}	.12	2.08 _a	.18	2.09 _b	.11	10.20 (2) **
Ways you could get HIV (0-3)	2.41	.09	2.44	.12	2.68	.07	4.63 (2)
Ways you could get an STI (0-3)	2.29	.10	2.42	.13	2.61	.08	4.34 (2)
How to protect yourself during activity (0-3)	2.47	.09	2.61	.10	2.73	.07	2.89 (2)
Number of sexual safety strategies used (0-7)	2.00 _{a, b}	.14	4.52 _{a, c}	.20	5.78 _{b, c}	.12	420.30 (2) ***

Table notes:

There were no significant differences between classes regarding either sexual attraction (same-sex only versus both sexes) or gender variance (absent versus present); see text.

When the omnibus test is significant, values in a row that share the same subscripts differ at least at p < .05.

* p < .05,

**

p < .01,

p < .001