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Condoms and Contexts: Profiles of Sexual Risk and Safety Among Young Heterosexually Active Men

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Abstract

Heterosexual men's sexual safety behavior is important to controlling the U.S. epidemic of sexually transmitted infections (STIs), including HIV. While sexual safety is often treated as a single behavior, such as condom use, it can also be conceptualized as resulting from multiple factors. Doing so can help us achieve more nuanced understandings of sexual risk and safety within partner-related contexts. We used Latent Class Analysis with data collected online from 18-25 year old heterosexually active U.S. men ($n = 432$) to empirically derive a typology of the patterns of sexual safety strategies they employ. Indicators were sexual risk reduction strategies used in the past year with the most recent female sex partner: Condom use, discussing sexual histories, STI testing, agreeing to be monogamous, and discussing birth control. We identified four subgroups: Risk Takers (12%), Condom Reliers (25%), Multistrategists (28%), and Relationship Reliers (35%). Partner-related context factors – number of past-year sex partners, relationship commitment, and sexual concurrency – predicted subgroup membership. Findings support tailoring STI prevention to men's sexual risk-safety subgroups. Interventions should certainly continue to encourage condom use, but should also include information on how partner-related context factors and alternate sexual safety strategies can help men reduce risk for themselves and their partners.

Sexually transmitted infections (STIs) including HIV, continue to put the health of young people in the United States at substantial risk. Approximately half of each year's 20 million new STI cases occur among 15 to 24 year olds, though this group represents only about 25% of the sexually active U.S. population (Centers for Disease Control (CDC), 2012; Weinstock, Berman, & Cates, 2004). In addition to the human costs of STIs, associated medical costs to the U.S. healthcare system have been estimated at \$16 billion per year (Owusu-Edusei et al., 2013).

Heterosexual men's behavior is important to controlling the epidemic of STIs and HIV for heterosexual women as well as for men themselves, but until recently, research on

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^aBecause the programming only counted a survey against the quota once it was completed and submitted, slightly over 100 men in some categories participated.

heterosexual risk reduction has focused more on women (Bowleg et al., 2013; Edwards, Barber & Dziurawiec, 2013; Exner, Gardos, Seal & Ehrhardt, 1999; Higgins, Hoffman & Dworkin, 2010; Kennedy et al., 2013; Phillips & Pirkle, 2011). While this is partly because disease transmission is more efficient from men to women than vice versa (Haverkost & Quinn, 1995), this state of affairs also parallels tendencies to emphasize the vulnerability of women (Dworkin, 2005) and to place responsibility for protection on them (Campbell, 1995). It may stem from a worldview that stereotypes heterosexual men as sexual risk takers who are likely to pressure women to have unprotected intercourse and women, in contrast, as more concerned about sexual safety and the prevention of STIs, HIV, and pregnancy (Higgins et al., 2010).

Research on the sexual risk of men who have sex with women has increased in the 21st century (e.g., Bowleg et al., 2013; French & Holland, 2013; Kennedy et al., 2013; Kershaw, Arnold, Gordon, Magriples, & Niccolai, 2012; Oparanozie, Sales, DiClemente & Braxton, 2012; O'Sullivan, Hoffman, Harrison & Dolezal, 2006; Walsh, Senn, Scott-Sheldon, Vanable, & Carey, 2012). Factors such as masculinity norms and heterosexual scripts influence men's sexual behavior in ways that may increase risk both for them and their female partners (Santana, Raj, Decker, LaMarche & Silverman, 2006; Wade, 2008), and men differ in the extent to which their behavior conforms to these scripts (Masters, Casey, Wells & Morrison, 2013). Additional research with heterosexual men is thus both important in itself and a critical complement to prevention research with women.

Sexual Safety: Multidimensional Patterns of Behavior

To achieve sexual risk reduction, we also need to develop a more nuanced understanding of sexual risk and safety practices. Much research on HIV and STI prevention through sexual safety has focused on condom use (Albarracín et al., 2005; Logan, Cole, & Leukefeld, 2002), for good reasons. Condom use is potentially responsive to interventions and protects against HIV/AIDS, STIs, and pregnancy. Condoms are also inexpensive, easy to learn to use, available without prescription, and without medical side effects. However, while relatively easy to measure, condom use alone does not necessarily reflect overall sexual safety. It is possible to be sexually safe without using condoms (e.g., by having a mutually monogamous relationship with a disease-free partner who uses another contraception method like the birth control pill). Similarly, it is possible to use condoms and still be exposed to high levels of risk (e.g., by using condoms inconsistently in situations where one or both partners have concurrent partners and no other pregnancy prevention method is used).

Although sexual risk reduction among young people has focused to a great degree on promoting condom use, or, in the case of pregnancy prevention, contraceptive use, there has been a continuing thread recognizing the importance of partner communication (DiClemente, 1991; DiIorio, Dudley, Lehr & Soet, 2000; Manlove, Franzetta, Ryan & Moore, 2006; Manning, Giordano, Longmore & Flanigan, 2012; Rickman et al., 1994; Sales et al., 2012). Particularly among young women, communication specific to negotiating condom use with a male partner has been found to be related to higher levels of condom use (Peasant, Parrap, & Okwumabua, (2014)). Similarly, communication with male partners

about contraception has been related to more consistent contraceptive use (Manlove et al., 2006). There is also evidence that communication about other sexual safety topics – including partner’s sexual history, pregnancy prevention, and preventing STIs and HIV – is related to reduced risk behavior (Sales et al., 2012). However, findings are mixed; DiIorio et al. (2000) found that responses to the communication subscale of the Safe Sex Behavior Questionnaire were not related to self-reported condom use in a large sample of college students. It is not known definitively whether communication with partners about various sexual safety topics predicts variance in STI, pregnancy, or HIV outcomes. However, if individuals perceive communication about these topics as a way of reducing STI risk, their engaging in this communication becomes part of their pattern of sexual risk reduction strategies.

The use of a particular strategy (e.g., a communication-related method such as asking for a partner’s sexual history) may be related to the use of others (e.g., condoms). Different methods of preventing STIs and pregnancy – condoms, female-controlled contraceptives, STI testing – may be combined in patterns that make other methods seem less necessary and lead to their nonuse or cessation. For example, a man who is primarily concerned with disease prevention may use condoms consistently, be protected against STIs and also incidentally against causing a pregnancy, and never perceive the need to discuss birth control use or STI testing with his partners. Another man, more concerned with preventing pregnancy than STIs, may encourage his female partners’ use of contraception and cease condom use.

Partner-Related Contexts of Sexual Safety Patterns

Of course, men do not make decisions about their patterns of prevention method use in a vacuum. The partner-related context of sexual events both shapes men’s selection of strategies for sexual safety and influences their overall risk level. This context includes factors like commitment, monogamy, and prior sexual history. For example, a man who has had multiple partners in the recent past may be aware he is at risk for having already acquired an STI (Padian, Hitchcock, Fullilove, Kohlstadt & Brunham, 1990), and therefore use barrier protection in any new relationship. The same is true if the man or his partner is known to have other concurrent partners, which creates heightened STI risk (Morris, Kurth, Hamilton, Moody, & Wakefield, 2009). In addition to monogamy, a man’s decision about the appropriateness of condom use in a particular situation also may depend on his beliefs about whether his partner is using another birth control method (and using it effectively). As a relationship develops, a man may forgo his initial condom use when his partner obtains an intrauterine device or goes on the pill. If this relationship continues to be monogamous, both partners may see themselves as well-protected against STIs and pregnancy even without condom use. If – as frequently occurs – the relationship is perceived to be monogamous but is not (Drumright, Gorbach, & Holmes, 2004), the perception itself may yet substantially decrease the likelihood of condom use. Evidence suggests that men use condoms more often for intercourse with casual and non-relationship partners; when intercourse is infrequent; or early in a relationship before female-controlled methods, such as birth control pills or intrauterine devices, are adopted (Gebhardt, Kuyper, & Greunsvan, 2003; Hoefnagels, Hoppers, Hosman, Schouten, & Schaalma, 2006).

Understanding Multidimensional Sexual Safety Patterns

One way to begin to understand how factors combine to produce an individual's type and level of sexual risk and safety is to use statistical approaches such as mixture modeling that emphasize patterns of behaviors rather than single behaviors (Collins & Lanza, 2010). Lanza and Collins (2008) demonstrated the potential of these methods by empirically identifying subgroups of 17 to 20 year old adolescents based on their patterns of dating and sexual behavior over the past year: Number of dating partners, sex (no/yes), number of sexual partners, and unprotected sex (no/yes). They used data from the National Longitudinal Survey of Youth and identified five groups: Nondaters, Daters, Monogamous, Multipartner Safe, and Multipartner Exposed. Beadnell and colleagues (2005) used similar techniques to identify profiles of sexual risk and safety among younger adolescents, basing these profiles on respondents' number of sexual partners, acts of intercourse, and consistency of condom use in their current school year. Among sexually active youth in grades 8 to 10, they found three groups (Condom Users, Few Partners, and Risk Takers), and among students in grades 11 and 12, four groups (Condom Users, One Partner, Two Partners, and Risk Takers). Among sexual minority youth aged 14 to 19, Masters, Beadnell, Morrison, Wells, and Hoppe (2013) used latent class analysis (LCA) to identify profiles based on sexual safety strategies (e.g., condoms/dams, monogamy, STI testing) ever used and lifetime number of sexual partners. They identified three subgroups for female youth (Few strategies, Many strategies, and Nearly all strategies) and four for male youth (Low partner numbers/Few strategies, Low partner numbers/Many strategies, High partner numbers/Few strategies, High partner numbers/Many strategies). Female groups did not differ as strongly from one another regarding average partner numbers as did male groups.

These studies complement perspectives that look at sexual risk subgroups based on researcher definitions and single variables, such as epidemiological studies that identify a "core" group of high-risk individuals based on high numbers of past-year partners (e.g., Humblet, Paul & Dickson, 2003). No work has yet employed LCA to identify empirically-based risk-safety groups of heterosexually active young adult men. Doing so would be useful, given that risk profiles may differ according to both age (Beadnell et al., 2005) and gender (Masters, Beadnell et al., 2013).

Demographic Associations with Sexual Safety Patterns

Prevention science can benefit from knowledge about individual characteristics that are associated with these patterns of sexual safety and risk. Factors such as age, socioeconomic status (SES), and race/ethnicity that are associated with differences in sexual behavior among men are also likely to be differentially associated with sexual risk-safety subgroups, and these groups may demand differently tailored prevention approaches. For example, as young men gain experience, and as they transition from exploring options to establishing ongoing relationships, their sexual risk behavior and safety strategies may change. Data from the National Health and Social Life Survey (NHSLs), a large and nationally representative sample of 18 to 59 year-olds, found an age difference in rates of having three or more partners in the past year, with older men having a lower likelihood than younger men (Mahay, Laumann & Michaels, 2001). Exploring and establishing romantic and sexual

relationships are central developmental tasks of the late teens through mid- to late twenties (Clark & Beck, 2011; Lefkowitz, Gillen & Vasilenko, 2011). It is not known how much developmental change in sexual safety strategies occurs during this period of emerging adulthood.

Group differences in patterns of sexual behavior by race/ethnicity and SES have also been widely documented. The NHLS demonstrated higher numbers of recent partners, rates of premarital sex, and likelihood of first sex before age 16 among African Americans compared to whites and Latinos. Whites and Latinos were generally similar to one another, although Latino men had higher rates of first sex before age 16 (Mahay et al., 2001). Data from the large and nationally representative National Longitudinal Study of Adolescent Health (Add Health) mirrored these differences (Blum et al., 2000). Upchurch, Levy-Stors, Sucoff and Aneshensel (1998) also included Asian Americans in their representative regional sample of Los Angeles County, and reported significantly higher ages at first intercourse relative to other ethnicities. Similarly, Meston and Ahrold (2010) documented more sexually conservative behaviors among Asian American college students compared to whites and Latinos. Differences associated with race/ethnicity also raise the question of whether socioeconomic status (SES) is related to sexual behavior variability among men. Multivariate logistic regression with the NHLS data indicated that while education level (representing SES) was related to some sexual behaviors – such as having first sex before age 16 – it did not entirely mediate the effects of race/ethnicity.

Members of a nonwhite ethnic or racial group may share a cultural heritage that is distinct from mainstream U.S. culture in some ways yet overlaps with it in others. For example, many of the sexual aspects of machismo, understood as a Latino-specific masculinity, overlap with hegemonic U.S. masculine sexual culture. These aspects include the belief that men have stronger “sex drives” than women and seek sexual variety (Falicov, 2010; Seal, Wagner-Raphael & Ehrhardt, 2000). Cultural norms of this type may influence group members’ behavior in multiple domains including the sexual (Hall, Teten, DeGarmo, Sue & Stephens, 2005). Structural factors may also interact with culture to shape men’s sexual behavior. For example, both men of low SES, and some racial or ethnic minority men, may lack access to some expressions of mainstream masculinity such as having a prestigious career. They may thus focus on those expressions of hegemonic masculinity that are available to them, such as sex with multiple partners (Connell, 2002). Both cultural and structural influences may lead to members of different racial/ethnic groups making up different proportions of identified sexual risk-safety subgroups. These ideas provide our rationale for testing such differences. Additionally, racial/ethnic disproportionality in HIV/STI rates (CDC, 2013) makes considering such differences undeniably important from a public health perspective.

Purpose and Research Questions

Characterizations of different subgroups have the potential to increase our understanding of young men’s strategies for ensuring (or ignoring) sexual safety. Information on such subgroups can potentially inform interventions by allowing the match of educational content to individuals’ unique sexual risk-safety profiles. To date, there are no empirically-derived

typologies of the patterns of sexual risk and safety strategies of young adult men. In this exploratory study, we applied LCA to 18 to 25 year old heterosexually active men's self-reports to address two main research questions regarding their sexual safety strategies. The first was: Can we identify profiles, based on men's behaviors and partner-related contexts, that summarize their strategies for safety and likely exposures to risk in a concise manner that can inform STI prevention? We came from the theoretical perspective that partner-related context factors help shape men's sexual risk reduction behaviors, including both condom use and communication-based strategies (i.e., discussing sexual histories, testing for STIs, agreeing to be monogamous, and discussing birth control). Our second research question was: Will the profiles identified be differentially associated with demographic variables such as age, SES, and race/ethnicity?

Method

We collected data in an online study investigating factors influencing men's sexual beliefs and behavior. The project began with qualitative interviews of 27 young men to inform measure development, and we pilot tested the online survey with 28 participants. We then programmed an online survey using Illume software, a product of the survey company DatStat, Inc., which hosted the survey on secure servers. Men who completed surveys received a \$40 check for participation. The University of Washington's Institutional Review Board approved all procedures. Other analyses based on the study's qualitative and quantitative data have been reported elsewhere (Masters, Casey et al., 2013; Morrison, Masters, Wells, Casey, Beadnell, & Hoppe, in press).

Recruitment

Recruitment occurred from mid-December 2010 to mid-June 2011. We placed online advertisements on Facebook and Craigslist which invited men to "share [their] views" for a "web survey on relationships with women." Eligibility criteria were being 18 to 25 years old, male, currently living in the U.S., having lived in the U.S. during adolescence, having been physically intimate with a woman (defined as touching below the waist or having oral, vaginal, or anal sex), and being interested in having sex with a woman in the future. Given the relative youth of our sample and additional aims of the research program, we specified these last two criteria to include men whose sexual experience had not yet involved intercourse. However, the analyses reported upon here include only men who had had intercourse within the past year. To prevent people answering untruthfully in order to gain eligibility, advertisements did not include specific screening criteria.

Since we aimed for a sample balanced among African American, Asian American, white, Latino, and multiracial or "other" men, we programmed quotas such that participants from each racial/ethnic group were ineligible once 100 surveys from their group had been completed and submitted.^a Three photo options used in the advertisements represented a range of apparent racial/ethnic identities. Because recruitment among African American, Latino, and Asian American men was initially slower than among white and multiracial or "other" men, we used U.S. Census data to target advertising to 14 urban areas around the U.S. with more concentrated populations of these racial and ethnic groups (e.g., Atlanta and

Chicago for African American men, Los Angeles and Miami for Latinos, and Honolulu and Los Angeles for Asian American men). Ads were presented in each of these areas for one week. Some men in the final sample were recruited through regionally-targeted ads and others through non geographically-specific recruitment, though to preserve confidentiality, information on participants' recruitment regions was not retained.

Participants

Six hundred and sixty-two men began the survey. Fourteen cases were excluded during data cleaning (described below) for suspicious response patterns. One hundred and twenty-nine cases were excluded because they dropped out of the survey before answering any of the questions used in these analyses. These 129 excluded men did not differ significantly from those retained in terms of age, race/ethnicity, education, or income. Of the remaining 519 participants, 87 reported not having had intercourse with a woman within the past year and were excluded from analyses, leaving 432 men in the analysis sample. Participants were 19% African American men, 19% Asian American, 21% white, 23% Latino, and 18% multiracial or "other." Their mean age was 20.6 (*SD* 2.06). Thirty-eight percent of participants were not currently students; 4% were enrolled in high school, 55% in college, and 3% in graduate school. We used mothers' education levels as a proxy for SES; 15% of participants' mothers had some high school or less, 25% were high school graduates, 20% had technical/vocational training or some college but no degree, 24% were college graduates, and 16% had graduate or professional degrees.

Survey Methods

Links in the advertisements took interested individuals to a screening survey. Once they had answered screening questions, men were identified as eligible or not, and if eligible, were shown a description of the study and consent information. Consenting individuals then proceeded to the survey. When participants finished the main survey they clicked through to a new webpage where they submitted a name and mailing address to receive payment via check. This separation ensured that names were never linked to data and protected participant confidentiality.

Online surveys can provide opportunities for multiple or careless responding, so we took steps to ensure data integrity. Programming allowed someone using the same IP address and already identified as ineligible to make multiple attempts to be screened as eligible without being screened into the study. Additionally, potential respondents were alerted that payment would be by a check made out to a named person and sent via postal mail, and that only one check per name would be issued. After data collection was completed, we conducted a thorough cleaning to identify cases that were potentially invalid. We 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 dataset. Review was conducted by pairs of authors; all questionable cases identified were then considered by the entire team to avoid deleting valid cases. Fourteen cases were dropped through this process.

Measures

Latent class indicators: Self-reported sexual risk reduction strategies—We assessed condom use frequency with men’s most recent female partner over the past year as *never, occasionally, half the time, often, or always*. Condom use during last sex was measured with “The last time you had sexual intercourse (your penis in her vagina or butt) with this woman, did you use a condom?” (*No or Yes*). These two condom use measures were significantly correlated ($r = .82, p < .001$). To assess use of other, communication-related sexual safety strategies, we asked participants whether they had done the following things with their most recent sexual partner: “Talked about sexual histories,” “Agreed to both get tested for HIV and/or STIs,” “Agreed to have sex only with each other,” and “Discussed whether she is using birth control;” all were answered *No or Yes*.

Latent class predictors: Partner-related context factors—We asked participants, “How many different women have you had sexual intercourse with in the past year?” They answered with a number, which we capped at the top end with 20 reflecting “20 or more.” With respect to the most recent female partner, we asked, “What best describes where you see this relationship heading?” Response options were “We just were physically intimate once and probably won’t ever be again” (0); “We were physically intimate more than once, but will not become romantically involved” (1); “We were romantically involved but are not any longer” (2); “We are romantically involved but we’re getting less serious about each other” (3); “We are romantically involved and we’re getting more serious about each other” (4); “We are romantically involved and I don’t see the relationship as changing” (5); “We’re likely to get married or commit to becoming lifelong partners” (6); or “We are married, or have committed to being lifelong partners” (7). Because relationship direction did not have a perfectly ordinal structure across the 8 response options, we recoded this variable into 3 ordinal categories representing increasing levels of commitment. Categories were *Casual* (responses 0-1), *Romantic* (responses 2-5), and *Committed* (responses 6-7). Finally, sexual concurrence during this most recent reference relationship was measured by asking, “Thinking about the woman you were physically intimate with [and] the time period when you were being physically intimate with her in the last year... During that time, were you ever physically intimate with another woman?” Ordinal response categories were *Never, Once, or More than once* (coded 0-2).

Demographics—To assess race/ethnicity, we first asked, “What is your racial background? Check all that apply to you” with options of “African-American, Black, or African,” “American Indian, Native American, or Alaskan Native,” “Asian, Asian-American,” “Latino, Hispanic,” “Pacific Islander,” “White, Caucasian, European,” and “Other: [fill in the blank].” We then asked, “Of the race and ethnic groups you have selected, which do you consider your primary racial or ethnic identity?” Options were “African-American, Black, or African,” “Asian, Asian-American,” “Latino, Hispanic,” “White, Caucasian, European,” and “Other race/multiracial.” We used mother’s education level as a proxy for men’s SES, asking “What is the highest education your mother (or the person who raised you) received?” Response options were “some high school or less,” “high school degree,” “technical/vocational training,” “some college but no degree,” “college degree,” and “graduate or professional degree.”

Analytic Approach

First, we used LCA with Mplus 7.11 software to identify classes of individuals based on self-reported sexual safety strategies (including condom use) as indicators of class membership. Missing data was minimal and scattered, showing no discernible pattern; we employed full information maximum likelihood (FIML) to include people with some missing data in analyses. Because our theoretical perspective was that partner-related context factors shape the use of these strategies, we included them (number of past year sexual partners, relationship commitment, and sexual concurrency) in the LCA as predictors that were allowed to influence class membership (Carlson, Wang, Falck, & Siegal, 2005). In LCA, this part of the model is a multinomial logistic regression, and as such provides a multivariate test where the influence of each partner-related context factor on profile membership is controlled for the influences of the others. It produces odds ratios, which indicate not only the statistical significance of the effects, but also their magnitude. After selecting the best fitting LCA model, we then reparameterized the multivariate logistic regression to change the reference group to obtain a complete set of odds ratios and significance tests (i.e., a comparison of each class to all the others).

While LCA will often produce classes that have significantly different distributions of responses to categorical variables, it models classes based on all item response patterns simultaneously (rather than variable by variable across classes). Thus, two classes may have statistically significant differences on one variable but not on another. For this reason, difference testing is not typically done for LCA indicators. However, for descriptive purposes, we compared classes on each indicator variable using the Wald test in Mplus (corrected for multiple tests). Finally, we compared classes on members' age, SES/class (mother's education), and race/ethnicity, using F-tests and chi-square tests in SPSS version 19 software. Because multiracial/"other" men do not represent a unitary category, we did not include them in the race/ethnicity comparison portion of the analysis.

Results

Regarding the self-reported sexual risk reduction strategies that comprised our LCA indicators, 25% of the analysis sample ($n = 432$) reported never using condoms, 19% using them occasionally, 12% about half the time, 13% often, and 30% always. Fifty-two percent of participants reported using a condom at their last sexual intercourse. With their most recent partner, 71% of participants had discussed sexual histories, 37% had agreed to both get tested for STIs, 62% had agreed to be monogamous, and 67% had discussed whether the female partner was using birth control. Men in the sample had a mean of 2.82 sex partners in the past year ($SD 3.16$). As expected, partner-related context predictors were correlated, but not highly (correlations among all LCA model variables appear in Table 1).

Latent Class Analyses

We evaluated two, three, and four class LCA solutions; the five class model was not estimatable. Fit indices differed regarding which number of classes was the best solution; details appear in Table 2. After evaluating the overall picture, we chose the 4-class model as having the most informative theoretical meaningfulness. In addition, it had good

classification quality and entropy, suggesting good class separation and model fit (Collins & Lanza, 2010). Both the Akaike Information Criterion and the sample-size adjusted Bayesian Information Criterion continued to decrease up to and including the 4-class solution, suggesting an appropriate balance between parsimony and model fit (Muthén & Muthén, 2000). Both the Lo-Mendell-Rubin adjusted likelihood ratio test (LMR) and the bootstrapped likelihood ratio test (BLRT) compare the fit of a “k class” model to that of a “k-1 class” model, and will become nonsignificant when adding classes begins to decrease fit. In these analyses, the LMR was nonsignificant at 3 classes and significant again at 4 classes, suggesting that either a 2- or a 4-class solution fit adequately. The BLRT, being significant for all models, was not informative.

Sexual Risk-Safety Profiles

Table 3 provides details on the four latent class groups. One group (comprising 12% of the sample), which we named “Risk Takers,” reported low condom use and little use of alternate safety strategies, although many did discuss whether their female partners were on birth control. Men in this group had the highest number of past-year sex partners and were substantially more likely to have had four or more partners than men in other groups. They had the most frequent concurrency and reported predominantly casual relationships. We named the next group (25%) “Condom Reliers;” they reported high condom use and little use of alternate safety strategies. These men had moderate numbers of past-year sex partners, were most likely to report two or fewer past-year partners, and had a fairly high likelihood of concurrency along with a relationship commitment pattern similar to that of the Risk Takers. The third group (28%) reported both high condom use and high use of many alternate safety strategies, with particular emphasis on agreeing to be monogamous and discussing birth control. These “Multistrategists” had the lowest number of partners in the past year, the highest likelihood of having only one partner, the lowest concurrency, and predominantly romantic relationships. We named the last group (35%) “Relationship Reliers.” This group reported low condom use and high use of many alternate safety strategies, and they shared an emphasis on agreeing to be monogamous and discussing birth control with the previous group. Men in this group reported low partner numbers, high likelihood of having one partner, and low concurrency. They described the most committed relationships of any group along with many romantic relationships.

Predictors of Class Membership

Pairwise comparisons indicated many significant differences between groups on number of partners, relationship commitment, and sexual concurrency. These differences are highlighted here and reported in detail in Table 3. Risk Takers had significantly more partners, and were more likely to have four or more past-year partners, than Multistrategists or Relationship Reliers, while Condom Reliers fell in between. Men in the Relationship Reliers and Multistrategists groups were both significantly more likely to have had one past-year sex partner than Risk Takers or Condom Reliers. Men’s assessment of their relationships was more committed among Relationship Reliers than in any of the other groups. Both these men and the Multistrategists were significantly more likely to be in romantic relationships, and less likely to be in casual relationships, than either Risk Takers

or Condom Reliers. The Risk Takers group was significantly more likely to have had repeated sex with another partner while in a relationship than any other group.

The multinomial logistic regression part of the model served as a multivariate test of whether the three partner-related context variables, when controlling for each other, predicted class membership. Reparameterization of the results produced a complete set of odds ratios that, instead of using a reference group, compared each class to all of the others. Being in more committed relationships significantly predicted being a Relationship Relier compared to being a Condom Relier ($OR = 48.24 [15.05, 154.68]$), a Risk Taker ($OR = 33.72 [9.45, 120.39]$), or a Multistrategist ($OR = 2.17 [1.12, 4.19]$). More relationship commitment also predicted being a Multistrategist rather than a Condom Relier ($OR = 22.25 [9.12, 54.27]$) or a Risk Taker ($OR = 15.54 [4.08, 59.19]$).

In terms of number of partners in the last year, having more partners increased the odds of being a Risk Taker rather than a Condom Relier ($OR = 1.12 [1.001, 1.25]$). Finally, having had sex with other partners increased the odds of being a Condom Relier rather than a Multistrategist ($OR = 2.06 [1.09, .3.88]$), and of being a Risk Taker rather than a Relationship Relier ($OR = 2.41 [1.10, 5.26]$) or a Multistrategist ($OR = 3.53 [1.64, 7.58]$).

Demographic Associations with Class Membership

We compared classes on demographic characteristics. Sexual risk-safety classes did not differ significantly in age ($F = .16, (3, 429) p = .92$) or mother's highest level of education ($F = 1.21, (3, 431) p = .30$). Classes did differ significantly from one another in terms of their racial/ethnic composition ($\chi^2 = 21.67 (9) p < .05$). Significantly more Asian American men were Multistrategists, and fewer were Relationship Reliers, than were white men. The proportions of each sexual risk-safety profile group belonging to each racial/ethnic category are presented in Table 4.

Discussion

This study identified four sexual risk-safety profiles based on young men's self-reported sexual risk reduction strategies and partner-related contexts: Risk Takers, Condom Reliers, Multistrategists, and Relationship Reliers. Findings have both similarities with and differences from findings of previous LCAs on sexual risk-safety subgroups. Our Relationship Reliers group was similar in some ways to Lanza and Collins' (2008) Monogamous group, found in a sample of 17-20 year old men and women, our Condom Reliers to their Multipartner Safe group, and our Risk Takers to their Multipartner Exposed group. Similarly, Beadnell et al. (2005) found both Condom User and Risk Taker groups among sexually active high school students of both sexes, but did not identify groups whose sexual safety profiles included non-condom risk reduction strategies. Masters, Beadnell, and colleagues (2013) did include such strategies in their LCA with sexual minority youth aged 14-19, as well as analyzing male and female youth separately. Their male High partner numbers/Few strategies group was similar to our Risk Takers, and their High partner numbers/Many strategies group to our Multistrategists. Their group structure among female youth (Few strategies, Many strategies, and Nearly all strategies, with little differentiation based on average partner numbers), however, was less similar to ours.

Therefore, taking this literature's findings together with those of our study suggests two preliminary conclusions. The first is that emerging adults and younger adolescents may share some sexual risk-safety profiles (i.e. one emphasizing condom use and another that is risky by virtue of condom nonuse, multiple partners, or both), but emerging adults may also fall into profiles involving reliance on relationships for sexual risk reduction, as well as the use of non-condom methods of protection against pregnancy and STIs (e.g., female-controlled birth control, STI testing). Furthermore, a group that is low risk due to not yet being sexually active with partners is less likely to appear among emerging adults than among young adolescents. The second preliminary conclusion is that sexual risk-safety profiles may be more alike within than across gender, though this notion requires further study.

The profiles explicated here provide multidimensional but concise characterizations of how men's risk and safety decisions combine with their relational contexts to produce subgroups of individuals with different patterns of likely exposure to risk. By doing so, these findings suggest a way of thinking about sexual risk-safety that goes beyond condoms and starts to account for some of the contextual factors that may also contribute to men's overall HIV/STI risk. This study's findings have implications for researchers' and clinicians' conceptualization and measurement of sexual risk and safety behavior, and also for the design of tailored HIV and STI prevention interventions.

Although most congruent with the stereotype of young heterosexually active men's behavior (Higgins et al., 2010; Masters, Casey et al., 2013), the Risk Takers group was the smallest identified. This subgroup, about 12% of the sample, was characterized by low use of nearly all sexual safety strategies (including condoms); high partner numbers and concurrency; and more casual, and fewer committed, relationships. Overall, these men's pattern of behavior was likely to put them and their female partners at high risk for STIs. In terms of the practical implications of their sexual behavior pattern, this group may constitute the highest priority target for tailored HIV/STI prevention programming when prevention initiatives have limited resources.

Interventions tailored for Risk Takers could do three things. First, they could provide personalized normative feedback about the relatively low prevalence of this behavior pattern. As emerging adults whose identities are still fluid, some of these young men may be especially susceptible to masculinity myths (Clark & Beck, 2011), such as those suggesting that high-risk "player" sexuality is typical and normative. Learning that, in fact, only about one in ten men their age ignores sexual safety strategies while carrying on multiple concurrent or brief sexual relationships could potentially encourage safer behavior patterns (Lewis, Lee, Patrick, & Fossos, 2007). Second, this group's stereotypically masculine sexual behavior (e.g., multiple partners; Seal & Ehrhardt, 2003; Tolman, Spencer, Rosen-Reynoso & Porche, 2003) suggests that they may buy into dominant prescriptions for gender and sexuality more than men in other groups, and that interventions targeting them should take this notion into account. Finally, interventions for Risk Takers could build on the one sexual safety strategy men in this group are somewhat likely to employ: Discussing female partners' use of birth control. The risk of causing a pregnancy may be more salient to some men than the risk of an STI (Davis et al., 2013), so emphasizing condoms as male-controlled

contraceptives, which also happen to protect against HIV/STIs, could potentially increase their use among this group.

This study replicates and extends the findings of Humblet et al. (2003). The present study's Risk Takers subgroup is similar in size to the high risk group (defined by five or more past-year sex partners) among their New Zealand participants. Specifically, their high risk group comprised 10% of the 18 year old men, 14% of 21 year olds, and 13% of 26 year olds. The present study also provides additional information; Humblet et al. focused on differences between higher and lower risk groups and did not identify subgroups among lower risk individuals. It is therefore not possible to compare our findings about the proportion of men in our three remaining, "safer" groups to extant literature.

The Condom Reliers group was made up of the 25% of the sample who used condoms fairly consistently and alternate safety strategies very little. In terms of their partner-related contexts, men in this group were quite similar to Risk Takers, though less likely to have repeated concurrent sex and to report four or more past-year sex partners. However, their consistent condom use seemed likely to offer both them and their partners substantial protection against STIs. Given that condom use was already well established among this subgroup, interventions could support this behavior by providing ready and low-cost access to condoms. Condom Relier men could also potentially benefit from education about the risks to sexual health posed by partner concurrency (Morris et al., 2009), which are decreased but not eliminated by typical (that is, less than 100%) condom use.

About one quarter (28%) of the participants, the Multistrategists group, showed relatively low probable risk due to their use of both condoms and alternate sexual safety strategies. Furthermore, these men's partner-related contexts exposed them to relatively low likely levels of HIV/STI risk: They had lower partner numbers and less frequent concurrency than men in any other subgroup. Overall, Multistrategist men's behavior patterns seemed sexually safe for both themselves and their female partners. Interventions directed at them might help them maintain their protective patterns and also practice sexual safety strategies in truly effective ways. For example, simply agreeing to get tested for STIs is not in itself protective against them; rather, testing must actually take place, and if one or both partners is infected, effective risk reduction will also require treatment and a period of abstinence or condom use.

The largest group we identified, 35% of our sample, was the Relationship Reliers. These men described very little condom use, high use of many alternate safety strategies, and low partner numbers and concurrency. Their relationships were more likely to be committed than those of any other subgroup. Taken together, the behavior patterns of Relationship Relier men seemed likely to provide sexual safety for themselves and their female partners, with two important caveats. First, monogamy as a sexual safety strategy requires sustained commitment from both partners. When a man's main protection against STIs is a monogamous relationship, the relationship transitions that are common among emerging adults (Clark & Beck, 2011) can create sexual health risks. For example, say a Relationship Relier breaks up with his girlfriend and begins to briefly date a sequence of women whose STI status is unknown to him, while continuing his habit of not using condoms. Even if he

eventually settles back into a monogamous pattern with a new woman, his exposure to STIs will be greater during this unpartnered period. Second, a relationship in which one partner has outside sex may be perceived by the other partner as monogamous (Drumright et al., 2004) while still carrying increased risk of STI transmission. Men in this group might therefore be counseled that should their relationship context change, condom use would be well-advised. However, clinicians can meet such men where they are by acknowledging the utility of genuine monogamy as protection against STIs rather than applying one-size-fits-all encouragement of condom use in every situation.

Creating and maintaining satisfying sexual relationships is associated with human health and happiness generally (Diamond & Huebner, 2012), and this study's findings suggest a strong link between committed relationships and sexual safety patterns likely to be lower risk. Men's ratings of their relationships' commitment was not only a significant predictor of subgroup membership, but one with noticeably large effect sizes in terms of the odds ratios. In contrast, the effects of partner numbers and concurrency were significant but often smaller. Said differently, two of the groups likely to be lower risk (Relationship Reliers and Multistrategists) were, for the most part, in romantic or committed relationships, whereas the other two groups were very likely to be in casual relationships. This finding suggests that relationship skills-building interventions, by providing tools for succeeding in committed, romantic relationships, have the potential to influence men's sexual behavior in ways that may lead to lower risk behavior patterns. They may do so, in part, by increasing relationship stability and satisfaction and thus decreasing men's likelihood of switching partners frequently or having concurrent partners.

Sexual risk-safety profiles did not differ significantly from one another in age or socioeconomic class, and differed in only minor ways in terms of their racial/ethnic composition. Five racial/ethnic groups were represented in the sample in roughly equally proportions. Because it did not represent a unitary category, the Multiracial/"other" group was not included in follow-up analysis, which compared latent class groups on their proportions of African Americans, Asian Americans, Latinos, and whites. If there was no association between class membership and race/ethnicity, we would expect to see roughly equal proportions of each racial/ethnic category within each class, and indeed, this was the overall pattern of our findings. While we found that Asian American men were significantly overrepresented in the Multistrategists group, and underrepresented in the Relationship Reliers group, compared to white men, there were no significant differences between any groups' proportions of men of other race/ethnicities. Previous research (e.g., Blum et al., 2000; Mahay et al., 2001; Meston & Ahrold, 2010; Upchurch et al., 1998) has found racial/ethnic group differences in sexual risk behavior, which led us to test for such differences here. However, our findings suggest more similarity than difference in the distribution of men from different racial/ethnic groups within sexual risk-safety profiles. Several explanations could account for this finding. Other studies have looked at single sexual behavior variables rather than profiles that simultaneously characterize patterns of behaviors. These studies also did not examine racial/ethnic group differences in the same sexual safety strategies that made up our sexual risk-safety profiles. Regarding STI/HIV prevention programs, our finding of similarity suggests that interventionists avoid drawing

conclusions about men's level of sexual risk based mainly upon their racial/ethnic group membership.

Limitations

Limitations of the current study include sample characteristics that bound its generalizability and also measurement issues. Since men were recruited and took part in the study online, all participants were Internet users. Although most men in this age group do use the Internet (Pew Research Center, 2013), results may not be generalizable to men who do not. Our use of Facebook and Craigslist for recruitment advertising means that we drew our sample from those populations rather than from the general U.S. population. However, mathematical modeling of the demographics of Facebook suggests that the racial/ethnic distribution of users is similar to that of the U.S. population (Chang, Rosenn, Backstrom & Marlow, 2010). Since Craigslist users remain anonymous when examining postings, we have no way of estimating this population's demographics or how recruiting from it may limit generalizability. Furthermore, participants were not randomly selected from the population, but chose to participate in response to our advertising. Volunteers for sexuality-related research tend to have more sexual experience than non-volunteers (Strassberg & Lowe, 1995), so our sample may contain this bias.

Several measurement issues also limit the study. Though we employed strong monitoring and data cleaning procedures, we cannot be certain whether some cases of invalid responding to the online survey occurred without detection. Also, we used a measure requiring retrospective recall of past year condom use, which some literature suggests is problematic (McAuliffe, Difranceisco & Reed, 2007). However, other work suggests that condom use at last sex, also used here, is a reliable measure (Venable et al., 2009) and related to retrospective measures (Younge et al., 2008), and indeed, the two measures were correlated in our sample. The wording of our sexual safety strategies measure asked if men had "discussed" a female partner's birth control usage or "agreed" to get a STI test, rather than if these behaviors had actually occurred. Finally, our measures of sexual risk reduction strategies focused on those used with men's most recent partners. Being partner-specific, they thus may not have captured the totality of men's risk over the past year.

Future Research

This study suggests three main directions for future research. First, its focus on heterosexually active men was appropriate given that this group's sexual risk-safety patterns had not yet been characterized multidimensionally. However, applying similar latent class techniques could also enhance understanding of heterosexually active young adult women's sexual risk-safety patterns. In addition to providing information about variability among women, such research would allow for the investigation of gender differences and similarities. Second, although age was not related to sexual risk-safety profiles in this cross-sectional analysis, it seems likely that individuals' profiles might change as they develop from adolescents into adults. A longitudinal study could characterize sexual risk-safety trajectories and identify factors associated with moving from riskier to safer sexual behavior patterns, or vice versa. Finally, incorporating biological STI testing into future studies would

enable direct examination of which profiles are associated with disease acquisition, which would validate our theoretically-informed characterization of the profiles as riskier or safer.

Conclusion

Our findings emphasize the importance of accounting for both partner-related context and sexual safety strategies beyond condom use when assessing sexual risk-safety. Although condoms are widely available and their use almost universally encouraged, young people in the U.S. nonetheless remain at high risk of STIs (CDC, 2012; Weinstock et al., 2004). Many people, both male and female, believe that condoms limit physical sensation and emotional intimacy (Higgins & Hirsch, 2008) and seek to avoid their use when possible. Further, our findings suggest that exclusively emphasizing condom use as a sexual safety strategy may be redundant for some men (i.e., men in the Condom Reliers group), and perceived – whether accurately or not – as irrelevant by other men based on their partner-related context (particularly the Relationship Reliers group). Thus, extending clinicians' and intervention designers' conceptualization of sexual risk-safety beyond condoms has the potential to significantly improve prevention. The next wave of STI and HIV prevention interventions should certainly continue to encourage condom use, but should also include information on how partner-related contexts and alternate sexual safety strategies can help people reduce their risk and that of their partners.

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Table 1
Correlations Among LCA Model Variables

	1	2	3	4	5	6	7	8	9
1. Condom use frequency	—	.81**	-.11	-.04	-.15	-.00	-.10*	-.28**	-.09
2. Used condom last intercourse		—	-.15**	-.07	-.15**	-.07	-.11*	-.24**	-.12*
3. Discussed sexual histories			—	.23**	.29**	.25**	.00	.29**	-.05
4. Agreed to get STI tests				—	.28**	.25**	.01	.20**	-.01
5. Agreed to be monogamous					—	.32**	-.12*	.56**	-.22**
6. Discussed whether she is on birth control						—	-.04	.24**	.03
7. Number of sex partners in past year							—	-.19**	.23**
8. Relationship commitment								—	-.15**
9. Sexual concurrency									—

* $p < .05$,

** $p < .01$

Table 2
Comparing LCA Model Fit (n = 432)

Model	BIC _{ssa}	AIC	Entropy	Class Sizes	Classification Quality	LMR	BLRT
2-class	7505	7478	.93	226, 206	.98, .99	***	***
3-class	7307	7267	.91	116, 119, 197	.96, .95, .96	ns	***
4-class	7258	7207	.90	151, 52, 119, 110	.93, .88, .95, .97	***	***

Note. BIC_{ssa} = Sample-size adjusted Bayesian Information Criterion, AIC = Akaike Information Criterion, LMR = Lo-Mendell-Rubin adjusted likelihood ratio test, BLRT = Bootstrapped Likelihood Ratio Test.

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$

Table 3
Sexual Risk-Safety Profiles Among Heterosexually Active Young Men (n = 432)

	Latent class groups				Omnibus χ^2 (df = 3)
	Risk Takers (12%)	Condom Reliers (25%)	Multi- strategists (28%)	Relationship Reliers (35%)	
Class indicators: Self-reported sexual risk reduction strategies					
	Probabilities				
Condom use frequency					
Never	.44 ^{a,b}	.00 ^{a,c}	.01 ^{b,d}	.50 ^{c,d}	398.06 ^{***}
Occasionally	.23	.09	.03	.35	
Half the time	.20	.10	.15	.09	
Often	.13	.14	.23	.05	
Always	.00	.67	.58	.00	
Used condom last intercourse	.00	1.00	1.00	.00	\ddagger
Discussed sexual histories	.56 ^{a,b}	.49 ^{c,d}	.80 ^{a,c}	.87 ^{b,d}	40.83 ^{***}
Agreed to get STD tests	.17 ^{a,b}	.17 ^{c,d}	.49 ^{a,c}	.49 ^{b,d}	51.86 ^{***}
Agreed to be monogamous	.19 ^{a,b}	.08 ^{c,d}	1.00 ^{a,c}	.90 ^{b,d}	1540.85 ^{***}
Discussed whether she is on birth control	.65 ^{a,b}	.35 ^{a,c,d}	.92 ^{b,c}	.73 ^d	121.43 ^{***}
Sex partners in past year					
One	.17 ^{a,b}	.35	.57 ^a	.52 ^b	19.39 ^{***}
Two	.19	.29	.23	.13	
Three	.21	.12	.13	.13	
4 or more	.43	.24	.08	.21	
Relationship commitment					
Casual	.71 ^{a,b}	.74 ^{c,d}	.08 ^{a,c}	.03 ^{b,d}	275.20 ^{***}
Romantic	.29	.25	.72	.60	
Committed	.00	.01	.19	.37	
Sex with other partner while in this relationship					
Never	.39 ^{a,b}	.54 ^c	.82 ^{a,c}	.69 ^b	36.40 ^{***}
Once	.16	.28	.11	.15	
More than once	.45	.18	.07	.16	

Note. Shared superscripts in the same row (per variable) indicate pairwise differences in response patterns that are significant at $p < .008$ ($p < .05$ after Bonferroni correction for 6 comparisons among 4 classes, or $.05/6 = .008$).

Omnibus statistical difference tests, and pairwise tests as indicated by the superscripts, are based on posterior probability-based class assignment in Mplus version 7.11.

For descriptive purposes and for consistency with the top panel, the table's bottom panel shows predictors by the percent of people answering each possible response; these numbers were obtained from SPSS (version 19) based on most likely class membership.

* $p < .05$,

**
 $p < .01,$

 $p < .001$

† Probability distribution makes test non-estimatable; differences between Risk Takers and Relationship Reliers (.00 probability of condom use last intercourse) and other 2 groups (1.00 probability) are presumably statistically significant

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Table 4
Proportions of Each Sexual Risk-Safety Class Group by Race/Ethnicity

Racial/ethnic category (% of follow-up analysis sample [†])	Latent class group			
	Risk Takers	Condom Reliers	Multistrategists	Relationship Reliers
African American (23.7%)	25.5	23.2	20.4	26.3
Asian American (22.9%)	14.9	26.3	34.7 ^a	13.2 ^a
Latino (27.7%)	38.3	23.2	27.6	27.2
White (25.7%)	21.3	27.4	17.3 ^a	33.3 ^a

Note. Shared superscripts in the same **column** denote racial/ethnic categories whose proportions within that sexual risk-safety class group are significantly different using Bonferroni correction for multiple tests ($p < .008$); omnibus $\chi^2 = 21.67$ (9), $p < .05$.

[†]Because they do not represent a unitary category, multiracial/"other" men were not included in this follow-up analysis ($n = 354$).

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